SYSTEM OF MEDICINE

BASED UPON THE

LAW OF HOMŒOPATHY.

EDITED BY

H. R. ARNDT, M.D.

IN THREE VOLUMES.

VOL. III.

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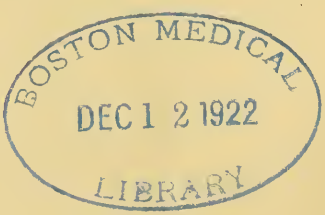

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PREFACE TO VOL. III.

THE issue of this, the last, volume of the "SYSTEM OF MEDICINE, based upon the law of Homœopathy," affords the general editor an opportunity to thank the professional public for the generous reception of the work, and the reviewers for the very courteous treatment which the successive volumes have received at their hands.

The general editor, finding in the success of the work the larger portion of his reward for several years of close application to the task now happily completed, has given careful consideration to the suggestions and criticisms offered from different sources, and it has been his desire to profit from them as opportunity offered. He has done so the more readily since he is painfully conscious of deficiencies which have crept into the work, a fact the full import of which will be understood by those of his colleagues who, at some period of their life, have had the courage to honestly compare results actually obtained, with the hopes and plans which originally inspired the effort. The knowledge that no work so extensive as this, and consisting of the labors of so many persons, can throughout maintain a standard of excellency sufficiently high to present an absolutely symmetrical entirety, or be so carefully planned and so skilfully executed as not to give room for severe criticism, did not by any means lessen the editor's desire to make this work one of permanent value, and a trusty counselor to those for whose use it was designed; nor did he for a moment presume that the former self-evident fact would materially temper the reviewer's pen.

At the very inception of the work the question arose whether to limit its scope to the strictest application of the law of the similars to the morbid conditions which constitute disease, or to include every agent by actual experience in the practice of reliable physicians of our school shown to be useful in the treatment of the sick. The general

editor was fully aware that the former course would secure the hearty commendation of many whom he values highly, while the latter would as surely meet with unmeasured reproach from the same source. Earnestly believing that it is the first and chief duty of the physician to heal the sick, and persuaded that in actual practice it is decidedly unwise to ignore the use of auxiliaries which neither lessen the marvellous usefulness, nor mar the beauty, of the law of cure, he unhesitatingly concluded to accept a plain duty, and to provoke severe criticism rather than publish a work which theoretically might seem perfect, but could not stand the test of actual practice. It is but just to add that expressions of approbation, coming in several instances from sources least expected, have confirmed the soundness of this view.

In order to have the separate articles represent actual experience had by the bed-side, it became necessary to allow each contributor full freedom in the elaboration of his treatment, limiting him only to experiences actually had, to clinical facts repeatedly observed, and to the general plan of this work. Having selected the contributors with particular reference to the experience had by them in the treatment of the various affections upon which they were to write, and fully satisfied of their thorough honesty, the general editor has not in a single case presumed to modify their statements so as to make them accord with his views or to suit the presumed taste or preference of the reader. If, for instance, an experienced and reliable practitioner, as the result of especial study and extensive observation, advised the use of methods lying outside of the limits of the law of homœopathy as usually interpreted, the general editor did not feel at liberty, even if so inclined, to assume the very grave responsibility of changing the original text and of thus robbing the reader of facts which to all appearance were amply substantiated. It is, indeed, a source of especial pleasure to feel that the teachings of this work, if judiciously followed, will by no means lessen the reader's faith in the law of Samuel Hahnemann, but, strengthening his hands, will aid him materially in the application of homœopathic therapeutics to disease, not as it is found described in some books, but as it manifests itself in the sick. The proper development of homœopathic therapeutics, and the welfare of the sick under the care of homœopathic physicians, depend much less upon the elaboration

of plausible theories, of ingenious arguments, or upon the presentation of, often, untenable claims, than upon a careful study of the *totality* of medical science, upon an intimate acquaintance with *all* the resources at the command of the modern physician for the cure of the sick, upon careful observations concerning their relative usefulness, and upon an absolutely honest record made of the facts observed by the bedside of the sick.

In one important particular the general editor felt constrained to vary from the plan commonly adopted by works on the Practice of Medicine, and his determination to do so, even at the risk of inviting criticism, was based upon experience had when serving in the rank and file of the profession as a country practitioner. Physicians who have survived and forgotten the earlier struggles of their professional life, or who live in cities which afford them the benefit of consultation with experienced colleagues or the use of large medical libraries, are not aware of the difficulty often arising in the practice of the country physician, particularly of the young and, often, poor practitioner, from an inability to command desirable counsel or, almost as important, recent works on subjects which lie outside of general, every-day practice, and which are yet liable to arise at the most inopportune moment. Fully aware that to this very large class of practitioners, whose responsibilities are great, whose duties are peculiarly varied and perplexing, and whose success markedly affects our common and most important interests, a work on "Practice" possesses a value far beyond the conception of a city-bred colleague, it seemed exceedingly desirable to incorporate in this work a number of topics which, strictly classified, belong more fitly to a work on surgery, or operative gynæcology, or some specialty. An attempt has, therefore, been made in this work to devote just sufficient, and no more, space to the discussion of several of these topics to enable the general practitioner to judge understandingly what to do in certain emergencies liable to arise at any time, and, more particularly, at what time to refuse further attendance and insist upon transferring a case to the care of the surgeon, the surgeon-gynæcologist, or the specialist. In the treatment of these topics it has been the one aim of the general editor to save the younger men in the profession and those who are occupying isolated fields of practice from the terrible fate of becoming,

through ignorance of facts, the agents of doing irreparable harm rather than good. It is on these grounds that this work contains articles on hernia, intestinal obstruction, ovarian tumors, growths of a malignant character, an epitome of the common diseases of the eye and ear, and others of a similar character. These articles are, of necessity, brief; but they will be found to answer the purpose had in view, and the expressions of appreciation already received from many practitioners of the class indicated, their unsolicited statements that ready access to these articles has been of the greatest possible value to them and their patients, only confirm the correctness of the views which led to their incorporation in this work.

The name of Prof. W. H. Dickinson, M.D., of the University of Iowa, was inadvertently omitted from the list of contributors to Vol. I.; and the article on "Epilepsy," to avoid considerable delay in the appearance of Vol. II., has been incorporated with the constitutional diseases.

The general editor, finally, desires to express his appreciation of the assistance, from colleagues and correspondents, which he has received in the performance of this task; he wishes to especially acknowledge his sense of great obligation to his publisher for the rare patience with which the latter, to his great inconvenience and considerable pecuniary loss, has waited for the completion of this work almost two years beyond the time originally specified for the delivery of the entire manuscript.

H. R. ARNDT.

Ann Arbor, Mich., March 1st, 1886.

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A SYSTEM OF MEDICINE.

DISEASES OF THE SKIN.

BY T. M. STRONG, M.D.

ERYTHEMA.

Synonyms.—Rubor, Combustio, Inflammatory blush; (Ger.) Hautröthe; (Fr.) Erythème, Dartre érythémoïde.

Definition.—This term is used to designate a superficial congestion of the skin, either limited or diffused, with an occasional exudative lesion.

Ætiology.—The disease may be either idiopathic or symptomatic, the latter passing under the name of roseola, and occurring after vaccination, during teething, from gastric disturbances and other causes. It is also observed in many cases of diphtheria, and may be mistaken for scarlatina.

The leading causes of erythema symptomatica are: mechanical injuries to the skin; high temperature; various medicaments; continuous applications of wet compresses; moistening of the skin with urine, liquid stools, and sweat; irritation from clothing.

Symptoms.—There are three general forms of idiopathic erythema, viz., *E. simplex*, *multiforme*, and *nodosum*. The first consists of a patch, or patches, of reddened skin, varying in degree, which disappear temporarily under pressure, while the lesions differ in size and shape, according to the extent and degree of the hyperæmia by which they are induced. The eruption usually disappears in a few hours or days, with the exception of a so-called chronic form of the E. simplex, appearing upon the face, and accompanied with a slight amount of desquamation.

The *intertrigo* of children is a progressive state of erythema, in which the epidermis has become detached.

Papules, raised rings, vesicles or bullæ may form, and then we have *E. multiforme* with its various species of papulosum, vesiculosum, and tuberculosum, although the hyperæmic condition is the main factor in all. This form is located, as a rule, upon the forearms, hands, dorsum of the feet, and thighs. The eruption appears in a symmetrical

manner upon each limb or side of the body attacked. It may also appear upon the forehead in the form of macules or maculo-papules.

The course is acute; the affection disappears after a few days or weeks, leaving, perhaps, traces of a slight desquamation. There are also present general symptoms of burning rheumatic pains, gastric derangements, and malaise. It is most likely to occur in spring and autumn, also in early adult life and in women.

E. nodosum has been described by many writers as a separate disease, but is undoubtedly related to the disease under discussion. There is an eruption of round, more or less elevated, node-like blotches with ill-defined edges, which are reddish at first, but later assume a dark-colored, faded, yellowish hue; hence the name of *dermatitis contusiformis*, under which this disease is sometimes described. It generally appears upon the extensor side of the limbs, and is accompanied with burning pains, tenderness on pressure, and, later, with desquamation.

There is no suppuration unless some external violence occurs. The nodules sometimes remain after the redness has passed away. The course is usually mild, but may be prolonged by successive outbursts of the eruption. This eruption is frequently complicated with pleuro-pulmonary and rheumatismal manifestations.

The raised round tumors or nodes along the extremities distinguish this form from *E. multiforme*. The ætiology of this form is not definitely known.

Varieties.—Here, as in other cutaneous eruptions, we find a multitude of names to express advancing processes of one general primary condition, viz., hyperæmia. Thus the "chilblain" is known by the name of E. perneo; the prodromal condition of the skin in bed-sores as E. paratrimmum. When the eruption takes on a circular form, or is due to the effects of the sun, poisons, and other causes, we have the terms annulare, circinnata, iris, solare, and venenata.

The three principal varieties have already been described.

Diagnosis.—The diagnosis will have to be made between E. simplex, erysipelas, and erythematous eczema.

In erysipelas the greater heat, with sharp circumscribed and infiltrated edges, will determine, while the moist, discharging surface decides the eczema.

E. multiforme may be confounded with urticaria, eczema, papulosum, and lichen planus, while erythema gyrata may be mistaken for herpes iris.

The presence of violent itching and burning, with wheals, and the less distinct form and color of the eruption favors urticaria.

The absence of severe itching, the larger size of the papules, as well as their irregular shape and form, decides against eczema. Herpes iris has been considered as an advanced stage of E. multiforme, the

presence of vesicles marking the distinction; the two stages are often seen merging into one another. E. nodosum may be confounded with bruises, cutaneous abscesses, and, when upon the tibia, with syphilitic nodes.

Treatment.—The removal of the exciting cause in E. simplex is, as a rule, the only thing necessary. The tendency in some persons to develop an erythematous condition upon the slightest provocation would seem to point to the existence of a constitutional cause.

The diet should be light and of easy digestion, all stimulating food and drink being avoided. The skin should be thoroughly cleansed, but soaps containing an excess of alkalies must not be used. In the treatment of intertrigo, benefit is obtained by using powdered applications, starch being the simplest as well as the most efficacious.

For the itching, equal parts of alcohol and water, or carbolic acid, one to two drachms to the pint of water, will prove serviceable.

Consult: Aconite, Arnica, Belladonna, Chloral hydrate, Ledum, Lycopodium, Mercurius, Mezereum, Petroleum, Rhus, Sulphur.

URTICARIA.

Synonyms.—Nettle rash, Hives, Cnidosis, Lichenurticatus; (Ger.) Nesselausschlag, Nesselsucht or -fieber; (Fr.) Urticarie, Fièvre ortiée.

Definition.—Flat, transient, elevated blotches called wheals, irregular in size and shape, whitish, pinkish, or reddish in color, and surrounded by diffuse redness.

Ætiology.—Urticaria is undoubtedly due to an inflammation or irritation of the terminal nerves, but the modus operandi is not clearly shown, and hence it has been considered by some as a neuralgia of the skin. The stinging by bees, fleas, and other insects; contact with nettles (urticaria urens); intestinal irritation from eating shell-fish, tainted fish, honey; mental emotions, such as fright and anger; uterine irritation during pregnancy or menstruation, together with various forms of diseases affecting the uterus, have been recognized as exciting causes. Many drugs, when taken in poisonous doses, produce an eruption similar to urticaria; such drugs are Quinine, Valerian, Copaiba, Hyoscyamus, Chloral, Salicylic acid. It has been observed also in connection with helminthiasis, and often seems to depend on individual peculiarities which cannot be explained.

Symptoms and Course.—The eruption, as a rule, appears suddenly, and may disappear in the rapid way, or, in many cases, more slowly. It may last only a few hours, or a few days, but may return at frequent intervals until radically removed. No desquamation is present, except in very few cases. It may occur in the course of other diseases, thus necessitating the distinction between urticaria as a primary condition and as a complication. The eruption, or wheals, may

be isolated and few, or numerous and closely packed together. The itching and burning sensations are very intense, and the scratching induced thereby causes a serous effusion upon the wheals, rendering the lesions more persistent, changing them into papules. Œdema of the skin may precede the eruption of the wheals, but gives place to the latter in a day or two. Sometimes there occurs an effusion of blood into the wheals which, upon the subsidence of the latter, leaves a purple stain.

Varieties.—Urticaria is acute or chronic. The former depends upon temporary gastric disturbances, and is often attended with general malaise, frequent pulse, and gastric symptoms. The latter develops insidiously, while the patient appears to be in good health.

At times the eruption may make its appearance at regular intervals, giving rise to the theory of a malarial influence.

Several varieties are mentioned by writers on this subject. Among them are *U. papulosa*, which is commonly seen in children, and characterized by lichenoid papules which remain after the disappearance of the wheals, the latter being small.

When the eruption is large, we have the *U. tuberosa*. In *U. pigmentosa* we have a yellowish elevated patch, the discoloration remaining a long time after the disappearance of the wheals. The *U. vesiculosa* is characterized by the appearance of vesicles upon the wheals.

Diagnosis.—Urticaria can be, as a rule, easily recognized by the sensation of pricking, burning, and stinging, and the sudden appearance of the efflorescence, but in some instances may be mistaken for *erythema multiforme*.

The papular form of urticaria may resemble *scabies* and *eczema papulosum* and *E. tuberculosum*. The absence of intense itching, and the history of the papules, will differentiate between urticaria and erythema.

In *erythema nodosum*, which may resemble *U. tuberosa*, the tumors are firmer, more persistent, and are unattended by itching.

Prognosis.—An acute attack due to indigestion may pass away in a few hours, but the frequent indulgence in a diet provoking such attacks may lay the foundation for a chronic condition which often proves very unmanageable.

Treatment.—If the irritating substance is still present in the stomach, an emetic should be given. The diet, in persons subject to these attacks, should be light and easily digested.

In the lighter or transient forms no medicines will be required, the removal of the cause being sufficient. For the more persistent conditions the remedy may be selected from the following: Aconite, Apis, Antimonium tart., Arsenicum, Belladonna, Bryonia, Calcarea, Chloral hydrate, Dulcamara, Hepar sulph., Pulsatilla, Rhus, Sulphur.

FURUNCULUS.

Synonyms.—Furuncle, Boil; (Ger.) Blutschwär; (Fr.) Furoncle.

Definition.—A deep-seated inflammatory disease characterized by one or more circumscribed, pointed, painful subcutaneous abscesses, which usually terminate in suppuration.

Ætiology.—Low depraved states of the system from excessive fatigue, nervous depression, improper food and exercise, or any cause inducing general debility. It often occurs after acute diseases, fevers, or prostrating diseases with septic conditions. Furuncle may occur at any time of life, but is more common in youth and old age. The causes may be local in some cases, depending upon friction, contusions, or other injuries, added to constitutional predisposition.

Symptoms.—One or more boils may occur at one time, or they may follow each other in succession, appearing isolated or at distant points. The first indication is a small induration in the skin, which is very tender to the touch, and has a limited inflamed area. It reaches its full development of increased redness, heat, and tumefaction within a few days, presenting finally a circumscribed suppurative centre, called the "core." The length of time required to complete the suppurative action varies from a few days to several weeks. The size of the furuncle varies, the discoloration being more intense in the centre, fading away towards the edges. The pain is throbbing, deep-seated, and apt to be worse at night; it is relieved when suppuration has occurred. Any portion of the body may be attacked. Constitutional disturbances, to a greater or less degree, are generally present.

Diagnosis.—The disease most resembling furuncle is the carbuncle or anthrax. The single suppurative centre, the pointed shape, the small size, the excessive sensitiveness to the touch, the comparatively rapid course, and the absence of grave constitutional symptoms which often accompany anthrax, will favor the diagnosis of furuncle. Circumscribed furuncular abscesses of the groin must not be confounded with buboes.

Prognosis.—When the furuncles appear in succession, they are apt to prove rebellious, and when numerous, may seriously impair the general health.

Treatment.—For the single furuncle very little treatment is required, but when occurring in debilitated constitutions, a tonic regimen, with a generous diet of milk, cream, eggs, and fresh meat should be allowed. In prolonged furunculosis, change of climate, habits of life, etc., are to be recommended. If resolution or suppuration is not reached promptly under internal treatment, poultices should be applied. Some authorities claim that poultices lengthen the course of the disease; nevertheless, when suppuration is inevitable, their use certainly relieves the distress and pain accompanying the inflamma-

tory symptoms. The use of the lancet should be deferred until the boil is fully "ripe," otherwise reparative action will be very much delayed.

Consult: Apis, Arnica, Arsenicum, Belladonna, Hepar sulph., Mercurius, Nitric acid, Silicea, Sulphur.

ANTHRAX.

Synonyms.—Carbunculus, Carbuncle; (Ger.) Brandschwär.

Definition.—A firm, more or less circumscribed, cutaneous or subcutaneous abscess, accompanied with phlegmonous inflammation, deep-seated pain, induration, and sloughing, leaving a persistent cicatrix. The term anthrax has also been used to designate the condition known as splenic fever, murrain and charbon, but is used here to describe the common and well-known carbuncle.

Ætiology.—The causes of anthrax are not well known. It occurs in persons who are broken down in general health, and not necessarily in those who are intemperate. It is found more often in men than in women, and in later than in earlier life. The general causes are, undoubtedly, very similar to those giving rise to the furuncle.

Symptoms.—General systemic disturbances usher in the attack. The skin becomes painful, hot, and tender, with a circumscribed reddish inflammatory infiltration extending deep into the skin. In a few days the inflammation reaches its height, and the discoloration becomes darker. The tissues finally soften and break down in numerous places, forming centres of suppuration from which issues a yellowish, sanious fluid. The whole indurated mass eventually becomes a slough, which is thrown off entire or in pieces. The resulting ulcer is slowly filled by granulation, leaving a discolored cicatrix. The course of the disease varies according to the age, general condition, or recuperative power of the patient. The favorite localities are the neck, shoulder, back, and buttocks.

Diagnosis.—In the early stage anthrax may be mistaken for erysipelas, but later the circumscribed swelling with hardness and peculiarly severe, burning pain, will determine the condition. From furuncle it may be known by its flatness, density, slower development, larger size, multiple points of suppuration, the character of the slough, the comparative absence of tenderness, and the severity of the pain.

Prognosis.—The prognosis should be guarded, especially in the early part of the disease. In old people and broken-down constitutions the termination may be fatal.

Treatment.—Such hygienic measures as may be suited for each individual case. Cold water dressings are serviceable in the earlier stages, but later, when suppuration is threatening, hot fomentations

or poultices materially assist the process. After suppuration is established, a weak Carbolic acid wash may be applied once or twice a day. When gangrenous processes are present, disinfectants should be used. As mechanical treatment, crucial incisions or injections of Carbolic acid have been recommended. But we would utter a word of caution against the already too frequent use of mechanical measures in furunculous disease.

Consult Apis mel., Arsenicum, Belladonna, Carbo veg., Hyoscyamus, Lachesis, Lycopodium, Mercurius, Nitric ac., Rhus, Secale corn., Silicea, Stramonium, Sulphur.

FURUNCULOUS AFFECTIONS.

Pustula Maligna, Malignant Pustule.

This is a boil-like inflammation with a marked tendency to gangrenous degeneration, and results from poisons received by contact with certain animals affected with the "charbon," "murrain," or "anthrax." This inoculation takes place through abraded surfaces, although it is said that the disease may arise by eating the flesh of cattle so diseased. This contact may occur during the life of the animals or in handling their carcasses. The first appearance is a dark-colored papule with induration of surrounding tissues. In a few hours the papule becomes a dark-colored vesicle with a hard erysipelatous areola which may spread with great rapidity. As the swelling increases, the cuticle becomes raised by effusion under it, and sloughing ensues.

The constitutional symptoms are at times very marked, the pain excessive, symptoms of blood-poisoning predominate, and the patient dies in coma; if recovery takes place, the sloughing is followed by a healthy granulating surface.

Cauterizing and the application of charcoal poultices, together with a generous diet and a liberal allowance of stimulants, are valuable adjuncts in the treatment.

Consult Arsenicum, Lachesis.

PUSTULA ALEPPENSIS.

Synonyms.—Bouton d'Alep, Aleppo bouton, Boil or evil, Delhi boil, Beskra bouton.

Under these various names writers have described certain chronic endemic diseases which resemble one another, and are found in Arabia, India and Africa. They are epidemic in their character, and are probably allied to the furuncle, although running a more chronic course.

It is a chronic inflammatory infiltration of the skin, marked by painful nodosities, affecting the face, hands and other portions of the

body. It begins with a small red spot, and develops into an indurated swelling which becomes a pustule with a dry, brownish crust, terminating in ulceration, the ulcers having thickened edges with foul granulations. This disease occurs but once in a lifetime, but lasts for several months, the ulcers finally healing with deep scarring.

The discharges seem to possess the power of propagating the disease, especially among soldiers or in crowded centres of population. Dr. Hyde thinks that several different disorders have been included under these titles, such as lupus, syphilis, and conditions due to vegetable parasites. Personal inspection of the endemic disorders of Arabia and the African coast had failed to convince him that the numerous furuncular, and other, affections differ from similar lesions observed in temperate climates, except that they are greatly aggravated by filth, meagre diet, intense heat of climate, ignorant and vicious medication, and the syphilitic diathesis.

Cauterization with strong Nitric acid or Potassa fusa may aid in controlling the process, together with the use of emollients and cleanly habits.

HERPES.

Definition.—An acute inflammatory affection marked by the presence of one or more groups of flattened vesicles, filled with a serous fluid seated on an inflamed and sensitive base, appearing generally upon the face and genitals, and following a definite and short course. Its causes are not clearly defined.

Symptoms and Course.—Herpes may appear idiopathically or in the course of other diseases, as fevers, pneumonia, etc.

The eruption may be preceded by slight malaise and fever. The vesicles are larger than those of eczema, but smaller than those of herpes zoster or zona, a disease with which herpes is often confounded.

The vesicles rupture in a very few days, and the serous contents dry into thin crusts or scabs. These are soon thrown off, and leave behind reddish excoriations or stains which promptly disappear.

When appearing upon the genitalia, small ulcerations may result which have a tendency to increase if not promptly treated, and under these circumstances they may be mistaken for venereal sores.

In some persons there is a tendency for the eruption to recur frequently upon the penis, especially after coition.

If the disease from any cause should prove obstinate, the vesicles may assume a darker appearance, the fluid being thicker and cloudy, and the resultant crusts surrounded by hyperæmia and circumscribed œdema. The subjective symptoms are not usually severe, being marked by a moderate itching, burning and heat.

Varieties.—These are due more to the location and cause than to

any distinct characteristics of one form over another. We have H. febrilis, facialis, or labialis, as the disease occurs upon the lips or mouth, the "cold sore"; H. iris, or circinnatus, from the variegated coloring or circular form of the groups; H. progenitalis* or preputialis, occurring upon the genitals; H. gestationis, a form which occurs in some women at every pregnancy, generally about the seventh month, and continues until full term. In the latter case the eruption appears upon the lower extremities and may assume a bullous form.

Diagnosis.—The superficial and grouped character of the vesicles, abrasions, or ulcerations, with the sudden appearance after a little burning or pain, distinguishes the eruption from syphilitic infection. H. gestationis bears a resemblance to papulo-vesicular eczema, if it might not with equal justice be assigned to the latter form of eruption.

Prognosis.—As a rule, recovery is prompt. In the preputial form relapses may occur. This form is of particular interest since the abrasions may furnish an entrance for the syphilitic virus.

Treatment.—Locally, absorbent powders and, when ulceration is present, mild astringents and careful cleansing are to recommended.

Consult Aconite, Arsenicum, Graphites, Hepar, Mercurius sol., Natrum m., Rhus, Sepia, Sulphur.

ZOSTER-ZONA.

Synonyms.—Zona repens or serpiginosa, Cingulum, Ignis sacer, Shingles; (Germ.) Gürtelkrankheit; (Fr.) La zona.

Definition.—An acute inflammatory eruption of large vesicles occurring in clusters on erythematous, sensitive patches, following the tracks of nerves, and accompanied with neuralgic pains.

Ætiology.—Atmospheric changes, exposure to damp and cold and the sudden checking of perspiration have occasioned the disease. At times it would seem as if it were present in the form of an epidemic. It is considered essentially a neurosis, due to inflammation of the sensory roots of spinal nerves. The affection has also been observed as a result of injury of nerve trunks by disease or otherwise.

Symptoms.—The disease is ushered in with slight febrile disturbances and malaise, followed by sensations of heat or darting pains in circumscribed regions. These pains may exist for sometime before the eruption makes its appearance. Erythematous spots which are irregular in shape and size appear, and are followed by small vesicles. The vesicles are in groups and, as a rule, remain separated, but some of them may coalesce and form bullæ of irregular size. The vesicles are flat, and have but a slight tendency to rupture. The surface lying between the vesicles is reddened and painful to the touch.

From transparency they pass to an opaque appearance which

* See Jour. of Cutaneous and Venereal Diseases, vol. i, pp. 321, 403.

becomes turbid as the disease advances and the patches begin to fade. The eruption shrivels into small dark crusts which, falling off, leave red stains which gradually fade away; or scars may be present which are more or less distinct, according to the severity of the attack.

The disease usually runs its course in two weeks, but it may be more protracted. The early rupture of the vesicle, or a cachectic constitution in the patient, may produce an ulcerated condition difficult to heal. The eruption may vary somewhat and the vesicles be few or numerous and transient, or may be transformed into bullæ containing sanguino-purulent fluid. Severe neuralgic pains usually accompany the eruption, being most severe in the aged and debilitated. It is usually confined to one side of the trunk, rarely appearing upon both sides at once. It may appear upon other parts of the body, such as the forehead, side of the face, or neck. Or, instead of following a normal course, the eruption may take on a purpuric or hæmorrhagic condition in some of its groups. The course is acute, though variable in duration, and generally terminates in recovery. It is met with in both sexes, in children and adults, and is more prevalent in winter than in summer. The disease rarely occurs more than once in a lifetime.

Diagnosis.—H. zoster may be mistaken for erysipelas, eczema, pemphigus, or H. simplex. In erysipelas with bullous manifestations the surrounding areola is much more extensive and the color darker, the blebs are larger, less numerous, and not grouped, the margins of the erythematous patches are raised, and neuralgic pain is absent.

In eczema the patches, when present, are not well-defined, the vesicles are smaller and more crowded, and there is itching, but no neuralgia.

In pemphigus the bullæ are never arranged in systematic groups. H. simplex recurs frequently, is liable to spread around mucous outlets of the body and on either side of the latter, while zoster extends from other parts, and is monolateral. Dr. Piffard gives the following diagnostic marks between zoster and herpes.

Zoster.	Herpes.
Zoster is semilateral (with very rare exceptions).	Herpes is frequently bilateral.
Occurs but once (with rare exceptions).	May attack frequently.
Neuralgic pain in the course of the affected nerve.	Pain not neuralgic but of a burning or itching character.
Vesicles large.	Vesicles small.
Fluid often opaque.	Fluid usually transparent.
Vesicles often persist until the fluid is absorbed.	Vesicles usually rupture in a day or two.
Duration from two to four weeks.	Duration from four to ten days.
Lesion often extends to the corium.	Lesion superficial.
Often leaves cicatrices.	Never leaves cicatrices.

Prognosis.—In old and debilitated persons the disease is apt to assume a gangrenous form and to be followed by persistent neuralgia, occurring about the head and eyes, the pain being intense and the result serious. But in ordinary cases the disease is self-limited.

Treatment.—When the affection runs a normal course not much active treatment is required. Poultices and hot lotions are contra-indicated. Applications of oils and starch-powders afford the greatest relief. Zoster is in a sense a self-limited disease; hence we cannot positively ascertain the value of our remedies in shortening its course; yet, it seems proven that intercostal neuralgia is much less frequent under the indicated remedy than otherwise.

Consult Aconite, Apis, Arsenicum, Croton tig., Graphites, Mercurius, Mezereum, Pulsatilla, Rhus tox.

PITYRIASIS.

Synonyms.—Dermatitis exfoliativa generalis, Porrigo or Herpes furfurans; (Ger.) Kleine flechten; (Fr.) Dartre furfuracée volante, Dandruff, Branny tetter.

Definition.—A chronic inflammatory affection with exfoliation of the epidermis in fine, thin, opaque scales, covering a harsh surface of skin which is slightly reddened and infiltrated.

Ætiology.—The causes are obscure. The affection has been traced to a previous eczema, to over-feeding, fatigue, and depression from mental anxiety. In some cases there is considerable derangement of the functions of the liver or female generative organs. Late observations point to the presence of fungi scattered among the horny cells, and, based upon this discovery, the assertion has been made that the disease should be classified as parasitic. To this Dr. Piffard answers that contagion and capability of inoculation should be proven before accepting this theory. The same author places the disease among the results of a "rheumic" diathesis. The constitutional symptoms (which are sometimes quite extensive) of each case follow the eruption and seem to be the result of it. Children from six years of age to puberty are particularly liable to it.

Symptoms.—The name of pityriasis has been given to several different forms of skin disease marked at some stage of the process by the presence of scales, but a closer subdivision has been made by later writers.

Two forms only will be mentioned here, namely, P. simplex and P. rubra. In the former the scales are fine, powdery, thin, dry, and white, the skin being without infiltration and but slightly, if at all, reddened. The scales are readily removed and rapidly replaced, so that we have a dry and continually desquamating surface. The patches of eruption vary in size and may appear anywhere upon the body, but

are most frequent upon the scalp, face, and upper part of the body. On the scalp the eruption constitutes one of the varieties or forms of dandruff. It seldom becomes generalized. Pruritus may be present, but is not so violent as in P. rubra, although at times quite severe upon the scalp.

The second form, or P. rubra, is a more important, although rarer, form. It is also known by the name of dermatitis exfoliativa generalis, and may follow eczema, psoriasis, or pemphigus. Later observations would seem to confirm the statement that the two diseases are distinct.

When the surface covered by the eruption is extensive, febrile symptoms are present as well as distension of the skin. The eruption frequently makes its appearance as large red spots of indefinite and irregular shape, while the skin itches and burns; the redness assumes a yellowish shade when pressed upon. The eruption, before becoming general, appears first as a rule upon the lower extremities, and then extends to the other parts of the body. The scales are more of a flaky nature than branny. The itching is oftentimes very severe and interferes with the sleeping.

There is a marked infiltration of the skin in the beginning, and no papules, vesicles, or discharge are present. Quite a dark-hued pigmentation may be left upon the skin beneath the larger flakes.

Dr. Graham,* writing on dermatitis, states that the principal features may be divided into general hyperæmia, general exfoliation of the epidermis, and severe constitutional symptoms appearing at various times throughout the attack, and, in many instances, tending to a fatal result.

The disease may be divided into an acute and chronic form, and the latter again into dermatitis exfoliativa rubra, and dermatitis bullosa et exfoliativa, in which serous exudation or bullæ precede the exfoliation. The former variety would include pityriasis rubrum, and the latter pemphigus foliaceus.

The course is slow, the patient presenting no changes for years, but finally he loses strength, and may run into a condition of fatal marasmus.

The acute form of dermatitis has a marked tendency to recur.

Diagnosis.—The eruption must be distinguished from eczema squamosum, psoriasis, pemphigus foliaceus, lichen ruber, and possibly tinea circinata and versicolor.

In eczema, when extensive, there is a general feeling of uneasiness and malaise, so that the patient is averse to moving about, while in pityriasis the patient is active and in motion, and only when the disease has existed for some time or has been severe is there a dejected appearance. In eczema the superficial nature and general distribution

* Journal Cutan. and Ven. Dis., vol. i., p. 390.

of the eruption, the absence of thickening of the skin, the presence of moisture somewhere in the course, the peculiar formation and character of the scales, which are scant, adherent, larger, yellowish in color, and semi-translucent, while their rapid production and abundance in pityriasis and the absence, as a rule, of itching and burning will help to determine the diagnosis.

Psoriasis occurs in healthy, and pityriasis in cachectic, subjects. The bleeding surface beneath the scales, the character of the latter, large, thick, and adherent, the thickening of the cutis and the appearance of the affection about the knees and elbows also point to psoriasis. The bullæ will distinguish the earlier stages of pemphigus, but later it is more difficult to draw the lines of difference.

Attention has already been called to the fact that pityriasis rubrum may represent the sequelæ, as it were, of the two latter forms of eruption.

Prognosis.—In its milder form the disease, when not affecting hairy parts, is not intractable; but when the hairy parts are attacked, it is apt to be more chronic, and may cause temporary alopecia.

Treatment.—Alkaline remedies and tonics, baths and emollients, sometimes even continuous inunctions with oil.

An infusion of saponaria bark has rendered good service in some cases.

The application of green soap, followed by tar ointment, this by a mercurial ointment, and finally a bland oily application, are successive steps of a treatment highly recommended.

It is a chronic affection, and a rapid cure must not be expected; hence, frequent changes of remedies should be avoided.

Consult Arsenicum, Graphites, Lycopodium, Phosphorus, Silicea, and Sulphur.

PSORIASIS.

Synonyms.—Lepra' vulgaris, L. Willani, L. Alphos, Herpes furfurans; (Ger.) Schuppenflechte; Dry or scaly tetter, the varieties; Baker's or Grocer's itch, Washerwoman's scall.

Definition.—Psoriasis is a non-contagious constitutional disease of the skin, characterized by slightly reddish, elevated patches, with abrupt edges and rough amorphous scales, which are dry and white with a shining appearance when removed, and occur in layers adherent to the skin, the latter being slightly infiltrated and reddish in color.

Varieties.—The patches vary in size, occur at different parts, and present varied appearances in different spots and under different conditions, so that numerous names have been given to conditions which are but advancing processes of the same disease. Thus, when the

patches are small, being but slightly reddish elevations, they are called *P. punctata;* when larger, and covered with whitish scales like drops of lime, we have *P. guttata;* when circular in form and of the size of medium coin, *P. nummularis;* when the patches coalesce, *P. diffusa;* when the spots become clear in the centre, and extend outwards from the edges, they are called *P. annulare*, *circinata*, *orbicularis*, *lepræformis*, or *lepra vulgaris;* when the patches extend in a sinuous form, *P. gyrata;* when the eruption is extreme, it is called *universalis;* and when obstinate, *P. inveterata.* Wilson considers it a manifestation of eczema squamosum.

Ætiology.—The predisposing cause may be a matter of a diathesis, while the exciting cause has been ascribed to excesses in eating or drinking, fatigue, or mental emotion. Very little dependence, however, can be placed upon these causes. It is not traceable to constitutional derangements, although the appearance of some constitutional disease may for a time suppress the eruption.

While occasionally occurring in persons who are debilitated, the patients, as a rule, seem in the best of health.

"It appears also in some women when in a state of gestation and lactation, and in such cases is the probable result of the debility induced by these conditions, and again in the case of lactation to the withdrawal from the blood of large quantities of fatty materials needed in the system for the purpose of combustion and oxidation."

Ludlam reports a case where a patient suffering with painful menstruation, with the passage of shreds and strips of membrane, was greatly relieved by the appearance of *P. guttata.*

It is a disease of malnutrition of the skin, due to tissue irritation, which may be aggravated and continued by an unhealthy state of the blood.

Transmitted syphilitic poison through one or more generations was suggested by Wilson as an ætiological factor;* the affection has also followed vaccination with bovine virus.

Symptoms and Course.—While psoriasis may occur in any portion of the body, the elbows, knees, hips, scalp, and forehead are the localities most frequently affected. The eruption varies somewhat according to the parts affected. Upon the scalp the scales are large and dry, and the hairs fall freely, but are soon replaced if the disease does not continue too long. Upon the face the patches are smaller, with fine scales. If located near the angles of the lips there may be fissures; on the genitals we find infiltration and fissures, often presenting marked resemblance to eczema. On the palms of the hands and soles of the feet the patches are larger, the scales are thicker, the fissures deep, and there may be a bloody serous exudation.

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* Journal Cutan. Dis., vol. i., pp. 3, 161.

A scaly eruption confined entirely to these parts is almost without exception a syphilide and not psoriasis.*

When occurring in strumous persons, the scales are thick and heaped up, without much congestion at the base; in the gouty diathesis the scales are thin, scanty, and the base red; the former do not itch, while in the latter the itching may prove very troublesome.

The eruption commences with a small spot covered with epidermic scales loosened from their attachment to the cutis. These scales are white in color and, when removed, leave small, red, dry spots, which are slightly infiltrated and occasionally bleed slightly. This infiltration differs from eczema in that the surface underlying the scale is found to be smooth, dry, and not covered with papules and fissures.

From these small spots the eruption may extend into the various forms already described. Many different stages may be witnessed at one and the same time.

The scales are quickly replaced after removal, the deeper layer being more adherent than the superficial. The latter are easily removed by friction, and thus we may have long continued desquamation. Though not characterized by itching, yet, pruritus is occasionally present, and may be the only subjective symptom.

When the progress is towards a cure, the desquamation gradually lessens, the scales become smaller, the underlying surface becomes paler, and the infiltration disappears. The patches may heal in an uneven manner from the centre, or from several different points.

Psoriasis may occur as early as the seventh year, exceptionally before that time; the most common age is between twelve and thirty years. It occurs in all classes of society and in every physical condition. It seems to be worse in winter than in summer, sometimes appearing only in the former season.

Diagnosis.—While the diagnosis of typical psoriasis does not present any difficulty, an imperfectly developed eruption may at times occasion doubt.

From eczema we distinguish it by the locality; eczema prefers the anterior surface of the body, the flexor surfaces of the joints, depressions and angles; psoriasis attacks the posterior surface of the body, the extensor aspect of joints and extremities. On the head psoriasis creeps along the edges of the hair, while eczema spreads over the head and down the face.

From favus, the cup-shaped yellow crusts and brittle condition of the hair will decide.

In lichen ruber the lesions are papular, distinct, covered with a few scales, yellowish in color, and without lustre. When scratched, the patches do not bleed. There is also a general constitutional impair-

* Journal of Cutan. Dis., vol. i., pp. 417, 449.

ment of the health. In lupus the patches are more circumscribed, the scales are scanty and firmly adherent, and there is also a bluish violaceous tint to the eruption.

Seborrhœa rarely appears upon the body, but is located, as a rule, upon the scalp; the crusts are pale in appearance, and the surface underneath does not bleed, and the crusts have an oily feeling when rubbed beneath the fingers. From syphilis and tinea circinata psoriasis can be distinguished with comparative ease by the history in one case, and the smooth circular patches upon the scalp in the other.

Prognosis.—The disease is apt to be chronic. After lasting for months and years it frequently recurs, and may continue to do so for a lifetime. It is non-contagious; rarely, if ever, fatal. From its liability to frequent recurrence the prognosis of a cure should be guarded.

Treatment.—From the tendency of the disease to relapse the treatment is often unsatisfactory.

Prof. Hyde does not hesitate to declare that in many cases no treatment is called for, as, for example, in the extremely indolent cases when the patches exist in middle-aged adults and upon parts of the body entirely protected by clothing.

The diet should be strictly regulated and include a vegetable and fatty regimen.

The cause of the disease being unknown, and the general health of the patient, as a rule, good, treatment will have to be directed largely to the removal of objective features.

The scales should be thoroughly macerated by means of some fatty or oily substance, and these washed off with soap and water, especially when the eruption is extensive. If the eruption is localized, the oil may be applied by means of cloths, and continued for some time, the scales being removed with the curette; or the skin may be rubbed with the sapo viridis until the crusts are removed. Alkaline baths are of service after the scales are removed. The tar preparations are indicated when the disease is more chronic in its form and course. They check the cell-proliferation without stimulating the skin. In young persons, or when the skin is irritable, or in the acute stage, they should be used very carefully at first. Tar in the proportion of one to eight of water may be spread over the surface of the eruption once or twice a day; the pathogenetic symptoms sometimes produced disappear in a few hours when the application has not been pushed to excess.

Pyrogallic acid, chrysarobin, betanaphthal (15 per cent. solution), turpentine, and others, have been recommended, but the probabilities are that the use of oils, sapo viridis, alkaline baths and tar, properly combined with the carefully selected homœopathic remedy, will be quite sufficient.

Consult Arsenicum, Petroleum, Phosphorus, Sepia, Sulphur.

ICHTHYOSIS.

Synonyms.—Fish-skin disease, Porcupine disease.

Definition.—A congenital, chronic, dry, harsh, scaly condition of the skin, with adhesion of the epidermic particles to the derma beneath, the skin being marked by lines and deep furrows.

Ætiology.—Hereditary or congenital, never acquired. (Hebra.) The true causes are unknown. The disease is usually worse in winter. The condition has also been observed in tabetic subjects.

Symptoms and Course.—During the first year of life the skin of the child shows no abnormality except, possibly, harshness or toughness, with a dirty yellowish tinge (xeroderma), provided the infant is kept carefully washed. From this date the disease becomes more marked by the hypertrophy of the skin and the formation of scales. The latter appear upon the extensor surfaces, rarely, if ever, upon the flexors or the face. The elbows and knees are the favored localities. According to the severity of the disease the scales are thinly scattered over the skin, with but slight hypertrophy of the epidermis, or they form a thick, horny covering, with cracks and fissures, dark in color from adhesion of dirt or dust, while the pupillæ are markedly hypertrophied, and the extent of the surface invaded varies greatly. The skin is dry and parched over a considerable extent, while perspiration is almost entirely wanting. As fast as the scales fall off, new formations occur. When the scales are lifted or heaped up, the term I. hystrix is used to designate the fancied resemblance to the quills of a porcupine. The disease may be general or local. Men seem to be more frequently attacked than women.

Diagnosis.—The diagnosis should be made between squamous eczema, pityriasis rubra, and possibly psoriasis. All have redness of the skin, while ichthyosis has a leadened paleness of the integument. In pityriasis there is a fine bran-like desquamation, while in ichthyosis the scales are larger and adherent. When the scales are removed in psoriasis, there is redness of the surface beneath and oozing of blood; in ichthyosis these features are wanting.

Prognosis.—The disease is incurable, but great relief can be given by treatment. It does not endanger life. The time for the most persistent treatment is in early life, when the best chances are afforded for modifying its course, if not for removing it.

Treatment.—Internal and external use of oily preparations, warm baths, friction with castile soap, and vapor baths.

Arsenicum iodat., Aurum, Iodum, Phosphorus. Other remedies are mentioned, but they are of doubtful utility.

LICHEN.

Synonyms.—Herpes siccus, Tinea volatica, Papulæ siccæ, Dry itch; (Ger.) Schwindflechte; (Fr.) Dartre furfuracée volante, Gale séche.

Definition.—By lichen is meant an eruption of inflammatory papules, varying in size, usually of polygonal shape, though generally small, remaining unchanged, and generally accompanied by severe itching, and with a wrinkled, thickened condition of the skin. The papules are dry throughout their course.

Varieties and Symptoms.—Several eruptive manifestations which were formerly included in the generic term lichen have been transferred to other classes. Thus, what was formerly known as lichen simplex is now called eczema papulosum, and under this we have the divisions circumscriptus, tropicus, agrius, urticatus, etc., according to the location or extent of the eruption. Lichen scrofulosus seems to be nothing more than an aggravated attack of lichen simplex, occurring in strumous subjects, since we have marked glandular complications in connection with the eruption. The form known as lichen ruber (planus) is marked by sharply defined papules with flat apices, often umbilicated, of a livid or dark-brown color with shining surface. The eruption appears suddenly, increases to about one line in size, and is persistent in duration. Sometimes the papules run together, forming patches. While in the early stages the papules may be smooth and free from scales, in the later stages considerable desquamation may be present, or the exuded bloody serum, due to scratching, may dry into small hard crusts.*

The eruption appears most frequently on the wrists, backs of the hands, or on extensor surfaces; sometimes it appears in rows, as if it followed a nerve tract. Marasmic symptoms may supervene upon or succeed the eruption.

Some writers recognize a second form designated by the name of acuminatus. Here the lesions are smaller, more pointed, and scaly; do not occur in groups, and are apt to spread rapidly. This form is said to be rare in this country, and lichen ruber is not frequent. That there is a connection between the two forms would seem evident from the fact that both have been seen occurring together.

The disease occurs most commonly in persons of nervous or sanguine temperament. The course is more chronic than acute, and the disease is liable to recur frequently. It is non-contagious. The sexes seem equally attacked; it generally occurs in middle life, but has been observed in infancy.

* Itching and burning with nightly aggravation are at times marked symptoms, or, on the other hand, may be entirely wanting. The skin becomes thickened, loses its elasticity, and may be deeply fissured.

Ætiology.—The ætiology is not definitely known; lichen is often accompanied with debility due to improper nourishment. From the tendency to appear in bands, a nervous origin has been assigned to the disease. It is neither hereditary nor contagious.

Diagnosis.—It may be mistaken for urticaria papulosa and also for scattered papular syphilodermata, and sometimes for psoriasis guttata and erythema papulatum. The absence of moisture, the presence of umbilication, and the history of the eruptions aid in the diagnosis.

Prognosis.—When acute, it may yield readily, but when further advanced in the course of the disease its removal is more difficult. The presence of marasmus renders the prognosis much more unfavorable.

Treatment.—Internal and external measures should be adopted. Tonics and alkaline baths, moderate and unstimulating diet, and avoidance of liquors should be enjoined. In very severe attacks poulticing may be necessary. Carbol. acid and Hydrarg. bichlor. are to be used locally. For the itching, powders and ointment may be used. Although we find a large number of remedies recommended for this affection, few of them, except in the milder forms, will be found serviceable. Of these mention may be made of Arsenicum, Graphites, Lycopodium, Mercurius, Staphisagria, Sulphur iodat.

ECZEMA.

Synonyms.—Salt rheum, Moist tetter, Running scall; (Ger.) Eczem, Hitzblätterchen. Schweissblätter; (Fr.) Eczème, Dartre vive, Poussée.

The variety E. impetiginosum, as crusta lactea, porrigo larvalis, tinea porrigo, milk crust.

No disease, especially among those characterized by external manifestations, has been the subject of a more varied nomenclature or has caused more confusion in the minds of physicians than eczema. Known from the earliest time, occupying a prominent place in the literature of our profession, met and treated both by the general practitioner and specialist, observed among the poor and rich, it still remains in many of its forms indistinctly defined and little understood.

Definition.—Eczema may be defined to be a non-contagious, acute or chronic inflammation of the skin, with infiltration and derangements of its functions, and accompanied with vesicles, pustules, papules, or fissures, and with an exudation which may be serous, purulent, or extremely plastic, and terminating in the formation of crusts or desquamation.

Ætiology.—Eczema is always symptomatic of some irritation,

proceeding either from the constitution itself, or from the action of a local cause.

A failure of proper nerve force in its nutrient capacity is the chief factor in producing this condition, since this failure necessarily leads to congestion and other disturbances in the circulation. Thus we may have an idiopathic or symptomatic cause. The former is due to any direct or mechanical irritation of the skin; the latter arises, as a rule, from internal troubles of the digestive and renal organs, as well as from menstrual irregularities. The condition may often be due to the combined effects of an irritation acting from within and another from without. In the former case the cause is generally predisposing; in the latter it is exciting.

At times an internal irritation through its long continuance causes so great a degree of reflex irritation of the skin that it can no longer tolerate external influences, which, under ordinary circumstances, would be insignificant, and eczematous eruption is the result.

Anything causing a stasis of the circulation, and thus giving rise to an exudation, may produce an eczema, especially when some irritating substance exists in the discharge.

In many cases of dyspepsia the skin shows the influence of perverted nutrition, and we frequently have eruptions which in many instances give rise to the amelioration of the dyspeptic symptoms.

Lesions of nerves or brain-irritation are said to produce diabetes, and eczema, especially of the genitals, has been observed in connection with this disease, due, it is supposed, to the saccharine composition of the blood. Eczema, however, has been observed in connection with nerve irritation or lesion without regard to any diabetic trouble.

Children are more apt to suffer from eczema than adults, but persons affected with gout or those addicted to the excessive use of malt liquors may also suffer. In the gouty diathesis it frequently assumes a chronic form.

Three forms of debility, according to Wilson, may predispose to eczema, viz.: nutritive, assimilative, and nervous. According to many writers we have the existence of a special cause which determines the cutaneous effect in that limited class of individuals known as eczematous or "les dartres" of the French.

Dr. Miller says:* "Some authors doubt the fact of eczema being an hereditary disease. Be this so or not, I have a family under consideration where the grandfather was so affected; the father also had 'running sores' on the legs; the son also had eczema; the son's son, an infant, shows signs of the same trouble. Here are four generations that show evidence at least of some chronic affection. One young lady of the family has metrorrhagia, hysterical weakness, and hæmor-

* Trans. Homœop. Med. Soc. of Penn., 1880.

rhoids; another has very troublesome night sweats. A child of the family has very irregular, intermittent heart's action. Indeed, every member of the family seems to be tainted with chronic troubles where, in the greatest number, eczematous symptoms crop out."

Dr. Brown, writing upon this subject, very pertinently asks:* "Is no consideration due the inherent nature of the skin, its peculiarities of organization, the measure of its tolerance of irritating influences? Why should not the skins of different individuals differ as much in their constitutions and morbid tendencies as do their other organs? Eczema is the natural and usual expression of a simple inflammatory action in the epidermis. So soon as an irritation can no longer be tolerated by this tissue, the vitality of the part begins to succumb, and the legitimate outcome is eczema."

Dr. Piffard, in his recent work, says: "In general it may be stated that the scrofulous diathesis gives the eruption a somewhat bluer or more livid color than usual, impresses a more suppurative character upon the lesion, diminishes the violence of subjective local symptoms, and impresses upon the lesion a tendency to extreme chronicity. Syphilis does not appear to modify the appearance of acute eczema, except, possibly, to shorten the duration of the eruption."

As local causes, we have irritating discharges, exposure to extreme and long-continued heat, the handling of irritating substances, the external use of Croton oil, several varieties of Rhus tox., and other similar drugs. The affection has also followed vaccination, but probably this is merely a matter of coincidence.

Symptoms and Forms.—The varieties of eczematous manifestations are numerous, and the external appearances may vary from profuse exudation to dryness and scaling. In the latter form the diagnosis may be very difficult, since the objective symptoms so closely resemble those cutaneous diseases characterized entirely by scaling of the epidermic cells. The length of time it has run, the character of the lesion, and the locality of the body affected by the eruption, have an influence in making up the general appearance of the disease in individual cases.

In the greater number of instances the disease is ushered in with a congested appearance of the skin, accompanied by increased sensibility, itching, and burning. This, the erythematous form, soon gives place to a moist excoriated surface, which may be associated with desquamation.

In acute eczema there occurs, at times, a prodromal febrile action. But there is nothing in such a condition which is at all characteristic, or which can aid in recognizing the disease in its earlier stages. The exudation varies in quantity, and may be so scanty that papules,

* Eczema, its Pathology and Treatment, Journ. Cutan. Dis., vol. i., 129.

vesicles, or crusts may be the only apparent manifestation of the affection. These were formerly considered distinct types of cutaneous diseases, but later study has shown them to be progressive stages of an advancing disease, and careful examination shows that a serous discharge accompanies the onset of almost every case.

The vesicles (E. vesiculosum) of eczema are small, grouped together, and apt to become confluent; they are easily broken down either by friction of the parts, rubbing of the clothing, or by pressure outwards of the contained fluid. The exudation may be clear and transparent, or of a yellowish opaque color, and rapidly dries into crusts of varying thickness.

When these crusts are removed from any cause, the underlying surface is found to be moist and reddened. The repeated and alternate renewal and removal of the crusts is a characteristic feature of this disease. By degrees the exudation lessens, the crusts become thinner, and, if the effusion ceases entirely, the cutaneous surface becomes dry and covered with fine white scales.

The gradual disappearance of these scales restores the skin to its normal condition.

Instead of a continued vesicular eruption we may have, as already stated, a papular or pustular one. The general conditions are much the same in either case. If pustules (E. pustulosum or E. impetiginosum) are present, they break down rapidly, and we have the formation of greenish crusts, varying in thickness, and leaving behind them, when removed, the same congested surfaces which are found in the vesicular form. The exudation, instead of being colorless and transparent, is creamy and opaque. It occurs frequently upon the scalp and face of children, and may prove very obstinate.

This form has been separately described by many authors under the name of impetigo, but clinically very little difference exists. This variety of eczema is generally associated with a scrofulous diathesis. Sometimes it appears under a contagious form, and has been described as such under the name of impetigo contagiosa.* The papular form (E. papulosum, formerly lichen simplex) is less common than the preceding forms. The exudation is slight, and is produced, as a rule, by mechanical irritation, such as rubbing or scratching. The papules generally appear upon a reddened surface, and are small, round, discrete, and rarely confluent. While, as a rule, they continue as papules throughout their course, they may change into, or be associated with, vesicles. The course of the eruption is similar to that of the other forms.

Eczema fissum or rinosum consists of fissures or clefts in the epidermis, exuding a serous or sero-purulent fluid, and may accompany any or all of the forms already mentioned.

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* Medical News, vol. xliii., p. 676.

The termination of the disease is marked by the disappearance of the exudation, the closing of the fissures, the formation of scales upon a dry and shining surface, and the gradual return to a normal condition.

The squamous form, characterized by dry, harsh, scaly patches, accompanies, like the fissured form, one of the varieties already described, especially the erythematous. It is also employed to denote the chronic stage of these varieties.

Dr. Piffard refers to a form which he designates by the term "*primitive exfoliation*," and explains it thus: "Succeeding the primary congestion of the part we have exudation from the vessels; this exudation being too thin, or otherwise unadapted to the formation of papules, penetrates the rete and reaches the under surface of the stratum corneum. Here, instead of issuing through clefts or raising the corneum in vesicles or pustules, it simply floats off from the surface the previously loosened cells of this layer."

All these forms may exist separately, but as a rule they are more or less associated together, infiltration being present in nearly every case.

While eczema may be seen upon any part of the cutaneous surface, and may affect almost the whole of it at one time, there are certain localities which it attacks in preference to others. The location of the disease also changes its general appearance, as, for instance, eczema of the scalp, which is, as a rule, of the vesicular or pustular form, rarely, if ever, of the papular or fissured form. When affecting the beard, axilla, and other parts of the body, freely covered with hair, we have a papular or tubercular form through the enlargement of the hair follicles.

Eczema affecting the genitals is very apt to remain moist throughout its course.

When the disease attacks the dorsal surface of the hands and feet, it assumes the fissured form. When upon the palmar or plantar surfaces, as usually happens, it may assume the vesicular or pustular, but more especially the fissured forms. The conditions accompanying the eruption, the combination of the forms, the locality and the extent of the eruption, have all been used to designate the varying circumstances under which an eczematous eruption may manifest itself.

If we bear in mind that these names are descriptive of location, form, extent, etc., we will not be confused by their multiplicity. Thus we have, for example, in addition to those already mentioned, E. rubrum, ichorosum, œdematosum, verrucosum, faciei, figuratum, diffusum, solare, intertrigo, etc.

The chronic form of the disease follows the acute or subacute conditions, and is so called as much from the length of time the disease

has run as for any other reason. Like other chronic inflammations it has its rise and decline with an intermediate period of activity of greater or less duration.

Complications.—Eczema more frequently occurs as a complication or accompaniment of other diseases. Depending, as it does, upon malnutrition and defective innervation, it will be very apt to be associated with such conditions as depend upon these same general causes; it may vicariously take the place of other diseased conditions, or may supersede some chronic ailment. It is associated with rheumatism, varicose veins, and ulcers, especially of the extremities.

The lymphatic glands frequently enlarge, especially those of the neck, and when the eczema is located on the scalp. Suppuration of the glands, however, does not take place, save in cases of well-marked scrofulous diathesis. The superficial and deep layers of the skin being affected, thus implicating the lymphatics of the skin, the extension of the inflammation along the lymphatic tract is an easy and natural step.

Diagnosis.—While the diagnosis of eczema is, as a rule, comparatively easy, errors may nevertheless occur. Especially is this true in regard to the form which affects the head and hairy portion of the face. Here we must distinguish between eczema capitis and the syphilitic form of the same, from seborrhœa capitis, psoriasis capitis, and tinea tonsurans, decalvans, and favosa. Eczema of the head must also be distinguished from tinea sycosis and sycosis non-parasitica,* and, in general, from erythema, erysipelas, herpes, intertrigo, and lichen.

Without enumerating the symptoms connected with eczema, it may be said that syphilitic eczema capitis occurs among adults, appears in small patches, with absence of itching, with deep ulceration and an acknowledged or recognized history of syphilis.

In seborrhœa we have the oily nature of the secretion and the smooth, uninflamed condition of the skin beneath; it is also a slow affection, associated with hyperæmia rather than inflammation. In psoriasis the dryness of eruption, with white, adherent, silvery scales, the abruptness of the edges of the patches, the absence of itching, and its occurrence in persons of robust health, will determine the condition.

In tinea tonsurans, the circular patches, broken brittle hairs, and the presence, frequently, of tinea circinata in other parts of the body, will decide.

In tinea sycosis we find pustules, tubercles, and indurations, rings of tinea circinata, brittle broken hairs, and fungi.

Crusts are abundant in eczema, scanty in tinea; the removal of

* Anderson, Journal Cutaneous Diseases, vol. i., pp. 359-397-422.

crusts in the former exposes a smooth surface, in the latter an uneven or lumpy surface.

The hairs of eczema are removed only with pain. In sycosis they fall out of their own accord.

In the non-parasitic variety, tubercles and small abscesses are more prominent features than pustules. In lupus narium the chronicity, absence of itching at the nostrils, the presence of the papulæ of lupus in the immediate vicinity, the absence of any extended eruption, and the engorgement or suppuration of the glands of the neck will aid in the diagnosis, especially in those rare cases of eczema narium in which perforation of the septum occurs.

In erythema, itching, swelling, exudation and crusts are wanting; erysipelas is an acute febrile disease, with shining tense swelling, well-defined borders, and marked constitutional symptoms; in herpes, the eruption or bullæ collect upon a red base, and, instead of breaking down and discharging their contents, they shrivel away in a few days, and gradually disappear; intertrigo occurs in the folds of the skin, with thin secretion, and absence of vesicles and crusts; in lichen we have itching, a hard and dry papular eruption, with no crusting.

Prognosis.—Eczema is curable, and has been cured, but in the majority of cases relapses are frequent, and oftentimes continuous, much depending upon the circumstances surrounding each case.

The acute vesicular form is apt to run a short course, while the papular form is more likely to prove chronic. Eczema of the head and face is likely to prove obstinate. The affection is often indicative of a general breaking-down of the system, and should never be lightly considered.

Treatment.—Eczema may follow, or take the place of, some other chronic disease. Again, a sudden checking of the eruption may appear to bring out some latent disease. Hence has arisen a universal fear of suppressing the eruption. The safest plan is to consider the primary cause of the trouble, the consequent debility, and the possibility of the disease attacking the weakest part in the body.

In our endeavor to remove the debility, we need not fear the disappearance of the eruption, and our duty is, therefore, to cure the eruption, and not let it run on for months and years. There is also the probability that the long continuance of the disease in one generation may produce the hereditary diathesis of the next.

The treatment recommended for eczema has been as varied as the disease is frequent. Successful treatment in the greater number of cases depends upon a judicious use of hygienic, internal, and external means. Fresh air, bathing, and exercise, are essential to invigorate the system and to keep the skin in a proper condition. The diet should be carefully selected; vegetables, especially those which can be eaten uncooked, and which contain potash salts (celery, lettuce),

and fruits, are very beneficial, while fresh meat should be used sparingly, and salt meat not at all.

It is stated that, as a rule, the milk of the mothers or nurses of the children suffering from eczema is deficient in butter, and on this score the addition of cod-liver oil to the diet-list has been recommended. This article is of value also in the chronic stages, and when emaciation is present. When the disease is accompanied by excessive itching, the hands, especially of children, should be covered with gloves, so as to avoid laceration of the skin, which is often caused by scratching during sleep. Objection is at times made to the use of external adjuvants, but there appears no reason why a diseased and irritated surface should not be as much protected when this state is due to an internal cause as when it arises from burns or other external irritation. Undoubtedly many cases are much relieved by soothing external applications.

When crusts are present, their removal should be facilitated by warm and, if necessary, hot baths, and by the use of liquid fats and oils. Wet lotions, when used for the erythematous forms, should be kept up continuously.

The insoluble powders, such as rice, flour, starch, etc., can be applied by first smearing over the skin some soothing ointment, emulsion, or glycerine. When the skin is rough and harsh, the cuticle brittle and uneven, and the surface dotted with scales, crusts, and abrasions, non-irritating ointments are not only beneficial, but necessary for softening the surface of the skin. When a more or less extensive surface of the skin is reddened, and exudes a copious and ichorous discharge, ointments should give place to astringent washes and absorbent powders. Alkaline applications are of value in nearly all forms of the disease, especially when accompanied by intense itching and burning.

When the acute form is present, diluted alkaline washes should be used; but later, when pathological products have formed, the alkaline soaps are serviceable. In the chronic cases, where there is thickening or infiltration of the cutaneous layers, potassa fusa may be used.

In the irritable fissured forms, concentrated carbolic acid may be used, but in a guarded manner. Tarry preparations are of service when the disease is confined to the upper layer of the epidermis and the superficial bloodvessels; when desquamation is present and the papules are congested; in constitutionally healthy subjects; when the chronic eruption is declining; these preparations must be employed, at first, with due care, and quite weak.

Mercurials (calomel, ʒss. to ʒ½; red oxide, 5–20 grains; and ammoniated mercury, 20–40 grains to the ounce) are of service when the cutis and subcutaneous tissues contain the accumulated products of inflammation.

The impermeable rubber covering which acts as a continuous hot-

bath softens and macerates the thickened cuticle in chronic cases, and enables the vesicles beneath to discharge their contents; it thus relieves the engorgement which is present, and leaves the skin in a condition similar to the acute stage. Iodine tincture has been successfully used in the local treatment of the papulo-squamous form. Such are the external applications and their indications which have stood the test of experience in the treatment of the old school, and are of undoubted value when aided by the internal means at our command.

We do not recommend their use in every case, nor even in the majority of cases, but circumstances will arise when external measures must be used, and those enumerated here have proved reliable. Especial stress must be laid upon the necessity of exercising patience in the treatment of skin diseases of all forms, and the remedy employed should be given in the medium or higher potencies.

The principal remedies for internal use are: Arsenicum alb., Calcarea carb., Graphites, Hepar sulph., Lycopodium, Mercurius, Silicea, Sulphur, Croton tiglium, Viola tri.

Other remedies which may prove serviceable at times are: Baryta carb., Clematis, Natrum muriat., Psorinum, and Rhus. Less frequently useful are: Alumen, Sarsaparilla, Sepia, Ranunc. bulb., Tartar emet., Petroleum, Borax, Dulcamara, Chrysophanic acid.

PRURIGO.

Synonyms.—Scabies papuliformis; (Ger.) Jueckblattern; (Fr.) Strophulus prurigineux, Scrofulide, Boutonneuse benigne.

Definition.—Prurigo is a papular eruption, the papules being discrete, rounded, small in size, and solid; the color varies but little from that of the normal skin. Later we have thickening and discoloration of the skin; the itching is intense from the beginning.

Ætiology.—Nearly always found among the impoverished or accompanied with symptoms of debility. It does not seem to be hereditary, although appearing in early life. It occurs more frequently in males than in females.

Symptoms and Course.—Great confusion has arisen in the proper understanding of this disease in consequence of the confounding by writers of the terms *pruritus* and *prurigo*. The former is a condition which may occur in numerous diseases, in fact, a temporary cutaneous hyperæsthesia; prurigo, on the other hand, is a deep-seated trouble rarely seen in this country, but prevailing quite extensively in Germany. Hebra has given the best description of the disease and shown its true classification. The presence of the papules causes a good deal of irritation with an inclination to scratch. In scratching the epidermic layer is removed, and a transparent, or serous, or yellowish fluid, and very often a drop of blood, is discharged. The drying of

the latter leaves a blackish crust upon the summit of the papule. Following this condition we have a pigmentary discoloration of the skin, which becomes thickened, infiltrated, rough, and dry. In severe cases the papules are larger, the itching more intense, the excoriations more severe, and the pigmentation more marked, with a dry and shrivelled epidermis. The excessive itching causes a decay in the general health of the patient on account of the insomnia and nervous concomitants produced thereby. Emaciation and malnutrition, as shown by glandular swellings with exhaustion, are frequent accompaniments of the last stage of the disease. The eruption appears upon the extensor surfaces of the extremities, especially the lower, and more rarely upon the trunk. The disease may persist throughout an entire lifetime, and its progress be marked by periods of alternate exacerbations and remissions. The cessation of the eruption may leave clearly defined pigment stains which are larger than the preceding papules.

Varieties.—Several forms of the eruption are mentioned, but they relate more to the severity of the attack than to any real difference in the character of the eruption itself. Thus we have P. mitis, ferox or agria, and formicans.

Diagnosis.—The disease may be confounded with pruritus pediculosis, or eczema papulosa, but careful attention to the history of the case will establish the diagnosis.

Prognosis.—The course of the eruption is always obstinate and lasts for years. It is said to be curable in childhood, but such a favorable termination can scarcely be expected after the disease has persisted until far into adult life.

Treatment.—The general hygienic conditions must be improved, otherwise we can do absolutely nothing in the way of treatment. The diet should be of the most generous kind, including tonics and, in most cases, cod-liver oil. Baths are useful adjuncts, those medicated with tar and sulphur being the most valuable. Carbolic acid, externally and hypodermically, has been used with apparent benefit. The fingernails should be kept cut close or the hands muffled. Baehr says: We are not acquainted with a single case of prurigo that has been cured by homœopathic treatment, although such a cure may be possible, or may have been accomplished. Kafka and others give long lists of remedies for this affection which are not clinically verified. The antipsoric remedies should be studied carefully.

SEBORRHŒA.—ACNE.

We group under this title affections of the sebaceous glands, although it is questionable whether seborrhœa or gutta rosacea properly belong in this category. Clinically the conditions are so closely associated

that confusion will be avoided by placing all together, for an excess of secretion (seborrhœa) may easily be succeeded by retention.

Synonyms.—Seborrhœa, Steatorrhœa, Fluxussebaceus, Milium, Vulgaris, Varus, Juvenilis, Gutta rosacea, Stone pock, Maggot-pimple, Whelk, Copper nose.

Definition.—A functional or inflammatory affection of the sebaceous glands, characterized by excess of secretion or by papules, tubercles or pustules, occurring usually upon the face, which may result in suppuration.

Ætiology.—By some authors this condition is described as a local affection, by others it is considered as reflex, due to derangements of other organs, especially those of the sexual and digestive systems. We often find an eruption of acne associated with the establishment of puberty. The severer forms are found later in life, and are induced by gastric derangements or excessive use of alcoholic liquors. Acne occurs in both sexes, but is more common in females.

Symptoms.—The external appearances vary from an oily exudation to papules of a pin-head size, and larger. The papules are sometimes slightly painful and tender, although patients may suffer from an extensive invasion of this disease with but few subjective symptoms. Pustules are also present in the later stages of the affection. By the coalescing of several suppurating follicles, subacute abscesses may form. The disease is apt to become chronic, although it may run an acute course. The outbreak is usually upon the face, especially upon the forehead and cheeks, but may appear upon other parts of the body. The eruption is generally symmetrical. Burning and itching are seldom present. The number of the pustules varies, and the inflammation may be superficial or extend deeply into the glands.

Varieties.—Several varieties are recognized, viz.: A. sebacea, punctata, miliaris, simplex, indurata, and rosacea. In *A. sebacea* we find an oily secretion on the skin, giving it a greasy appearance. The forehead, upper part of the face, and scalp are the usual locations.

In the dryer form, *A. sebacea sicca*, we note the presence of greasy masses, scales, and crusts, arising from the evaporation of the watery portions of the secretion. The face often has a dirty look from the adhesion of dust to the skin.

Acne punctata.—Here the face is covered with papules having dark centres which are due to the collection of dirt in the open mouths of the follicles. When these points are squeezed, there is forced out the contained sebum which has the appearance of small worms, and is called comedones. The retention of this secretion within the follicles may give rise to inflammatory conditions, and we have *acne simplex.* In this form numerous pustules are present, scattered among the follicles.

A. miliaris.—Instead of the black points from retained sebum we

have the minute, white or pearly appearing papules which are slightly elevated above the surface of the skin. They are more frequent about the eyes and upper part of the face. They are collections of sebaceous matter which have undergone alteration and are covered with a thin layer of skin.

Acne indurata is a more advanced stage of acne simplex. The papules are larger, and partake in many cases of the nature of tubercles. Indurated masses are formed from the size of a pea to a nut, of an indolent character, purplish in color, and slow to suppurate. Pus forms finally in the nodule, leaving after suppuration an indurated condition which passes away slowly. Should suppuration be extensive, cicatrices may form.

A. molluscum.—This is a rare form, and, by some authors, has been assigned a place in other divisions. It is more common in young women than in adults, and consists of small whitish or reddish nodules slightly elevated. A cheesy or milky substance can be squeezed out of the nodules. The upper part of the face is the spot selected by preference, but it may be found in other parts of the body. It has been asserted that these lesions are contagious, and the term "contagiosa" has been applied to them, but their contagious nature has never been clearly demonstrated. These nodules may increase in size until they form small cysts or wens, which appear as small globular tumors with semi-fluid contents, covered by normal or slightly reddened skin.

Acne rosacea.—This form appears in persons of more advanced age, and generally about the nose and cheeks. The surface of the skin is reddened in irregular patches, giving the skin a mottled appearance; later the bloodvessels appear dilated with scattered papules or pustules. Heat and burning are present, and the redness is aggravated by any excitement. Several grades of this form are described, in which the successive steps are from hyperæmia to dark-colored growths or vegetations, traversed by a network of vessels, the latter occurring chiefly upon the nose and cheeks; persons addicted to the excessive use of liquors suffer from this form, although the condition of telangiectasis may appear under other circumstances.

Diagnosis.—The acneic eruptions should be distinguished from papular or pustular syphilodermata in which the history, absence of various signs of general syphilis, the course, and the fact that acne is generally scattered quite uniformly over the location of the eruption, while syphilitic eruptions tend to form groups, will determine the true condition. When the eruption is on the forehead alone, some difficulty may be experienced in making the differential diagnosis.

Prognosis.—The milder forms are curable. In the severer forms the chances for permanent removal of the disfigurement are doubtful. Even if not cured, the subjective symptoms may be very light or

entirely absent; but the patient frequently suffers keenly from the consciousness of the presence of the unsightly eruption.

Treatment.—The diet, for a long time, must be carefully regulated. The contents of the pustules should be pressed out. In the sebaceous form, mild stimulating or astringent lotions are of service, together with the external use of tar or green soap. Where cysts or small tumors are present, they should be clipped off, or the contents evacuated and the base or sac cauterized. Acne molluscum is not amenable to internal treatment. Hot water, frequently applied by means of cloths, has been successfully used for the purpose of allaying the congestion which may be present. When the cause can be ascertained, as in functional derangements of the digestive and generative systems, medicines having an affinity for these organs will need to be studied, and are likely to prove of service.

Baehr speaks of the good result following the use of washed flowers of sulphur (ʒ to ℥) applied at night, allowed to dry, and removed in the morning (acne rosacea).

Consult Antimonium crud., Calcarea carb., Graphites, Iodum, Lycopodium, Natrum mur., Nux vomica, Phosphorus, Sepia, Silicea, Sulphur, Tartar emet.

ECTHYMA.

Synonyms.—Phlyzacia, Boutons, Thyma; (Fr.) Dartre crustacée, D. fongeuse.

Definition.—An inflammatory disease characterized by few or many scattered, flat, large, rounded pustules, with inflammatory bases and yellowish or brownish adherent crusts, leaving brownish or dark-red stains, which disappear slowly; the affection may be accompanied with destruction of the derma and scarring.

Ætiology.—The causes are similar to those of impetigo; and ecthyma may occur in persons in apparently sound health. From its general resemblance to impetigo, many authors have considered it an advanced stage of impetigo. It is generally seen in the course of constitutional diseases and more particularly among the poorer classes, living in damp unwholesome dwellings and badly nourished. Injuries of skin in diseases due to faulty nutrition or depending upon the strumous diathesis may produce this form of eruption. It may also follow specific fevers, or may be due to the contact of local irritants or the presence of the acarus scabiei. It is non-contagious.

Symptoms.—The pustules are seated upon injected and infiltrated bases which are at times bright, and at other times darker in color, the bases being firm and sensitive to the touch. The pustules are isolated, well developed, semi-globular, sharply defined, and filled with a yellowish or reddish fluid. They are very liable to appear in successive crops. The surrounding discoloration of the pustule disappears coincidently

with the breaking down of the vesicles and the formation of crusts, the latter being darker in color according to the amount of blood mingled with it. When the crusts are removed, being non-adherent, depressions in the skin are observed varying in depth and coated with a bloody, puriform secretion. The bottom of this depression is often ulcerated, limited in extent, of greenish or yellowish color; granulations may be present. The crusts may increase in thickness if suppuration should continue beneath them, a condition which often occurs in cachectic subjects. Pain, with burning rather than itching, and with febrile symptoms, may precede the eruption. The pustules generally appear on the lower extremities, and occasionally upon the thighs and body. The course may continue for weeks and months.

Rupia, the name given to a pustular outbreak similar to ecthyma, has been placed by recent writers among the syphilitic exanthemata, but is practically ecthyma associated with the syphilitic poison.

Diagnosis.—Ecthyma may be confounded with rupia, impetigo, acne, and the pustular syphilides. If ecthyma should be confounded with other pustular affections, the result clinically would be unimportant, as the distinction rests more upon the severity of the process than upon any real difference in the essential points of the disease. Kaposi has said in this connection that the term ecthyma may well be employed to characterize the pustular grade of any cutaneous inflammation at a given time.

In the syphilitic variety the ulceration shows the pronounced features of a syphilitic ulcer in its secretion, edges, course, and accompanying history.

Prognosis.—With proper care, ecthyma can be relieved. When occurring in aged and debilitated persons, or as the result of some debilitating illness, the prognosis is much less favorable.

Treatment.—General hygienic treatment is important, together with nutritious and wholesome food, including meat, eggs, milk, and similar articles, with cleanliness, fresh air, proper rest, tonics, light wines, etc.

Locally, alkaline baths and cooling lotions may be used. The crusts may be removed with poultices, followed by water dressing and mild stimulating ointments; or the crusts may be loosened with oil or fat. Ulcers should be dressed with carbolated water and ointments.

Consult Antimonium tart., Arsenicum, Kali bich., Mercurius, Nitric acid, Rhus, Secale cor.

PEMPHIGUS.

Synonyms.—Morbus vesicularis or phlyctenoides, Typhus vesicularis; Vesicular fever, Bladdery fever, Water blebs, Blister tetter; (Ger.) Blasenausschlag; (Fr.) Fevre bulleuse.

Definition.—An acute or chronic inflammatory disease with suc-

cessive crops of round, irregular-shaped blebs, varying in size, and distended with serum or sero-purulent fluid, appearing in different parts of the body, and accompanied with febrile and other symptoms of constitutional disturbance.

Ætiology.—The disease occurs among those who are debilitated or "run down" by mental and physical troubles; also after exposure to cold and moisture. This fact has led to the theory of a nervous origin. M. Gibier states that his experimental researches have shown the presence of bacteria as a cause of acute febrile pemphigus. Pemphigus also occurs in infancy and early childhood; in a great number of such cases this is undoubtedly due to a syphilitic taint, and such cases do not properly belong here.

After childhood has passed, age ceases to be a factor. Seasons or atmospheric changes have no influence.

Symptoms and Course.—The eruption is generally preceded by febrile conditions, accompanied, often, with gastro-intestinal derangements. The eruption at first presents the appearance of highly inflamed maculæ which soon give place to the characteristic bullæ; the latter, in some cases, may be the first thing noticeable. The bullæ are round, of the size of a pea, and larger; they may be few or numerous, scattered or in clusters, having a reddish inflamed border, but no surrounding blush or tumefaction. The itching and burning at times is severe. The contents at first are serous, but later become bloody or purulent. Thin crusts form, later consisting of blood, pus-cells and tissue débris of various kinds. Beneath these crusts a new epidermis is found, which remains deeply pigmented for some time.

Two forms are described, viz., *P. vulgaris* and *foliaceus*. The former is the more common, develops rapidly, and partakes of the general description given above. The latter seems only another step in the process of development, modified or altered by the constitutional debility with which it may be associated. Here the bullæ appear in rapid succession, are not clearly developed, are flaccid and only partially filled with fluid, break down easily, and present raw surfaces with attached pieces of epidermis, the result of premature rupture of imperfectly formed bullæ. The course is chronic and obstinate.

All the accompanying symptoms gradually increase in severity, and there is much fever, pain and itching, together with enlargement of the lymphatic glands. Frequent exacerbations occur, and remissions for weeks or months, the disease either wholly disappearing or recurring in the future, with a probably fatal termination, the patient, after suffering greatly, dying from exhaustion.

Varieties.—Besides the two forms already mentioned, we have others, the terms of which however designate conditions rather than distinct clinical manifestations. Thus we have P. pruriginosus,

(known also as H. gestationis), from the intense itching; P. malignus, cachecticus, gangrænosus, according to the severity of the disease; the latter form has also been called Rupia escharotica.

Diagnosis.—Bullæ, generally speaking, occur in numerous affections of the skin, but in all such cases they are a sequel of other morbid processes; in pemphigus the bullæ are present from the beginning, and are the essential features of the disease.

Prognosis.—Unless the attack should prove very mild, the prognosis is always grave. The more frequent the relapses, the more serious the prognosis.

Treatment.—Tonics and nutritious diet. Lead, Opium and Zinc washes are of service in allaying the itching and burning. The water-bath, continued for a long time, has proved of service in some cases, while in others it did not agree with the patient. The bullæ have been pricked in order to relieve excessive tension.

Copaiba balsam is said to have produced a group of bullæ in one case.

Consult Arsenicum, Cantharides, Causticum, Phosphoric acid, Ranunculus bulb., Rhus tox., Sepia.

LENTIGO—EPHELIS.

Synonyms.—Pannus lenticularis, Freckles, Pannus hepaticus, Sunburn.

Definition.—A discoloration of the skin, congenital or acquired, characterized by minute spots appearing upon exposed portions of the skin.

Ætiology.—In some cases apparently congenital. Others are caused by, or aggravated from, exposure to the rays of the sun; it occurs most often in persons of fair complexion.

Symptoms.—The spots are small and rounded, the color varying from a bright to a brownish yellow. The stains may be scattered or in clusters. They generally appear upon the face and hands, and are congenital or occur early in life. There are no subjective symptoms.

In ephelis the spots are much greater in extent and the discoloration is darker. The causes are exposure to the sun; it occurs also during the menses and pregnancy. The spots generally disappear with the causes producing them, but sometimes they remain permanently.

Treatment.—Existing uterine troubles should receive appropriate treatment, and exposure to the sun's rays should be avoided as much as possible.

Consult for Lentigo: Antimonium, Bryonia, Calcarea carb., Lyco-

podium, Natrum, Pulsatilla, Sepia, Sulphur. For Ephelis: Alumina, Dulcamara, Graphites, Kali c., Sepia, Tartar emet, Veratrum.

VITILIGO.

Synonyms.—Leucoderma, Macula alba, Cutis variegata, Piebald skin.

Definition.—A whitish discoloration of the skin, congenital or acquired, occurring in rounded patches of variable size.

Ætiology.—The causes are unknown, but supposed to be of neurotic origin.

Symptoms.—The disease begins as small, white dots, slowly increasing in size, until we have more or less extensive patches of blanched skin. The edges surrounding the parts may be tinged a little darker than normal, and are generally abrupt. The affection occurs on all parts of the body and is comparatively rare. Its course is slow and gradual.

Treatment.—The treatment is very unsatisfactory, if not ineffectual. Alumina, Arsenicum, Sulphur, Calcarea carb., Carbo anim., Mercurius, Nitric ac., Phosphorus, Phosphoric ac., Sepia, Silicea, Sulphur, have been recommended.

NÆVUS.

Synonyms.—Maculæ maternæ, Nævus-sigillum, Mother's mark.

Definition.—A congenital, permanent discoloration of the skin, with, at times, elevation above the surface of the normal skin.

Symptoms.—There are two kinds of nævi, the pigmentary and the vascular. The former are also known by the common name of "moles," and appear as rounded stains varying in size and color. The cutis may be elevated, and a tuft of hairs may be included within the stain,—"mouse marks."—The discoloration is due to an excess of pigment, and the elevation to an hypertrophy of the skin. The nævi may be few or numerous, and usually appear upon the face, neck and hands. Vascular nævi are so named on account of the excessive development of the arterial or venous capillaries of the skin, either superficial or deep. The former are commonly known as "port wine" stains. The spots are irregular in size, superficial, and the discoloration disappears upon pressure. They appear commonly upon the face and neck, and may by their extent produce a marked disfigurement.

When the deeper vessels are involved we may have a mass forming a round or oval tumor varying in size and height. When the vascular development occurs later in life, it is known by the name of telangiectasis. This condition at times occurs with acne rosacea.

Treatment.—The treatment is by the subcutaneous ligature or electrolysis, the latter being a late and apparently successful measure. Thuja, Calcarea carb., Cundurango, Carbo veg., are recommended for the pigmentary forms.

VERRUCA.

Synonyms.—Warts.

Varieties and Course.—Warts are cutaneous excrescences consisting of circumscribed papillary hypertrophy of the skin. They vary in size, number and shape, and may be sessile or pedunculated, pointed or flat, smooth or rough. They may occur anywhere upon the body, but are chiefly noticeable upon the hands. There are several divisions given, but they are chiefly descriptive of form, time and place. V. vulgaris is the common hard, dry form usually seen upon the hands.

V. acuminata or condylomata are the so-called venereal wart or vegetations, and are most frequent upon the genitalia. These warts may arise also from leucorrhœal or non-venereal discharges. They are moist, and are frequently covered with a puriform secretion of a disagreeable odor.

V. senilis is the form occurring in the aged. They are dark or brown in color, flat in shape, and granular. When torn off, they show a reddened surface beneath.

Treatment.—Warts often disappear spontaneously, and many are the legends of their removal by the touch, rubbing, and other manipulations at the hands of other persons. They may be removed mechanically by the scissors or curette; the bases are to be cauterized with nitric or acetic acid. Internally we may use Calcarea carb., Causticum, Lycopodium, Natrum c., Nitric ac., Thuja.

FIBROMA MOLLUSCUM.

Synonyms.—Molluscum simplex, M. pendulum.

Varieties and Course.—This disease consists of soft, roundish tumors of various sizes, which may be sessile or pedunculated, and of the color of the skin, unless when irritated or inflamed. These tumors may be very few in number, or there may be hundreds scattered all over the body. In some instances they are very large and pendulous. When small, they are usually soft, but when they are larger in size they are more apt to be elastic and fibrous. The tumors, as a rule, are unaccompanied with pain.

There are two forms, M. contagiosum and M. non-contagiosum. The latter form has been described above, and occurs in the middle-aged. The contagious form is commoner in children and youths, and occurs most frequently on the head, neck and limbs. The

tubercles grow quicker, are harder to the touch, constricted at the base, vary in size, and have a smooth, shining surface. They may dry up and fall off, or may inflame and suppurate, or may terminate by gangrenous processes. The connection of these two forms of disease is disputed by many writers.

Treatment.—The tumors may be excised, if their numbers does not render this course impracticable, or they may be emptied of their contents and the sac cauterized. The ligature and galvano-caustic loop are also serviceable.

LUPUS.

Synonyms.—Herpes exedens, ferox, serpiginosus, Corroding tetter, Wolf; (Germ.) Fressende Flechte; (Fr.) Dartre ulcérée, phagédénique.

Definition.—A chronic disease of the skin, associated often with a scrofulous taint, characterized by a slowly developing reddish-brown discoloration, with swelling of the skin, and terminating in the formation of a permanent cicatrix with or without previous ulceration; or the patches may be elevated, with depressed centres, varied in color, and covered with adherent, yellowish-gray scales.

Ætiology.—The causes are constitutional, such as heredity, scrofulous diathesis, and lymphatic temperament, or they may be found in unhealthy surroundings or insufficient and unwholesome food. It occurs frequently in childhood and in the female sex.

Symptoms.—The disease commences as rounded, shining, reddish, infiltrated patches. These patches may become covered with whitish and opaque adherent scales arranged in curved lines. The forcible removal of these scales leaves the surface beneath reddened and as though punctured with needles; when undisturbed, the patch spreads slowly, the center healing and leaving a depressed whitish indelible scar. There are occasional pricking sensations, and the disease, by spreading over a considerable extent of surface, may give rise to constitutional symptoms.

This is the general course of the variety known as L. erythematosus. Instead of following this course the disease may appear as small pustules upon the reddish patch. These break down and, exuding a plastic liquid, form an adherent crust, which, when detached, is seen to cover a shallow ulcer. The disease extends around the crust by the spread of the livid infiltration and the formation of fresh pustules, which also form crusts. After a time the crusts fall off, leaving a depressed opaque cicatrix. This is L. pustulosus.

A third form is the L. vulgaris or hypertrophicus. It is characterized by the formation of reddish or brownish masses, soft, more or less translucent, and by the process of ulceration and destruction of tissue gives rise to marked cicatrices.

Lupus generally appears upon the face, especially the nose and cheeks, and sometimes on the extremities. It is a rare disease. The course is slow and obstinate, and while not involving life directly, may give rise to unsightly scars from extensive ulcerations.

The above descriptions agree with the milder forms of the disease; but they do not always follow such a course. In its severer forms it belongs as much to the domain of surgery as to dermatology; especially the L. exedens or rodent ulcer.

Treatment.—In the management of lupus the strictest attention should be paid to hygienic measures. The diet should be of the most nourishing kind, and frequent exercise should be taken. The external treatment is largely surgical, and consists of the use of the caustic, curette and knife.

Not much reliance can be placed upon internal treatment, although reports have been made of cures by means of internal medication. The remedies recommended are Aurum, Arsenicum, Causticum, Graphites, Hydrocotele asiat., Iodum, Kali bichr., Nitric acid.

LEPRA.

Synonyms.—Elephantiasis Græcorum, Leprosy.

Definition.—A chronic disease characterized by yellowish-brown stains upon the skin, followed by tubercles and, later, by ulcers, which at times extend deeply into the subjacent tissues. The sensibility of the skin is generally decreased, but it may be increased.

Ætiology.—It is endemic in certain localities and is rare in this country, although late observations seem to point to its increase. Heredity and special climatic influences are predisposing causes. The exciting causes are unhealthy surroundings, intemperance, and nervous affections. It is more common with men than women.

Symptoms.—Three forms are described, but all may be seen occurring at the same time. They are Lepra maculosa, L. tuberculosa, L. anæsthetica. The tubercular form may commence with macules, and all cases exhibit during their course more or less anæsthesia.

The first form begins with macules, which are reddish, infiltrated and irregular in outline. They assume a brownish tinge as the disease advances, with a tendency to a lighter color in the center; this atrophied appearance may extend until it is an inch, or more, in diameter, surrounded by a dark-colored margin. Hyperæsthesia may be present in the beginning, but is soon superseded by anæsthesia. The stains appear first on the face, legs and fore-arms, and may be preceded for some time by a feeling of malaise and languor.

Upon these macules small irregular nodules may appear of a yellowish and, later, of a brownish color. This is the tubercular form. Appearing upon the face, they may, by their number, development

and accompanying hypertrophied condition, present a revolting and hideous appearance. Other parts of the body may be affected later, as also the mucous membranes and the eye.

In the last form (L. anæsthetica), the nervous system seems to be first affected. There are burning, painful sensations along the nerves of the extremities, especially the ulnar. Later macules, bullæ, and ulceration appear, with loss of portions of the hands and feet, or the parts may become shrunken and distorted. The whole system is affected during the progress of this form, so that the muscles waste away, the skin becomes shrivelled, and the mucous membranes dry.

All the forms continue for indefinite periods of time and give rise to debility, mental disquietude, and oftentimes ulceration of the bowels, with diarrhœa.

Prognosis.—This is unfavorable ; treatment as hitherto applied has accomplished little in staying the course of the disease.

Treatment.—The unfavorable hygienic surroundings should be changed completely, and bathing, exercise and the most nourishing food supplied. Cod-liver and Chaulmoogra oils are recommended as valuable adjuncts.

Prof. Piffard, referring to the increase of leprosy in the United States, urges that prophylactic measures should be instituted at once, and recommends the establishment of a Lazaretto through national legislation.

Internal treatment has failed to make a lasting impression upon the disease. Arsenicum iodat., Hoang-nan, Hydrocotele asiat., and Piper methyst. are recommended.

ELEPHANTIASIS ARABUM.

Synonyms.—Barbadoes-leg, Elephant-leg.

Definition.—The disease begins by attacking some part of the lymphatic system, and manifests itself by acute inflammatory symptoms of the lymphatic vessels and skin. By a succession of attacks the parts become swollen and indurated.

Ætiology.—The cause of this affection is very uncertain. It is a disease chiefly of tropical countries, occurs mostly in adult life, and does not seem to affect one sex more readily than another. It is not hereditary or contagious.

Symptoms.—The disease is generally ushered in with febrile conditions and with pain in the affected part, the lymphatics of which become inflamed and form tender, swollen, knotted cords, reaching the whole length of the limb. When the attack is severe, vomiting, headache and delirium may be present. In a few days all the conditions are improved, the only symptom remaining being a slight swelling of the affected part. The attacks frequently recur, and each time

leave the part larger than before, until the enormous swelling characterizing the disease is produced. It may take years for the swelling to reach its full extent. The swollen part may have a uniform and rounded appearance, or it may be divided into portions separated from each other by deep folds. The skin may be thin, smooth, hard and firm, or may present a papular or vesicular eruption. The veins may assume a varicose condition, or the skin may have a scaly appearance, or be covered with warts; deep cracks, crusting and ulceration may be present. The affection generally appears upon the lower limbs and the scrotum. The appearance produced by the swelling of the lower limbs gives the name to the disease. When the scrotum is affected, it may attain an enormous size.

Prognosis.—Elephantiasis has an indefinite duration, and while in the early stage some relief may possibly be hoped for, it must be regarded as incurable when of long standing.

Treatment.—The general health should be sustained by proper nourishment and hygienic surroundings. To these should be added rest, and firm and continuous bandaging. Ligature of the veins, and even amputation of the affected organ, have been advised and practiced, but are at the best of doubtful value.

As remedies for general conditions we may recommend Arsenicum, Graphites, Hydrocotele asiat., Iodum, Lachesis, Myristica sebif., Phosphorus, Silicea.

TRICHOPHYTOSIS

Under this title Dr. Piffard groups the various forms of tinea due to the presence of the parasite trichophyton tonsurans. The varieties present the common features of contagiousness and capability of transmission from man to certain animals, and *vice versa.*

TINEA TONSURANS.

Synonyms.—Porrigo scutelata, Porrigo furfurans, Trichoses furfuracea, Herpes tonsurans, Tinea tonsurans, Ringworm of scalp; (Ger.) Scherende; (Fr.) Herpes tonsurant, Teigne tondante, Teigne tonsurante.

Definition.—An eruption upon the scalp of one or several circumscribed tumid patches, with breaking off of the hairs, producing a partial baldness, together with vesiculation and crusting.

Ætiology.—The presence of the parasite trichophyton tonsurans occurs among all classes of society. It is contagious, but not all persons are susceptible to its influence. Heat and moisture seem to favor its development, hence its presence after long-continued use of wet and uncleanly compresses. Dampness in dwellings, especially when producing mould, is also a cause. It is an affection of childhood, and

is rarely seen in infancy or adult life. It occurs also in children of a lymphatic temperament, or those who are thin and pale. It may be transmitted by means of hair-brushes, wearing apparel, towels, etc.

Symptoms.—The disease first appears as small, round points, increasing peripherally into patches upon the scalp, upon which is formed a ring of small ill-defined vesicles or pustules, terminating in whitish or yellowish scales. At times a hyperæmic condition may be present surrounding the circumscribed patches. The patches may increase in number, and spread in circumference until nearly the whole scalp is invaded. The disease may extend from a single patch, or the scalp may be covered by numerous small but increasing patches. The hairs become broken, their ends presenting a ragged, uneven appearance; they are dull, lustreless, and dry or brittle, fall out easily, and thus produce a more or less complete baldness. The disease may be acute or chronic in its form and course. The dry and squamous form may give place to vesicular and pustular lesions with the formations of crusts. Pruritus is present, and though not severe in degree, is sufficient to aggravate the disease by the act of scratching. The disease may vary from the above described course, and we may then note lesions resembling eczema or seborrhœa. The hairs may remain long, but are easily removed. Again, there occur slight scaly patches, with but little inflammation, the hairs not breaking off until in the later stages. There is also a variety of discrete or grouped small pustules with a tendency to crust, which appear late in the course of the disease. When the affection has lasted for a long time the scaly patches become more marked and prominent. Inflammation is not marked, and the lesions vary in size.

This parasite is the cause of tinea tarsi, a contagious pustular affection of the eyelids of poor and ill-nourished children.

Diagnosis.—Seborrhœa has been mistaken for tinea, but the extent of the surface affected, the gluey feel and unbroken condition of the hairs in the former, and the branny scales, stumps of hairs, and limited area of the latter, will generally decide. Eczema squamosum and alopecia areata may also be mistaken for this disease. In eczema there is no history of contagion; the course is chronic, the patches are not sharply defined, the hairs are fast, and itching is more prominent. In alopecia the absence of all the hairs in a given patch and the smooth, polished surface will generally determine. The microscope decides positively the differential diagnosis.

Prognosis.—Recovery is the rule, but only after a long course of carefully applied treatment. Spontaneous recovery has been noted, but the majority of cases are obstinate. When occurring in schools or crowded asylums, it is very difficult to cure, and relapses are likely to occur.

Treatment.—The means recommended for tinea circinata are also suitable for this form.

TINEA CIRCINATA.

Synonyms.—Herpes circinatus, Tinea trichophytina corporis, Ringworm of the body; (Fr.) Herpes circiné, Trichophytic circinée.

Definition.—A contagious, parasitic disease, marked by circular, irregularly shaped vesicular or scaly patches, with inflammatory accompaniments, and occurring upon the general surface of the body.

Ætiology.—The disease is caused by the presence of the trichophyton, and is, consequently, contagious. It may appear soon after birth, and may be contracted from animals affected with the parasite.

Symptoms.—The disease first appears as small erythematous spots, scaly and irregular in shape, usually elevated, but oftentimes level with the surface of the skin. These spots increase from the edges outward, forming at times quite a large circle. It has a tendency to clear in the centre as it extends in circumference. The margins are sharply defined, slightly raised, reddish, and covered with loose scales. The centre of the patch may have a dirty yellowish color with some scaling. Occasionally the spots may coalesce and form large or irregular patches. The edges become paler, and finally disappear entirely. The subjective symptoms are not marked, and but slight itching is present. The disease appears upon all points of the body, except the scalp, bearded face, and genitals; it may be found upon the face of children, and occurs more frequently among them than adults.

Varieties.—When the disease attacks the perinæum and inner thighs, we have the distinctive title tinea trichophytina cruris, called also by Hebra *eczema marginatum.* This form is characterized by extensive erythematous patches, with well-defined borders and pale centres. The course of the disease is obstinate and the itching severe.

Diagnosis.—From psoriasis and squamous eczema. The history of the case and the rapid development of circles clearing in the centre will distinguish the form of disease under discussion. As in other forms, the microscope is the final judge.

Treatment.—Tonics, cod-liver oil, good food, and absolute cleanliness, are the hygienic measures to be followed. Tincture of iodine, hydrarg. bichlor., mercurial or sulphur ointments, carbolized glycerine (one part to six) may be applied externally. In other words, the thorough application of a parasiticide is the essential factor of a successful treatment. Where the hairy parts are involved, epilation should be practiced, and the ointment or wash applied. The scalp should not be washed too often. The internal treatment must be directed to the constitutional symptoms which each patient may present, or for the conditions remaining after the removal of the parasite.

Consult Calcarea carb., Rhus tox., Sepia, Sulphur, Tellurium.

TINEA SYCOSIS.

Synonyms.—Sycosis parasitica or contagiosa, Mentagra, Barber's itch, Ringworm of the beard; (Ger.) Parasitäre Bartfinne.

Definition.—A disease confined to the hair and hair-follicles of the face and neck, with inflammation of the skin and connective tissue, and the formation of tubercles and pustules.

Ætiology.—The cause is found in the presence of the same parasite which produces tinea tonsurans and circinata. It is not of common occurrence, is very contagious, and is generally contracted in the barber-shop. All persons do not seem to be equally susceptible.

Symptoms.—Small, slightly elevated, reddish patches, extending peripherally, appear first, which are soon marked by scaling, swelling, and induration. The hairs become dry, brittle, and loosened. As the disease advances, the skin becomes nodular, and pustules appear about the mouth of the follicles. The surface of the skin becomes a deeper red in color, and is occupied with tubercles or pustules in various stages of development. The tubercles coalescing gives the formation of large uneven lumps. The amount of discharge varies, and when accompanied by crusting, may be great enough to be mistaken for pustular eczema. Underneath these crusts is found a moist, uneven, excoriated, inflamed surface, studded with yellowish points resembling a fig, hence the name sycosis.

Diagnosis.—The disease may be confounded with sycosis non-parasitica, pustular eczema, and indurated acne. Microscopic examination decides the diagnosis.

Prognosis.—The disease is somewhat rebellious, and relapses are liable to occur, but persistent treatment generally results in a perfect cure.

Treatment.—Poultices and emollients may be used to soften indurated abscesses. The hairs should be extracted and parasiticides used. Electricity may prove serviceable for removing indurated nodules, which are slow in undergoing resolution.

Consult: Graphites, Mercurius præcip. ruber, Tartar emetic.

TINEA VERSICOLOR.

Synonyms.—Pityriasis versicolor, Chloasma, Phytosis versicolor (Wilson), Liver spots.

The names tinea and pityriasis have been considered objectionable, since the former might lead to the supposition that the various tineæ are but varieties of the same affection, which is not proved, and the latter would imply that the disease in question is a variety of ordinary pityriasis, which is not the fact. Many writers, therefore, favor the name of phytosis, first given to this form of disease by Wilson.

Definition.—A vegetable parasitic disease, with dry, slightly scaly and yellowish patches of irregular size, occurring generally upon the trunk of the body.

Ætiology.—The cause is due to the presence of a fungus called *microsporon furfur*. The spores of the parasite are exceedingly small, of varying size, and uniformly round; the mycelium is sometimes simple and sometimes branched. It is detected by scraping a few scales from the surface, macerating them in ether and alcohol to remove the oil, and then examining them with any amplifying power of five hundred diameters. The spores are found only in the epidermis, and do not invade the hair-follicles or hair. The affection is contagious, though only under favorable conditions. It occurs frequently in those who are out of health, especially in persons suffering from wasting disease, particularly phthisis, and seems to be more common in women than in men. It is very apt to occur in those who wear flannel and are not cleanly in their habits.

Symptoms.—The disease begins with the appearance of very small yellowish-brown spots, irregular in size and extent, rarely elevated, and but slightly scaly. It is usually seen first upon the chest, and spreads from here upwards and downwards. The patches increase in size as the disease progresses and may coalesce, but the edges remain sharply defined. The face and limbs are rarely invaded, so that it may be considered a disease of the trunk. The eruption may consist of a number of small points or, at other times, of patches, covering considerable surface. Itching may accompany the eruption. When the eruption is associated with profuse sweating, the scaling may be almost entirely absent and the surface reddened. The course is tedious.

Diagnosis.—From chloasma, leucoderma, erythematous syphilodermata. This eruption was formerly known by the name of *chloasma*, but the latter term is now given to a non-desquamative pigmentary affection which occurs upon the face.

In *leucoderma* there are white patches upon a yellowish or brown base without scaling, while in tinea versicolor we have yellowish patches upon a normal skin. The two former affections are seated in the mucous layer of the skin, while tinea versicolor is seated in the horny layer of the epidermis. In the syphilodermata the patches are indistinct in outline, have a mottled appearance, are pigmented, and without scales, and are unaccompanied by itching. Tinea may occur, however, in a syphilitic subject. Errors in diagnosis occur only when the true nature of the disease is not suspected, and the microscope will decide this.

Prognosis.—The eruption is liable to recur, and may last for years, unless the parasite is entirely destroyed. Under thorough treatment the prognosis is favorable.

Treatment.—Boracic, Carbolic, and Sulphurous acid, Iodine tincture, Sulphur, and alkaline baths are used successfully. The preparations of mercury are also valuable. The true secret of success lies in the thorough application of a parasiticide of suitable strength, and one which can be conveniently used by the patient. Strict attention should be given to cleanliness, and the body should be frequently washed, while tonics, regular living, good diet, and change of air are useful adjuncts. Dr. Duhring gives the following: "Sapo viridis should be thoroughly rubbed into the affected skin every morning and evening for several days, one coating of the soap being applied over the other. Four or five days later the first bath is ordered, after which the disease will be observed in many cases to have disappeared."

Internal treatment is of little service except for such general systemic disturbances as may accompany the eruption.

FAVUS: TINEA FAVOSA.

Synonyms.—Porrigo favosa, Porrigo lupinosa, Favus dispersus, Crusted ringworm, Honey-combed ringworm; (Ger.) Erbgrind; (Fr.), Teigne faveuse.

Definition.—Slightly raised, discrete or confluent small white points, becoming later a bright yellow or sulphur color, with umbilication and crusting. Usually located about the hairs or at the mouth of the hair follicles.

Ætiology.—The disease is the result of the presence of a vegetable parasite, called achorion Schönleinii. The parasite is capable of transmission, and the disease is consequently contagious. The affection has been traced to the contact of the cat with mice, in which the disease has been said to originate, and is in this manner transmitted to children. It is generally seen in those in ill health and of strumous constitutions, and seems to lower still further the general vitality of the patient. It is almost limited to the poor, and rarely occurs in those well nourished.

When the masses are examined under the microscope, they will be found to consist of the spores and mycelium tubes of the parasite. The spores are round or ovoid, separated or joined together in chains of two or more, and the tubes are simple or branched. Fine granular matter is also present. It is a local affection, the hairs and follicles being the structures usually attacked.

Symptoms.—While it may appear upon any part of the body, the scalp is most commonly affected. The fungus penetrating deep into the hair follicles, the disease is at times very severe and obstinate. When attacking parts but poorly supplied with hairs, the eruption is more superficial, and hence more easily cured. The crusts are at first very small, but later increase in size and diameter, or, jointing, form

masses of considerable size, which are easily displaced and leave a red glazed surface beneath. Here, as in other skin diseases, the clinical appearances vary, and the cup-shaped character may be wanting. In such cases we have a collection of yellowish, dry, crust-like masses around the hairs, rendered darker in color at times by the presence of dust or blood. The disease may exist for some time, and affect a large portion of the scalp and extend down to the roots of the hairs, so that the latter become loosened and are removable rather than brittle. Cicatrization may follow the destructive process of the disease. The nutrition of the hairs is disturbed, and they become dry and harsh. When appearing upon other portions of the body, the disease presents small, reddish, slightly raised spots, the crusts being surrounded by an erythematous circle. In rare cases the affection may extend over a large portion of the body, and may be accompanied with a moderate degree of pruritus; it is comparatively rare in this country.

Diagnosis.—If the diagnosis cannot be made out, recourse must be had to the microscope. Pustular eczema of the scalp, some cases of syphilis, and psoriasis are the only diseases with which it may be confounded.

Treatment.—The superficial crusts should be scraped off, or, if very adherent, they may be softened by means of a poultice and followed by a thorough anointing with sulphur ointment. When the hairy parts are involved, thorough depilation of the hairs should be practiced, and a solution or ointment of bichlor. (3 grs. to the oz.) or of the red oxide of mercury, well rubbed into the affected parts night and morning. When the body is the part affected, sulphurous acid, oleate of mercury (5 per cent.), or iodine, may prove serviceable. The general health should be sustained by appropriate regimen. As in other parasitic forms of eruptions, the remedies must be administered for conditions accompanying the eruption.

Consult: Bromine, Calcarea carb., Graphites, Lycopodium, Phosphorus, Sulphur, Viola tricol.

TINEA DECALVANS.

Synonyms.—Porrigo decalvans, Alopecia areata.

Definition.—Circumscribed patches of baldness occurring upon the scalp and other hairy parts.

Ætiology.—The cause is attributed to the presence of the parasite microsporon Audouini. Others have advanced the theory that there are two diseases concerned, one parasitic tinea, and the other non-parasitic, to which the term alopecia areata has been given, and supposed to be a trophoneurosis. The latter opinion certainly deserves careful consideration, but inasmuch as the disease is still involved in doubt we place it among the parasitic diseases. Its contagious

nature is in dispute, although persons living together under the same unfavorable conditions of health are often affected at the same time.

Symptoms.—The spots of baldness are isolated and appear on the head, in the beard, and eyebrows. The surface of the skin involved is clean, white, and shiny. The spots appear suddenly, vary in size, extend rapidly, and the hairs come out by the roots unbroken, although more or less dry. The spots may extend and coalesce until the whole scalp is depleted. Permanent baldness may result or a new growth of hair may occur. The disease occurs in youth and among adults. It is unaccompanied by marked subjective symptoms.

Diagnosis.—The only eruption likely to be mistaken for this disease is the tinea tonsurans, but with a little care the error is not likely to be made. It is only necessary to refer to the fact that baldness may occur in consequence of seborrhœa, eczema, and syphilis, in order to avoid any mistakes in diagnosis from such causes.

Prognosis.—The prognosis is favorable, as a rule, but speedy relief must not be anticipated.

Treatment.—Epilation of the margins of advancing patches, and blistering with cantharides, iodine or capsicum, and the application of an ointment of bichloride of mercury (1 gr. to ʒ) or tincture of phosphorus (gtts. iii., aq, ʒxvi). Spontaneous recoveries undoubtedly occur, and while treatment should not be neglected, too much credit should not be given to it.

Consult: Arsenicum, Baryta, Carbo veg., Graphites, Lycopodium, Natrum mur., Phosphorus, Sepia, and Sulphur.

SCABIES.

Synonym.—The Itch.

Of the diseases of the skin due to the presence of an animal parasite scabies is the most important. It is not a common disease in this country, and generally it occurs among the poor and uncleanly. The disease is produced by the acarus scabiei or sarcoptes hominis. The insect burrows under the skin and may be traced by the appearance of a dark thread-like line upon or beneath the skin. Papules, vesicles, or pustules may develop as lesions of the disease, together with crusts and marks due to scratching. The disease is contagious, and is readily transmitted by contact in bed or wearing clothing already infected, while it does not seem to be transmitted by ordinary handling, as in the examination of a patient. The length of time which the disease has run, or the condition and surroundings of the patient, will cause variations in each particular case, so that at times the inflammation may be very severe and the manifestations multiform. The favorite points of attack are between the fingers, after that the inner surface of the wrists and the soles of the feet. The parasite has also been found

upon the mammæ, penis, and about the buttocks. The itching is at times severe, especially after becoming warm in bed.

Diagnosis.—In the beginning it may be confounded with papular and vesicular eczema, but later the detection of the acarus removes all doubt.

Prognosis.—The prognosis is favorable since the disease may be radically removed if proper treatment is pursued.

Treatment.—A very satisfactory mode of treatment is the following. Rub the body, and especially the affected surfaces, with soft-soap thoroughly applied. This is followed by a warm bath, during which the surface of the body is thoroughly scrubbed, then dried, and a sulphur ointment (℥j to ℥ij to ℥j) applied, and the patient wrapped in a blanket and put to bed, a cleansing bath being taken next morning. The process may be repeated if found necessary.

Should the irritation of the skin be considerable, milder measures may be used to allay it before the above treatment is attempted. Treatment may be required for constitutional symptoms in the patients affected, but for the removal of the acarus we agree with Baehr that internal treatment is absolutely futile.

The Therapeutics of Diseases of the Skin.—Aconite.—This remedy is serviceable in erythematous forms of eruptions where the exciting cause is due to exposure and chilling. General heat and the characteristic restlessness of the drug are present. In the earlier stages of herpetic and urticarial eruptions, with catarrhal symptoms, and also in the febrile stages of zoster with neuralgic pains.

Agaricus.—In miliary and erythematous forms of eruptions, or in infiltrated patches of skin, purple in color. Burning-itching and smarting sensations in the parts affected.

Anthracinum.—In furuncular manifestations, with gangrenous tendency. Low, debilitated conditions, apparently the result of blood poisoning. Serviceable where Arsenicum has failed, although seemingly well indicated.

Antimonium crudum.—In catarrhal and pustular forms of eruptions, also in urticaria, where the wheals are surrounded by reddened edges. Acne of drunkards, with gastric derangements, severe thirst, and white coated tongue. General gastric disturbances are present, as a rule, and in many cases seem to be the exciting causes of the eruption.

Apis mellifica.—Furuncular, erysipelatous, and gangrenous manifestations. Marked inflammatory and œdematous conditions, followed by desquamation. Urticaria appearing suddenly, with stinging-burning sensations. Red and white spots in the palms of the hands, on the arms, feet, head, and neck. In zoster, when the burning-stinging pains are relieved by cold applications (Arsen. worse). In glandular enlargements with the characteristic burning sensations of this drug, and extensive erythema. Catarrhal conditions of the uterus are present in many of these cases.

Arnica.—Furuncular, erythematous, and purpuric forms of eruptions. It has the reputation of aborting boils when used internally and externally. Small, painful, hard, shining swellings.

Arsenicum album.—This remedy has a wide range of action in cutaneous diseases, and may prove serviceable in nearly every form of eruption; those associated with low, prostrated conditions of the system especially calling for its use. It is of service in pustular and desquamative forms of eruptions. It is recommended and used by the old school for psoriasis. Raised, circular, reddish spots covered with scales, especially upon the knees and elbows; anæmic debility. For pustules with malignant ulceration. Dark-colored ulcers with an ichorous discharge and a tendency to spread, with inflamed edges and thick crusts, accompanied with burning pains. In furuncular affections with acute subjective symptoms of burning pains, associated with restlessness

and prostration. Herpetic eruptions, confluent in form, and with intense burning; herpes facialis. Acne punctata, with dry and dirty-looking skin. Lepra, with irregular, circular, raised patches, consisting of grayish-white scales; intense itching and burning. In lichenoid eruptions, with scaling and tenderness of the skin; marasmic conditions, with weakened nutrition. Cachectic subjects.

Arsenicum iodidum.—In the chronic forms of scaly eruptions affecting the head and body, with burning and itching.

Asa fœtida.—Serviceable in ulcerated conditions, with bluish hard edges and a thin, fetid, ichorous, sero-purulent discharge. These ulcers often follow the pustular eruptions and are apt to be associated with a scrofulous or syphilitic taint.

Belladonna.—Suitable in the earlier stages of eruptions, associated with high fever and intense local congestion; also in the early stages of furuncular affections and inflammatory engorgements. Excessive sensitiveness of the skin to contact. Cerebral complications.

Bryonia.—In urticaria produced by atmospheric changes and accompanied with rheumatic pains, which are worse from motion and at night; sleeplessness and fever, Dry, miliary, itching eruptions. Skin yellowish in hue.

Calcarea carbonica.—The constitutional signs or conditions are the chief guides for the selection of this remedy, and since cutaneous eruptions often appear in those who are debilitated, or whose constitutions are depraved, Calcarea is a remedy in frequent use, especially for children. In vesiculo-pustular eruptions, where the crusts are thick and cover large surfaces, the purulent discharge being thick and profuse. In the erythema of children which gives but little trouble, or where the objective symptom is the only manifestation of the disease. In urticaria with bullæ, eruption dark-red in color, intense itching with aggravation from scratching. Acne sebacea with hyperæmia of the scalp and headache. The skin may be dry, shrivelled, scaly, easily suppurating, and of a yellowish taint, or oily and shiny.

Carbo vegetabilis.—This remedy will be found of service when the glandular system is involved in the general onset of the disease. Furuncular forms of disease, especially when they assume gangrenous conditions, and the secretions are dark and of foul odor. The skin assumes a raw, ulcerated condition. Prostration of the vital forces with hippocratic face.

Chloral hydrate.—This drug has produced an erythematous condition, associated with livid purpuric spots and marked pruritus of the whole skin. Suitable for neurotic forms of erythema or urticaria, especially of the face.

Chrysophanic acid.—Eczema of the lower extremities; intense itching; discharge profuse and offensive.

Conium.—For herpetic and pustular eruptions. Petechial spots or bruised appearance of portions of the body. Indurated acne of the face, chronic in course, and occurring in scrofulous subjects. Gangrenous ulcers. Glandular enlargements.

Croton tiglium.—Vesicular and herpetic eruptions on an inflamed skin. Violently itching eczema, involving a large portion of the cutaneous surface. Intertrigo, with smarting-burning, and with an offensive discharge. Itching and painful burning; desiccation and desquamation.

Dolichos pruriens.—Dry eruptions, with intense itching. The itching may exist without any perceptible eruption.

Dulcamara.—In urticaria caused by exposure to cold, and accompanied with pains in the bowels; nausea and watery mucous stools. Itching, followed by burning after scratching. Herpetic eruptions sensitive to touch, with aggravation from washing. Brownish herpetic eruptions with inflamed borders.

Graphites.—For eruptions of erythema, eczema, and obstinate forms of herpes. Its symptomatology covers all the manifestations of eczema, and the general condition of the patient will decide for its use when compared with other remedies. The discharges are glutinous and transparent or sticky, serous or purulent. We may have, on the other hand, a condition of excessive dryness of the skin, with tendency to ulcerate from every injury. Eczema aurium, with crusting and sero-purulent discharge. In acne sebacea, especially about the ears; acne vulgaris in fleshy subjects, especially women with delayed menstruation. Perspiration slight or wanting entirely. Lichenoid forms of eruption. Itching often intense. Hairs brittle, and fall out easily.

Hepar sulphuris.—This remedy, which has been a sheet-anchor with our

school in glandular diseases, is now in constant use by the old school, under the name of Calcium sulphide, and is recommended both to prevent and hasten suppurative processes. It is, therefore, of service in furuncular affections. In eczematous conditions, especially when crusting is present, or in eczema rubrum of children, of the vesicular or serous variety, and accompanied with local heat and soreness. In eczema hypertrophicum, and when affecting the chin and cheeks. In acne simplex with pustular lesions, or in sluggish papules occurring in lymphatic subjects. Acne appearing on the forehead, chin, and neck, with slight crusting; glandular swellings. In herpes with tendency to recur and scaly eruptions of the hands. Chronic cases of urticaria. Dry, miliary, pimply eruptions, with yellowish color of the skin, and itching. Non-parasitic sycosis, with follicular pustules and nodules. There is also an unhealthy yellowish condition of the skin, with ulceration, in which it will be found serviceable. Tenderness of the skin in or about the seat of the eruption.

Hydrocotyle asiatica.—Tubercular leprosy. Nose flattened and swollen, lobes of the ears pendulous and swollen. Swelling of the hands and feet. Leonine face. Feeling of lassitude.

Hyoscyamus.—This remedy, given for an excessive nervous condition, has the credit of modifying the furuncular process which causes it.

Iodum.—In glandular complications associated with papular, scurfy, rough, or thickened condition of the skin; œdematous swellings. Brownish discoloration of the skin, the latter being thickened and covered with scales. Intense itching, especially at night, causing sleeplessness and constant scratching. Cachectic features, emaciation and dyspepsia. Yellowish, clammy, moist skin. Acne indurata. The external application of the tincture has been recommended for the papulo-squamous form of eczema. Iodide preparations have produced an eruption of pemphigoid bullæ.

Iris versicolor.—Eczema pustulosum. Psoriasis in irregular patches on knees and elbows, covered with shining scales and slightly raised and irregular edges. Zona on right side of the body with gastric derangements. Fine miliary eruption, aggravated by scratching, with great itching at night.

Kali bichromicum.—Vesiculo-papular eruptions, soon degenerating into pustular forms, and these into ulcerated conditions. Yellowish, watery secretion from the vesicles. The ulcers vary in size, with overhanging edges, hardened bases, and inflamed areolæ. Deep-seated ulcers limited in circumference. Hard nodules on the extremities, with inflamed bases. Burning heat and itching of the skin.

Lachesis.—Malignant forms of furuncular affections, with a bluish-purplish look, and associated with symptoms of blood-poisoning and cerebral complications; or in cases where pustular eruptions assume a gangrenous tendency, or discharge a dark sanguino-purulent fluid. Corroding ulcers, variegated in color, with offensive discharges; ulcers bleed freely. Miliary and papular eruptions, followed by vesicles and pustules. In erythema nodosum, ecchymoses, and bed-sores. Bluish-purple discoloration of the skin with excessive tenderness.

Ledum.—Erythema, especially of the upper extremities. Purple petechial spots, with burning in the open air. Herpetic eruptions, with itching. Absence of perspiration.

Lycopodium.—In glandular and furuncular affections. Eczema with fetid secretion, thick crusts, and deep rhagades. Crusta lactea of the scalp, when the eruption has a blackish appearance. In pustular forms where the resulting crusts are fetid, thick, and bleed easily. Dry, scaly condition of the skin, which has a yellowish-red tint. Dry, scaly or sebaceous condition of the scalp. In chronic or oft-recurring forms of erythema and urticaria. Macules, especially on the trunk. Callous ulcers. Vascular tumors, with a bluish look. Nævus maternus.

Mezereum.—Erythema, with intense itching and burning, especially upon the lower extremities. Skin rough and covered with a red rash. Itching. Dry, scaly condition of the skin. Zoster, with hot darting neuralgic pains; burning sensations and chilliness.

Mercurius.—In erythematous forms due to errors in diet, especially in children, where heat, redness, itching, tenderness, and fever are present. Vesicles and pustules. Eczema palmaris, with stinging-burning pains, scratching followed by inflammation; raw, moist surfaces; aggravation during cold weather. Dry scaly conditions or crusts. Yellowish, dirty appearance of the skin. Superficial ulcerated conditions which bleed easily. Itching and soreness of the skin. Herpes or zoster with the nightly aggravation and perspiration without relief. In glandular enlargements or furuncular affec-

tions where the febrile conditions are not marked, but nocturnal restlessness and pains are present.

Natrum muriaticum.—Papular and herpetic eruptions. Verrucæ. Herpes occurring in fever, or associated with the debility which is the result of fever. Urticaria with red blotches and intense itching. Acne sebacea of the face. Itching of the scalp, with falling out of the hairs. In acne indurata, with oily appearance of the skin. Raw and inflamed appearance of the skin, with a corroding discharge. Skin shrivelled and dirty-looking.

Nitric acid.—Furuncular and pustular affections with a phagedenic tendency. In furunculosis, with stinging sensations, as if splinters were in the parts; similar sensations are present in the ulcerated conditions calling for this remedy. Ulcers bleed easily, and are angry looking, with red margins. Verrucæ large and numerous; bleed easily; friction produces laceration of the skin and deep rhagades. Skin dark-colored, dirty, spotted and dry.

Nux vomica.—Better suited to allay and control the digestive disorders, giving rise to cutaneous symptoms than for any special form of eruption. Suitable when there is a tendency to boils, especially small boils, or in urticaria, frequently returning after errors in diet.

Petroleum.—Eczematous eruptions. Raw, moist surfaces, alternating with thick scales or crusts. Unhealthy condition of the skin, which is cracked and bleeds easily. Discolored spots upon the skin, with tendency to suppurate. Painful sensitiveness of the skin, with itching; brown or yellow spots on the skin.

Phosphorus.—Recommended where there is a tendency to furunculosis. Seborrhœa capillitii, with itching in small spots; copious dandruff-like scales. Dry, scaly, or sanguino-purulent eruptions. Burning-stinging sensations; low prostrated conditions of the system.

Pulsatilla.—Acneic forms of eruption. Urticaria, with marked concomitant symptoms of disordered digestion, or associated with menstrual and rheumatic troubles Zoster with lancinating pains. Intertrigo and rhagades. Moles or freckles, especially on young girls. Paleness of the skin, with burning-itching, moving from one place to another.

Ranunculus bulbosus.—Vesicular eruptions. Pustules breaking down into burning-stinging ulcers, with ichorous discharges.

Rhus toxicodendron.—Erythematous blotches, with systemic disturbances; erythema nodosum. Confluent vesicles, with burning and redness of the skin, and suppuration. Raw, excoriated surface, with thick crusts and offensive discharge. Herpes and zona; bullæ with reddened areolæ. Recent forms of pemphigus. In vesicular urticaria with hot, dry, burning, swollen, and reddened skin; aggravation from cold and damp. Purplish appearance of the skin, discharging a serous fluid. As accompaniments in many cases we have: Itching, becoming a burning after scratching; rheumatic pains, sleeplessness, restlessness, and great weariness; general aggravation from, or caused by, exposure to damp, cold weather.

Secale cornutum.—Furuncular affections, with tendency to gangrene, and accompanied with prostration, and when cerebral phenomena are present at an early period of the disease. Pustules with sanguino-purulent contents. Shrivelled, dry appearance of the skin, with desquamation and low, prostrated conditions. General aggravation from external warmth.

Sepia.—Acne, eczema, and scaly forms of eruption, pustules and bullæ. Blotches over the skin, of a reddish or yellowish color, with itching and burning. Herpetic eruptions associated with menstrual irregularities or pregnancy. Transient forms of urticaria frequently recurring. In acne sebacea, with yellowish waxy secretion, forming thin crusts, which are firmly adherent. Soreness of the skin, with humidity in the bends of the joints. Pityriasis rubra in women with menstrual irregularities.

Silicea.—This remedy covers a wide range of eruptive manifestations, vying with Sulphur the place of a specific for cutaneous diseases. Suitable for eruptions characterized by profuse catarrhal or purulent secretions. In furuncular affections where the suppurative action is tardy (also Hepar sulph.) or where, after suppuration, a foul, unhealthy sore is left, with delay in healing. Tendency to boils, or where they are about leaving an indurated condition of the skin. Papules red, itching and burning; the itching is apt to be worse during the day. Pustules, bullæ, and ulceration. Unhealthy condition of the skin, which easily inflames. In all these conditions the constitutional concomitants will be the leading signs for the selection of the remedy.

Sulphur.—Serviceable in nearly the whole range of cutaneous manifestations; erythema, eczema, and pustular affections, with their resulting crusts and scales, have each a claim on the remedial powers of Sulphur. Acne rosacea of drunkards, with hyperæmia and varicosity of the capillary vessels. Irregularly rounded patches, with depressed centres and scaly circumferences, accompanied with itching. In all forms of eruptions the general conditions of the disease and the peculiar constitution of the patient, as in Silicea, must decide for this remedy. Its action is not rapid, and careful consideration will have to be given to the dose and its repetition in each individual case.

Tartar emetic.—Pustular and bullous affections, with large, deeply inflamed areolæ and burning pains. Suitable for pustular eruptions which have not become chronic. Bluish-red marks remain after the disappearance of the pustules. In acne with tendency to pustulation. Itching of the skin, followed by vesicles and pustules.

Urtica urens.—In urticaria occasioned by trifling changes of temperature, or when associated with renal troubles. Itching and burning of the skin. Ill consequences of suppressed urticaria.

Viola tricolor.—Moist secreting crusts, brownish in color and offensive. Crusts thick, hard, and cracked. Yellowish, purulent exudation, which becomes tenacious and gummy. Itching of the eruptions.

AN EPITOME OF THE COMMON DISEASES OF THE EYE.

BY C. H. VILAS, M.D.

I. OF THE CORNEA.

The absolute necessity of the cornea to the function of vision renders its preservation of the greatest importance, and the results of its injury much to be dreaded. A tissue of low organization, destructive changes are likely to be rapid, and changes incident to repair necessarily slow.

1. Keratitis.—Corneitis.—Inflammation of the Cornea.

Ætiology and Symptoms.—Among the many causes which may be enumerated under this head, those which are found in the various forms of conjunctivitis are the most formidable. Purulent conjunctivitis cuts off the nutrient supply of the cornea, and not unfrequently brings on destructive ulceration, or the sloughing of the entire tissue. Neglected granulations of the lids, or any form of injury or disease by which the lashes are distorted, by constantly rubbing over the polished surface of the cornea, induce roughening, cloudiness, and vascularity of its surface, which, unchecked, end in ulceration.

Perhaps of all constitutional diseases which bring about keratitis, the most strikingly characteristic is hereditary syphilis. Strumous subjects are especially liable to its ravages, and syphilitic and scrofulous keratitis were formerly confounded. Poorly fed and scantily clothed children, who are subject to the vicissitudes of poverty, fall an easy prey to corneal affections; and the same is true of persons suffering from great debility of any kind. Corneal incisions in cataract and other operations involving long wounds of this tissue, and blows and blunt wounds of all kinds upon its surface, exert their influence in producing inflammation of the cornea. Apparently trivial causes should never be overlooked, for in a fertile soil slight influences oftentimes bring about serious results.

The invasion of the corneal tissue by conjunctival inflammation is productive of the most serious results. The previously sound cornea, when thus destroyed in part, is not replaced by the same organization, but by a dense, white cicatrix, which impedes or stops the rays of light from entering the eye, and disfigures the personal appearance of

the unfortunate victim. But should the cornea, during the progress of the inflammation, become also swollen and thinned, the cicatrix extending over a large superficial area, it will bulge, or even burst, and its contents prolapse, forming a staphyloma. Such an accident not only almost invariably destroys the vision of the affected eye, but, by the irritation of the nervous connection, jeopardizes the companion eye. An apparently less serious effect is produced when a weakened cornea only slightly bulges; but in time the disastrous effect is seen. For the thinned walls, slowly yielding to the intraocular pressure (*vis a tergo*), protrude more and more, and the thus rendered astigmatic eye, in constantly increasing degree, becomes less valuable for vision.

But the great tendency of keratitis is to leave opacities, even after all inflammation has subsided; and if these opacities are dense and sufficient to cover the pupil, loss of sight is the result. A clear ring of corneal tissue, however, will enable an artificial pupil to be made; but a guarded opinion only as to the beneficial results likely to ensue should be given until assurance is obtained that the cornea is not seriously disturbed in its curvature.

The curability of resultant opacities depends largely on whether they are superficial or deep. If the former, affecting the epithelium, they are usually curable; if the latter, invading the parenchyma, they seldom are. Various names are applied to them with a view of conveying an idea of their relations. A superficial, faint, cloudy appearance is called a nebula, owing to its resemblance to nebulæ, or clouds. When the layer immediately beneath the epithelium is invaded, the opacity is called albugo; one deep, dense and white, leucoma, or leucoma adherens, if the iris is adherent.

Opacities, unless occupying a central position of the cornea, do not entirely obstruct vision, but often, by impeding a free passage of rays, cause squint, or nystagmus. Thus, clear vision not being obtained through the clouded portion of the cornea, the eye is involuntarily turned that a clearer part may be brought into the visual axis; the constant endeavor to evade the obstruction at length gives the eye a movement of oscillation or a permanent squint. Tattooing, or staining the opacities with India-ink, is sometimes resorted to when the personal appearance is much injured. It is an operation not unattended with danger, but in skillful hands will often give a remarkably natural appearance to an unsightly scar.

All cases of cloudiness of the cornea are not to be attributed to idiopathic keratitis. This cloudiness attends as a symptom of other diseases, such as glaucoma, serous iritis, or irido-chorioiditis.

It is often of importance to at once distinguish between an abscess and an ulcer of the cornea, an abscess being suppuration inclosed by corneal tissue, and an ulcer being formed by an abscess opening. Ulcers also occur superficially without previous abscess, and when

recurrent, or of a sloughing nature, frequently become difficult to control.

Treatment.—The treatment of ulceration or sloughing of the cornea when due to purulent conjunctivitis must be conducted with the greatest judgment. A case of conjunctivitis demands a watchful care of the cornea, and on the appearance of the slightest turbidity of the central portion, which is the usual precursor of sloughing, or rolling-up of the epithelium at the periphery, the forerunner of corneal invasion, eserine (℞ Eseriæ sulphatis, gr. ij ad gr. iv; Aquæ dest. ʒj. ♏) should be instilled in the eye, and the anterior portions of the globe at once brought under its effect. Extreme cleanliness should be observed about all contact with the cornea, especial care being taken that none of the astringents applied to the conjunctiva in any manner touch the cornea. Hot applications to stimulate local nutrition should be made, all pain alleviated, and every attempt made to sustain the strength of the patient. Sometimes atropine (℞ Atropiæ sulphatis, gr. ij ad iv; Aquæ dest., ʒj) is of more advantage than eserine; either may be used as indicated, a drop of the solution being placed in the conjunctival sac from two to eight times daily.

The sensitiveness of the cornea and adjacent tissues may be wholly overcome for the purposes of examination in this, or any of the forms of keratitis, by the instillation of a few drops of a two per cent. solution of cocaine muriate. A thorough and exhaustive examination may thus be easily made, and error in diagnosis avoided. To a certain extent this same remedy may be continued, either singly or in combination, as a means of treatment, but only exceptionally with the best results.

Even under the foregoing treatment the ulcer may steadily show a disposition to advance and the globe to burst. The latter should not be allowed, three alternatives presenting: The first is to perform paracentesis through the corneal margin, thus relieving the pressure from behind, the most generally applicable; the second, to perform Saemische's operation, the least generally applicable. This operation consists in entering the anterior chamber with a narrow, long knife, preferably a Graefe's modified cataract-knife, through the healthy tissue on one side of the ulcer, again penetrating and bringing out the knife through the opposite corresponding portion of the healthy cornea, and then urging the knife to cut its way out through the base of the ulcer. A fine probe is then used daily to keep the incision open, and the tension thus reduced. The third alternative, occupying a middle ground between the other two, consists in performing an iridectomy. If successful in its object, the latter also presents the advantage of an artificial pupil. Appropriate internal remedies will be found discussed at the end of the section.

A staphyloma, if of a pronounced nature, seldom yields satisfac-

torily to an internal remedy, and finds appropriate treatment only in operative surgery. It may necessitate the removal of the eye, from danger of sympathetic invasion of its companion; where there seems no danger of the latter, the anterior portion of the globe only may often be removed, thus leaving a better base on which to wear an artificial eye and greatly improve the personal appearance.

The treatment of opacities is much furthered by a judicious combination of internal and local treatment. While no one or half-dozen remedies can be relied on to treat such cases, *Calcarea carbonica* has seemed to relieve very generally, and *Ipecacuanha* is unquestionably of great service. A studied and judicious use of silver nitrate, calomel, or other forms of mercury, locally, will hasten tissue changes. Time, however, seems to be an element that largely enters into all local or other remedies and, whatever remedy is used, must be considered in the prognosis.

Recurrent vascular ulcers, sloughing vascular ulcers arising from injury and causes other than conjunctivitis, must be treated on the same general principles as have been given. Those dependent on impaired nutrition often prove most intractable and annoying, persisting even after every semblance of cause has apparently been removed.

Old, chronic, indolent ulcers, and at times ulcers of a low grade of an inflammatory type, showing little disposition to heal, may occasionally be advantageously gently touched with weak silver nitrate to stimulate them. But this privilege must be sparingly and judiciously used in the latter class, or harm will ensue of even an irreparable character; and it is generally safer to say that no silver nitrate, or other irritant, should be used in ulcers of an acute or inflammatory type. The rule is imperative regarding preparations of lead.

All ulcers and abscesses are benefited, and may often be cured, by a properly adjusted bandage alone. Staphylomata are not found when proper bandaging has been done at the outset. But such bandaging is an art of small degree, and an improvised make-shift does not produce the result of a carefully prepared bandage, nor do regrets atone for the eyes lost by neglect of so simple a remedy.

The various forms of inflammation of the cornea may, for convenience in their examination, be further divided into four kinds: (a) suppurative; (b) vascular; (c) pustular, with synonyms phlyctenular, herpes of the cornea; (d) interstitial, with synonyms parenchymatous, and diffuse. Not unfrequently the third form is classed with the recurrent vascular ulcer.

Certain symptoms are common to all the forms, some of which are, and all of which may be, present in any case. These are ciliary irritation; rosy zone of vessels around the corneal margin, with conjunctival congestion; contraction of the pupil; pain, photophobia and lachrymation; impaired vision. These, and the characteristic symp-

toms viewed on the cornea, render the diagnosis of corneal affections a matter of great simplicity.

(*a.*) *Suppurative Keratitis.*

This formidable variety of corneal inflammation is characterized by the inflammatory infiltration changing into pus, which appears as a yellow deposit in the corneal tissue.

Symptoms.—The whole cornea may become involved as a yellow, broken-down mass, or the suppuration may be limited to an abscess. At times the attending vascularity and pain may be very great; the impending danger gives full warning. Again, it insidiously steals on, and irreparable destruction of the cornea ensues.

The results may be materially changed by two conditions, whether the suppuration take the form of an abscess or an ulcer. An abscess begins by a grayish speck, which is often exceedingly tender to the touch. As it grows larger, it assumes the yellow pus-color distinctive of this form.

Two situations now present themselves; the abscess may burst and discharge internally, in which case we have an hypopyon, or pus within the anterior chamber, or the walls of the abscess may remain unbroken, and fatty or chalky degeneration of the pus ensue, a dense opacity resulting. The other situation may be that the abscess will burst externally, forming an ulcer. The final result will largely depend on the issue of these alternatives, as determining not so much the extent as the kind of deformity remaining. Leucoma adherens is the almost inevitable result of the former, while the range of the latter is from a faint nebula to the largest unsightly anterior staphyloma.

Hypopyon has been mentioned. There is a condition which is similar to, and often confounded with it, which has been named onyx or lunella, from a resemblance to the white crescent near the matrix of the finger-nail. This consists of a line of pus which gravity has settled to the lower body of the abscess. Glanced at in profile, an error is difficult, but that it may coexist with hypopyon should not be forgotten.

Treatment.—It is evident that the stronger the body of the cornea, the less likely it is to become seriously involved. Hence, one of the first indications is to support the general strength, and thus indirectly the corneal tissue. Even though this is successful only in part, a cornea tending to suppuration may be so strengthened that it will only bulge, and the main shape of the globe be maintained, though the sight be dulled on account of the changed curvature of the refractive corneal surface. Locally, in the beginning, great care should be given to the adjustment of the pressure bandage, which also enforces rest of the eye, and the instillation, as recommended, of eserine or

atropine. Large abscesses should not be permitted to burst, but paracentesis be performed through their bases. An hypopyon may be easily controlled by *Hepar sulphur*, and does not require evacuation. If the iris prolapse, it is better to snip it off with the scissors, unless it will return under the action of a mydriatic or myositic. The stimulating value of hot water has been alluded to; it furthermore is usually sufficient to allay the pain, and promotes the efficacy of the atropine. But if the pain is not quieted, a few drops of *Allium cepa* ^{0}, occasionally repeated, will usually prove all-sufficient.

(*b.*) *Vascular Keratitis.*

The special characterization of this form is gray opacity of, and development of vessels on, the roughened surface of the cornea. Typical cases present superior and inferior crescent-shaped patches of vascularity, preceded by epithelial turbidity.

Symptoms.—Examination of a case of suspected vascular keratitis often discloses that, instead of a precedent hyperæmia and sequent delicate loops pressing into the cornea, which are characteristic of this disease, there is present a hypertrophied epithelium, with a superficial, coarse and abundant supply of vessels. This is pannus, and its essential difference is that the epithelium is hypertrophied and firmly adherent, while in the vascular form the epithelium is loosely adherent, often shed, and, when so, the cause of severe and protracted pain. But there is never any pain from pannus, for it securely covers the terminal nerve filaments, rendering them inaccessible and, hence, free from exposure, the cause of the pain.

The course of the disease generally involves a period of more or less blindness, for the crescent-shaped patches advance until, meeting, a general redness of the cornea is thus brought about. As time elapses, resolution sets in, the vessels which were so apparent grow smaller, gradually withdraw toward the palpebral margins, and, disappearing slowly, leave the surface of the cornea more or less free.

Treatment.—All treatment of vascular keratitis should be at once in the direction of changing the nutrition of the body and cornea with a view to arrest the development of the vessels. The cause of any bodily ailment must be removed, and the nerve-centers stimulated to a correct action. To this end all noxious influences, of whatever nature, should be removed, and the patient placed beyond their reach. Locally, solutions of eserine or atropine, of the strength already indicated, should be used, aided by hot applications. If seemingly of benefit, hot poppy-fomentations or cold opium solutions may be used. Protection and rest of the eyes should be enforced.

Pannus is often benefited by the continuous and systematic use of indicated internal remedies, and may be thus cured. But when it

does not yield to that, washing with an infusion of Jequirity until a croupous conjunctivitis is produced may be tried, or an iridectomy made in a clear portion of the cornea. These failing, inoculation of pus from an infantile blenorrhœa may be undertaken as a last resort, and, though not as much practiced since Jequirity has been introduced, in the worst forms may not unfrequently prove successful.

(*c.*) *Pustular Keratitis.*

Though not inappropriately left by some authors to be treated under the general head of recurrent vascular ulcer of the cornea, this form is so common and persistent in certain sections of our country as to merit a separate consideration.

Ætiology and Symptoms.—Circumscribed inflammatory nodules, singly or in groups, appear on the superficial layers of the cornea, most often at the margin. Having remained a short time, vesicles form on the nodules, and, bursting, form ulcers. A nerve filament usually becomes implicated, rendering the pain, photophobia, and lachrymation wholly out of proportion to the seeming lesion. The lachrymation is hot and scalding, and all the secretions of the eye become acrid, and, flowing over the adjacent delicate skin, render the parts tender and excoriated.

It is often associated with conjunctivitis, and apt to appear in connection with the eruption of herpes or eczema, and in conjunction with nasal catarrh. Its great and often seemingly unaccountable tendency to recur makes it a dread to both patient and attendant. Its causes are obscure at the best, but aid in its management may be derived from its often particular association with the weak, nervous, and badly nourished. Sometimes it assumes an epidemic form and shows a strong tendency to afflict all who come within reach of its special influence.

Treatment.—The protective bandage and the use of a solution of eserine or atropine is usually sufficient. Finely powdered calomel flicked on is useful in a later stage. For the obstinate photophobia, plunging the head in a basin of cold water, or the use of the eye douche, or cup, will be found remedial. The cure for the tendency to recurrence must be sought in a change of surroundings and the securing of a better tone to the system.

(*d.*) *Interstitial Keratitis.*

The subjects of this chronic form are almost wholly those who have inherited syphilis. For a long time confounded with that of a scrofulous nature, it has at length been characteristically settled.

Symptoms.—A moderate infiltration of the cornea is seen of an opaque, grayish or yellowish-white product, showing little inclination

to break down, and usually collected in extensive, cloudy, and distinctively marked spots. These opacities vary all the way from slight diffuse cloudiness to density, in which latter case the cornea resembles ground glass. A peculiar physiognomy and notched formation of teeth, the upper central incisors of the permanent set being the test teeth, are noted in connection with it. The surface may, but usually does not, retain its smooth appearance, and the epithelium being lost, vessels appear on the surface. If the iris becomes implicated, serious results may follow.

Treatment.—Eserine solutions locally, when well borne, or, at least, only remedies which have a soothing action, should be used. Every attempt should be made to surround the patient with the best hygienic and sanitary influences, and to overcome the inherited taint and build up the system. Moderate exercise in the open air, regular diet, and, with the eyes protected, exposure of the body to a sunny, genial atmosphere. Time seems the great element in curing this malady, and local care being taken of the eyes, it may usually be safely left to this agent. Aid is often obtained from *Mercurius* in its many forms, and Turkish and Roman baths may be ordered to advantage. Iridectomy is sometimes needed in extreme cases, which, existing for a long time, defy all other treatment.

Besides those described, there are a few other diseases of the cornea commonly met with, but mostly of an innocuous or surgical nature, and not to be described in the brief space allotted in this work.

Internal Remedies.—The homœopathic remedies most successfully employed for these troubles, as well as for all other diseases treated of in this section, can be but briefly indicated in their plainest characteristics; their outlines must be rounded out in the Materia Medica, with which, fortunately, the profession is abundantly supplied. Too much care cannot be taken that indications for the local disease alone are not wholly relied on, but the general system be attentively considered in the choice of a remedy.

Aconitum napellus will be found useful in ulceration of the cornea when the characteristic symptoms are present, and the patient is restless, feverish, and thirsty. A dry condition of the conjunctiva is a marked indication. Ulcers due to injury call for this remedy, and yield under its influence.

Apis mellifica is indicated when there are stinging pains, with a swollen, œdematous condition of the lids. A tendency to swelling of all the adjacent parts is well marked in this condition, accompanied by the characteristic stinging pains. In a marked chemotic state it is also valuable.

Argentum nitricum is a standard remedy in preventing and relieving the ulceration of the cornea often attendant on the form of conjunctivitis known as *ophthalmia neonatorum*. Care should be taken that it is not given too low. As has been intimated in the foregoing text, it should be accompanied by the local treatment indicated for the trouble; and in such combination it will be found as nearly a specific as it is possible to obtain for this purpose. (See Conjunctivitis.)

Arsenicum album has been used to great advantage in those forms in which he ulceration is accompanied by profuse and burning lachrymation, with intense pho-

tophobia. The pains are worse at night, and are burning and sticking. Often spasmodically closed, the lids are swollen and excoriated by the acrid lachrymation.

Calcarea carbonica has proven one of the most useful of all remedies. It seems especially adapted to the form occurring in fat, unhealthy children, with potbelly, who are extremely liable to colds. The scrofulous diathesis is well met by it, and a speedy cure often effected when other remedies fail.

Chamomilla.—Much might be expected from this remedy, but beyond its quieting effect upon nervous, peevish children, it has proven of no efficient service internally.

China is a useful intercurrent, its use being indicated in weak, exsanguined persons.

Cimicifuga is of value in the wandering, shooting pains which occur in connection with deep ulceration.

Conium maculatum has one decided value, that of relieving the marked photophobia in superficial ulceration of the cornea whereby the terminal filaments of the nerves in the corneal tissue become exposed. This excessive photophobia is one of the commonest and severest in apparently slight ulceration, for on casual inspection there seems to be but little cause for the intense pain, little or no redness of the conjunctiva existing. The pain in such cases seems wholly out of proportion to the lesions, yet such is found not to be the case on a careful inspection. The lids are usually closed spasmodically, and, on being opened, the tears gush forth. The body is bent upon itself, and the head often held down upon the body.

Euphrasia has enjoyed a reputation in these corneal troubles apparently little warranted by the results attained. Its sphere of action is in another class of troubles, those of the conjunctiva, and there it deserves its reputed value.

Graphites is an important remedy, and, when the indications are met, yields gratifying results. Corneal ulcerations occurring in scrofulous children with eczematous eruptions, especially behind the ears, are strong indications. An acrid discharge from the nose, which is often covered with scabs, is frequently present. Bleeding and cracking of the external canthus are often seen, and in themselves are characteristic symptoms.

As has been expressed in the foregoing text, much reliance may be placed upon.

Hepar sulphur, as it will, undoubtedly, cure more cases of keratitis than any other remedy. In the suppurative form it is invaluable, and combined with the indicated local treatment, will speedily and promptly cure in this form. Hypopyon is quickly absorbed by this remedy, rendering evacuation unnecessary. Abscesses of the cornea usually require no other internal remedy, and the greatest reliance upon this drug in these troubles is warranted.

Ipecacuanha may be prescribed with the greatest benefit in scrofulous ulcers which show an especial tendency to recurrence.

Mercurius is well adapted to superficial ulceration, but not so valuable for deep sloughing forms of keratitis. It is an important remedy in the vascular form, and also for phlyctenular keratitis. From the reputation it has enjoyed in these maladies, it is frequently used at once, and disappointment ensues. An empirical administration often results in the loss of time, and the desired end is delayed. The protoiodide is often successful when the other preparations fail, and may be prescribed when the tongue is coated with a dense, yellow deposit.

Nux vomica is a useful remedy in the paralytic form. When a patient has been over-drugged, its well-known power to benefit does not fail it even in the corneal diseases. A special indication for its use may often be lacking, and yet in superficial ulcers benefit may be derived from its use.

Pulsatilla nigricans is valuable in the pustular form when it occurs in the characteristic subject.

Rhus toxicodendron is of marked benefit in all superficial forms of keratitis, especially when produced by wet feet, or by taking cold from getting the clothing wet. In the severe form chemosis is often quickly ameliorated by its use.

Silicea.—Some years ago it was pointed out that this remedy is valuable in the small round ulcers which show a tendency to perforate. Clinical experience is as yet wanting to confirm the statement. Its sphere of action is much better defined in other parts of the eye and its appendages, notably in the lachrymal diseases.

Spigelia anthelmintica is indicated by sharp, shooting and piercing pains

in connection with deep ulceration. The eyeballs hurt on moving them, and seem as if too large for the orbits.

Sulphur.—Sharp and sticking pains, as if a needle or splinter were being thrust into the eye, when occurring in the early morning. All the symptoms are aggravated by bathing the eyes, in marked contrast to the relief usually obtained in corneal affections by bathing.

II. OF THE CONJUNCTIVA.

Nature refuses to be hedged in by the artificial limits of man, so that, though the divisions of the many forms of inflammation of the conjunctiva to which it is so prone are easily described with set boundaries, often practically they cannot be found.

Conjunctivitis—Inflammation of the Conjunctiva.

Ætiology and Symptoms.—The various forms of this inflammation seem generally to develop from the same causes, and are often but another grade from the same origin. All may be infectious and contagious; the discharge from one form may produce its own peculiar kind of inflammation, or that of another variety, and may be endemic or epidemic. It much facilitates their understanding to divide them at the outset into the (*a*) catarrhal, (*b*) purulent, (*c*) granular, (*d*) diphtheritic, and (*e*) phlyctenular forms. In general, it may be said that hyperæmia precedes the catarrhal form, and the catarrhal the purulent, and that they often rapidly supervene on each other in the order named.

In its simple forms, conjunctivitis is not a dangerous disease, but it is too often neglected under the impression that it requires no treatment. No form of conjunctivitis is too mild to be neglected, but some forms of hyperæmia may require no attention; it is in this distinction that a serious error is often made. Two dangers are always present in serious cases; one that the cornea may become involved (see Keratitis) and break down, leading to permanent loss of sight, or that the papillæ of the mucous coat of the lids may become hypertrophied and a source of lasting discomfort and weary torment. For should the papillæ shrink away, and allow the raised and distorted lids to assume an approximately accurate position, the absorption of the effusion frequently so contracts the tarsal cartilages that in-turning lashes (trichiasis) take their place, and add to the discomforts by scuffing over the hypersensitive corneal surface with their stunted, bristling hairs.

Although the cornea is the most favorable tissue in which to illustrate the advanced theories of inflammation, for there the migration of the leucocytes themselves can be plainly seen, the effects of their wandering can be more readily felt in the conjunctiva, and as easily seen. Attended by all the old symptoms of inflammation (*rubor*,

dolor, *calor*, *tumor*), redness, pain, heat, and swelling, the wandering cells crowd and distend the meshes of the conjunctival tissue. This distension is often produced to such an extent as to cause the various folds to yield, and by reason of the firm attachment of the conjunctiva at the corneal margin, to overlap the cornea, and not unfrequently to such an extent as to hide it from view, a condition known as chemosis.

The main causes of this malady are exposure, injuries, or contagion. The exanthematous diseases, other neighboring inflammations, and bad hygiene contribute their share of these results, and the various errors of refraction are not unimportant factors. But the great causes of the terrible and hopeless results so frequently seen are an inappreciation and neglect of those seemingly small sparks of inflammation which light up and spread the overwhelming conflagration.

(*a.*) *Catarrhal Conjunctivitis.*

Synonym.—Catarrhal ophthalmia.

Ætiology and Symptoms.—A preliminary stage of hyperæmia precedes the first symptoms of this form, but is not unfrequently overlooked. There succeeds a sensation of sand in the eye, smarting, itching, and lachrymation; increased vascularity and sticking together of the lids, especially after sleeping. The lids grow red, swell, and stiffen. A mucous, or even muco-purulent, discharge sets in, being recognized by whitish flakes, containing albumin, mucus, and epithelial cells, and, perhaps, a tinge of pus. All of this train of symptoms is perhaps induced by a simple draft of air, or by the contact of a chemical or mechanical irritant.

Treatment.—Inasmuch as these symptoms closely simulate those where a foreign body has found lodgment in some portion of the ocular or palpebral conjunctiva, careful examination of these parts, and especially the retrotarsal and semilunar folds, must be made for minute bits of coal, stone, or other substance, and, if found, they must be carefully removed. If due to ametropia, the error must be found and neutralized by suitable lenses. If due to any of the exanthematous diseases, its progress should be stayed. Chemical irritants should be neutralized and thoroughly washed out; a little washing often injures in some forms of the acids. But if the disease is established, extreme cleanliness must be insisted on always, and care taken that all towels, basins, etc., are isolated, so that the contagion is not conveyed. If desirable that its power of contagion be ascertained, it may be advisable to inoculate the conjunctiva of some worthless animal, as neither chemical nor microscopical examination can determine this point. The aid of a mild astringent (℞ Argenti nitratis, gr. j ad. ij; aquæ destillatæ, ℥j) may be invoked, and a drop placed in the conjunctival sac

by means of a dropper or quill, every three or four hours, and the indicated remedy given internally. Under such treatment resolution is speedy, and the local solutions may soon be dispensed with. Should corneal complications ensue, the sclera develop a tendency to become implicated, or the iris grow sympathetic (rare complications when the treatment indicated is promptly used), a drop or two, occasionally, of an atropine solution (℞ Atropiæ sulphatis, gr. ij ad iv; aquæ destil., ℥j) will quiet all such extensions. Mild cases should not be vigorously treated, but the tendency of all to hurry on to the purulent form should evoke watchful care.

(*b.*) *Purulent Conjunctivitis.*

Synonyms.—Blenorrhœa, Military or Egyptian ophthalmia.

Ætiology and Symptoms.—This virulent form is always preceded and caused by the catarrhal variety, but the communication may be so rapid as to escape the notice of one not keenly on the watch for the invasion. The muco-purulent discharge loses its mucous elements, assumes those of true pus, and rapidly tends to a thorough disorganization of the tissues. There is no essential difference between the infantile (*ophthalmia neonatorum*), gonorrhœal, or ordinary forms, except in their intensity, but the gonorrhœal seems the most virulent of all. Its cause may be readily found in the direct contact of urethral or vaginal pus conveyed to the conjunctiva, for which reason the right eye is the one oftenest affected. When conveyed through the system, the attack is much milder. Unquestionably, those who have their conjunctivæ previously disposed to the reception of purulent conjunctivitis, from the presence of a condition known as "sago-granular," are most apt to take the infection. Hence, work-houses, military barracks, crowded and close school-rooms, are inviting repositories for the disease, and when once started it is apt to rage with a virulence and activity sufficient to incapacitate hundreds of victims in a short period of time. Every national army has suffered from its ravages in a greater or less degree, and it is an enemy of domestic happiness of a most unfortunate and disgusting character. The infantile variety is often quite mild, and easily cured; hence the many domestic remedies in vogue. But when of an active nature, it often over-leaps all surrounding lesser obstacles and hurriedly envelops the neighboring parts. Swollen and firmly closed lids hinder the essential cleanliness, and neglect of imperative rules adds the final means of destruction, and irremediable blindness is the result.

Treatment.—The treatment of no eye disease requires greater judgment or more careful thought, and it is quite beyond the limits of these pages to fully detail it. In ordinary forms, when the discharge has not set in, or suddenly ceases after inception, and the conjunctiva

is hot, tense, and dry, hot and soothing applications should be used, and the way carefully felt. The discharge established, an astringent lotion, variable in strength according to the severity of the case, must be instilled into the conjunctival sac, or painted on the inverted lids. For such lotion silver nitrate is the best remedy. Solutions of five or ten grains to the ounce may be used; they should be painted on the everted lids, and neutralized, or not, by a solution of sodium chloride (common table-salt) as experienced judgment may dictate. If the cornea becomes cloudy, more care in the employment of the astringent must be used, and atropine solutions instilled. Should the lids crowd too closely on the globe, canthoplasty must be performed. The discharge must be removed often, and this is best accomplished by sopping it up with small pledgets of cotton. The palpebral syringe should be used only by the experienced, on account of the great danger of spattering contagion. The non-affected eye, if one only is affected, should be sealed up usually; in any event, great care should be used that the disease be not communicated to it. Sometimes, in the early stages, cool or even iced applications can be borne, but usually not, and even when agreeable, they are liable to do harm to parts not immediately concerned in the process of inflammation.

The great and often lasting injuries inflicted by this disease are carefully detailed in the section on Diseases of the Cornea, and should be carefully studied in this connection. As the disease is so highly contagious, disinfectants may be freely used, and everything carefully guarded against infection. Constitutional symptoms are unfrequent; when present, they should be appropriately treated. The great drain on the system should be met by a generous diet, and the surroundings and prognosis be made as favorable as possible.

Although the records still show the highest ratio of total blindness sequent to the infantile form, the loss of an eye, when competent medical attendance is constant from the inception of the disease, cannot well be brought about at this day except by carelessness of a very reprehensible nature. In all cases the eyes should be thoroughly cleansed, even into the folds of transmission, every half-hour or hour, and one drop of a one or two grain solution of silver nitrate (proportioned according to the severity of the case) carefully placed between the lids night and morning, perhaps at noon also, and a powder of the 30th decimal attenuation of the same remedy administered internally every three hours. No reliance should be placed on the statements of interested or disinterested parties, but the physician be personally assured that his directions are faithfully carried out. The serious responsibility of entailing hopeless blindness at the beginning of life, in cases almost wholly needless, should spur all attendants to active and unremitting exertions.

In all purulent forms the guide for a repetition of the astringent is

the separation of the eschar, and no repetition of the astringent should be made until it has come away. A chemotic conjunctiva, which does not yield to hot applications, may be cut with a knife, care only being taken that the incisions are made parallel to the recti muscles and strictly avoiding the sclera.

(*c.*) *Granular Conjunctivitis.*

Synonyms.—Trachoma, Granular ophthalmia.

Ætiology and Symptoms.—This lingering complaint, the bane of the many forms, usually takes its rise from the neglected or imperfectly cured preceding forms, excepting only when it arises from its greatest origin, contagion. Unquestionably, impure air, and defective hygiene generally, add their quota to the disturbing causes, for it is particularly associated with the badly nourished, or with high, free livers, who crowd their stomachs, indulge in hot stimulating drinks, and remain in a smoky, heated, close atmosphere, and take insufficient exercise. Nearly always general complaints accompany or have originated this trouble, and with rare exceptions those badly afflicted have an accompanying peculiar odor to their persons. The disease shows great tendency to relapses, acute exacerbations being common. The mind is inclined to partake of, or sympathize with, the bodily weakness in old advanced cases, and the patient becomes addicted to lazy, indolent habits. Often scattered by released inmates of some military barracks or almshouse, it becomes fixed in detached communities, resisting very strenuous efforts to subdue it.

Locally this trouble is characterized by hyperæmia, swelling, and a peculiar roughness of the palpebral conjunctiva. These changes may be noticed as diffuse vascular excrescences in the conjunctival tissue, resembling roundish granules, or as hypertrophied papillæ. The former is called granular, and the latter papillary, and occurring together, as they most often do, mixed trachoma. There may be a discharge, at first thin and watery, gradually becoming thicker, and of a muco-purulent character, or the disease may steal on so insidiously as to become established before its existence is really suspected. In the latter case, on recalling what may have previously escaped attention, it will usually be found that there were premonitions from the morning agglutination of the lids, with some appreciable roughness. When either acute or established, the eyes are very irritable, with an accompanying sensation of sand, especially under the upper lid, and they become red and watery on attempting to use them. The lids then shortly become puffy, more or less flabby and limp. Variance in the symptoms, according to the severity of the attack, must be expected. The mucous lining of the lids may become chronically dry, a condition known as xerophthalmia, or be drawn inwards at the

margin (entropion), causing a turning in of the lashes (trichiasis), or become firmly adherent to the globe (symblepharon). Either of the latter, however, is more likely to be the result of injudicious treatment. The greatest danger usually lies in injury to the cornea, the rough, sandy lids irritating its sensitive surface or causing ulceration.

Treatment.—This, while very simple, is largely a matter of delicate tact and experience, and is with difficulty conveyed by words. It consists of the prevention of contagion, the protection of the eyes from light and injurious influences, placing the patient in the best hygienic condition, and securing as active employment of the mind and body as is consistent with the severity of the attack. These comprehensive directions will often tax the ingenuity of the physician to the utmost. Local treatment demands a well outlined idea and an experienced touch, and should be pursued with painstaking judgment. As often done it is productive of harm, and unless carefully and thoroughly done, it is much better to leave the case to internal remedies. Mild, or recent, cases do not require local treatment, as a rule. In the worst of old cases the large warty-looking granulations may be snipped off with the scissors, but the object of local treatment generally is not to burn off or destroy the hypertrophied papillæ, but, by mild inflammation and stimulation, to cause the absorption of the granules and the retraction of the papillæ where they protrude from the mucous lining of the lid. To this end, when necessary, they should be exceedingly gently touched on the exact spot, with, preferably, a finely pointed pencil of cuprum sulphate, or a solution of silver nitrate, or some other reliable irritant. This should be washed off or neutralized at once, or after a few seconds interval, according to the effect desired, and repeated daily, oftener, or less often, according as the case requires. When it is progressing satisfactorily, the stimulation should not be pressed; when lagging, again undertaken. But under no circumstances should a caustic effect be produced, and the stimulant should be changed when it seems to have worn out its effect. Alum, tannin, jequirity, and other irritants may thus be intercurrently employed. After such artificial irritation, the application of cold water to the closed lids for a few moments, succeeded by hot water for a time, will be advantageous, and perhaps necessary.

(*d.*) *Diphtheritic Conjunctivitis.*

Ætiology and Treatment.—This is an extremely rare disease in the United States, and is to be met with in its severest forms mainly on the European continent. It occurs in the course of diphtheria, and seemingly results from the same causes as do the other forms. The treatment is not very satisfactory, consisting of iced compresses locally in the first stages, and the treatment indicated under purulent conjunctivitis when pus sets in.

(*e.*) *Pustular Conjunctivitis.*

Synonym.—Phlyctenular conjunctivitis.

Ætiology and Treatment.—Beyond the fact that the occurrence of phlyctenules in the conjunctiva occasions less discomfort, and that they will bear a more energetic treatment, than when located on the cornea, there seems but little difference between this form and that already treated of under pustular keratitis, to which the reader is referred. Often associated, the two forms should be treated with discriminating judgment, in order to insure the best and speediest results.

2. Pterygium.

Ætiology and Symptoms.—The condition of the conjunctiva to which the name of pterygium is given, consists of a triangular vascular ridge of hypertrophied conjunctival and subconjunctival tissue, and in a great majority of cases appears on the nasal side of the eye, its base towards the canthus, and the apex adjacent to, or more or less on, the cornea. In rare cases a pterygium appears on the outer, or temporal, side of the eye, and occasionally on both sides, or on both sides of each eye in the same person. While seldom found of large size in this country, they may attain to a size of great discomfort, and in any event drag and pain the eye more or less. In hot climates, or where specially irritating dust, as alkali or other, is common, they become a serious matter, but when small may cause little or no inconvenience. Owing to some similarity, they are sometimes confounded with pinguecula, but are very different, the latter being an epithelial tumor, or due to micro-organism parasites, a deposit of fat often ensuing. The latter need excite no alarm, being carried for years with impunity.

Treatment.—Internal remedies, prominent among which are *Zincum* and *Argentum nitricum*, are credited with their removal, and it is not unlikely that other remedies might be added. If, however, the indicated remedy proves unavailing, and the pterygium persistently encroaches on the cornea, excision, ligation, or transplantation, the latter preferably, becomes necessary. A full description of these operations, with the results attained, may be found in the larger works. When unsightly or inconvenient, pinguecula may be snipped off with the scissors. Iridectomy is sometimes needed.

3. Hæmorrhage.

Ætiology and Treatment.—Hæmorrhage under, or into, the conjunctiva is not unfrequently produced by excessive vomiting or coughing, and is very alarming to the patient. A sharp blow from a twig, sleeve-button, or other simple cause, may also produce it. If not associated with any cerebral cause or affinity, to which it should

always direct careful attention, it is a slight matter, and may be left to nature, or its absorption hastened by the frequent instillation into the conjunctival sac of a weak solution of brandy and water.

4. Episcleritis.

Ætiology and Symptoms.—Cases are not unfrequent of what is seemingly a deep-seated inflammation of the conjunctiva, but which does not run the usual course of conjunctivitis, being indolent and accompanied by more or less neuralgic pain. They are frequently very alarming to the patient, an insertion of one of the recti muscles, usually the external, being apparently involved. A raised patch of congestion, lying in the subconjunctival tissue, adjacent to the cornea, marks the spot, and remains without apparently harming the other parts of the eye, and resisting all ordinary remedies. Disordered systems, particularly the female, seem most liable to it.

Treatment.—Finely powdered calomel dusted upon the part, accompanied by *Mercurius* internally, speedily removes this annoying and persistent affection.

Internal Remedies.—Conjunctivitis is a disease which requires a large number of remedies. So many special causes are at work, that careful consideration must be given extraneous causes and their agency fully weighed. Among those most valuable from their ophthalmic and general indications the following may be mentioned:

Aconitum napellus is notably valuable in the early stages. It is especially indicated in those cases which arise with much local fever and heat, when it is necessary to quickly break up these conditions. In the first stage of catarrhal inflammation, when severe, or when there is a sensation of local heat, it is always indicated. It is also indicated in the acute exacerbation of chronic granulated lids. When once the second stage has set in, or when the boundary is passed in the catarrhal form, and the purulent has set in, it is of little value, however, and its use should be discontinued. But generally, in all forms of inflammation its value is marked.

Apis mellifica is of value when the lids are swollen and stinging, with a general œdematous condition. The parts have that peculiar appearance they present when a bee has stung them. The general symptoms, such as drowsiness, absence of thirst, etc., may often suggest the remedy. Like *Rhus toxicodendron*, it is valuable in chemosis, the milder forms yielding to it alone.

Argentum nitricum.—Upon this remedy the greatest reliance may be placed. Combined with judicious local treatment, it will exceedingly rarely be necessary for sight to be lost even in part. In the purulent form it should be administered at once, but in the granular form it is indicated only in the first stages. It could hardly happen that so valuable a remedy should be useful only in the active inflammations; hence its use is indicated in pterygium, which it is reported to have cured.

Arsenicum album is to be used in the first stage of the catarrhal and granular forms, and the various stages of the pustular form, for the burning pain, especially at night. Periodicity of attack, and alternate shifting from one eye to the other, and the accompaniment of its general characteristic symptoms, will guide its employment.

Belladonna is useful in the precedent hyperæmia and catarrhal variety, but after the first stages of conjunctivitis are passed, and when the purulent form has set in, it is of little use. In the early stages it will overcome such symptoms as smarting and burning pains, with dryness and heat, and marked photophobia. The face is often

red and swollen, and headache accompanies the ocular attack, with bounding, rushing, and throbbing symptoms. It is also useful in the acute exacerbations of chronic cases.

Calcarea carbonica has been used for the relief of pterygium. It may also be demanded in the course of an inflammation for its well-known characteristics as an intercurrent, and, when indicated, is exceedingly valuable.

Euphrasia finds in the conjunctival troubles an appropriate sphere of action. When called for there is profuse, acrid and burning lachrymation, thick, profuse and yellow discharge, which runs down on and excoriates the cheek. Owing to the presence of this discharge on the cornea, vision is more or less impeded, but relieved by the act of winking, thus washing down the obstructing secretion. In the purulent form it must not be depended on, as it seems lacking in power to bring about a cure, and more especially is this the case if the cornea is threatening suppuration.

Graphites, in all forms but the pustular, does not seem well indicated. But when the external canthi crack and bleed easily, and eczematous eruptions appear behind the ears, the discharges thin, excoriating, and involving the nose, and a general scabby condition, with dry scurfs and a decided recurrent tendency is present, its use will be strongly demanded, and prove almost immediately curative.

Hepar sulphur must always be used when in the purulent form the cornea has become implicated, and there is a strong suppurative tendency, or suppuration has actually set in. Its value at such a time is very apparent. In a muco-purulent discharge it is also likely to prove useful.

Ipecacuanha is invaluable in so-called scrofulous conjunctivitis combined with keratitis, especially when showing a tendency to recurrence.

Mercurius.—Special indications for *Mercurius* are found in the profuse burning and muco-purulent discharges, they being thin, acrid, and excoriating. Although this remedy has been much abused and over-rated in syphilitic troubles, subjects of this malady often require its use, and the well-known train of symptoms classed under this name will guide in its selection. But too implicit a reliance on its general adaptability to such complaints has often been regretted, and time lost in the aiding of a cure.

Nitric acid may be used in that terrible malady, gonorrhœal ophthalmia, in conjunction with local treatment. A careful and critical study of the general symptomatology is necessary to a correct prescription in this disease, however, and a hasty selection of a remedy is to be deprecated.

Pulsatilla nigricans is a valuable remedy in almost all forms of conjunctivitis. When the catarrhal form, with a bland, thick discharge, occurs in the characteristic subject, it is at once curative; and it is especially to be prescribed in this form resulting from an attack of measles or from taking cold. In the purulent form, and especially in the form found in the newly-born, it may be used, but too exclusive a reliance should not be placed upon it. In the pustular form, also, its use is markedly valuable, but in the trachomatous form *Aurum metallicum* is far superior. When the lids are implicated, however, an additional indication for its use is had. The general characteristic, "worse in a warm room, better in the open air," often serves as a marked guide for its selection.

Rhus toxicodendron is valuable when the inflammation is caused by exposure to the wet, with a puffy, œdematous swelling of the lids. Intense photophobia and profuse lachrymation, in the phlyctenular form, call for this drug when *Conium* is not indicated for the special reasons laid down under its head in keratitis.

Sulphur is the remedy for certain forms of, and conditions associated with, phlyctenular conjunctivitis. Agglutination in the morning, marked photophobia and profuse lachrymation, burning and biting in the eye, with sharp, lancinating pains, are indications for its use. Chronic scabby cases, occurring in scrofulous children, will be much benefited by its administration intercurrently with other remedies.

Zincum metallicum is said to have cured pterygium, but as yet the statement has not been substantiated by repeated clinical evidence.

III. OF THE IRIS.

The affections of the iris with which the physician is concerned are mostly limited to those which are of an inflammatory character.

1. Iritis. Inflammation of the Iris.

Ætiology and Symptoms.—Iritis is by far the most common of all diseases which attack the iris. No time of life is exempt from this inflammation; it attacks the aged person and the mere infant, and reported cases lead us to infer that the fœtus is not exempt. But the majority of cases occur during the period of middle life. Men are more liable to it than women, and the left eye is oftener attacked for some unknown reason, frequently suffering alone, even when there are well-marked constitutional symptoms.

The great cause of iritis is syphilis, from fifty to sixty per cent. of all cases being attributed to this widely spread malady. Rheumatism may be mentioned next; overwork, exposure of the eye to irritating influences, possibly impaired nutrition, wounds, and as sequent to corneal and exanthematous diseases, comprise the remaining causes in so far as a general classification admits.

The diagnosis of the affection is generally easy. There are many features common to all kinds, which may be considered before discriminating between the various forms.

In all forms of iritis changes in the mobility and form of the pupil are present. A preliminary nervous stage, recognized by a spasmodic contraction of the pupil, and a wearying sense of discomfort in the eye, often precedes an attack. It is rare, however, that a patient seeks advice at this stage, so that when first seen by the physician there is some degree of impaired mobility, the pupil being sluggish and generally contracted, owing to the effusion which has taken place into the stroma of the iris, hindering the action of its fibers and causing its swollen appearance. Even a strong mydriatic (as four grains of atropia sulphate to an ounce of distilled water) may fail to dilate it for these reasons; and if this solution exerts an action upon the iris, it will generally dilate unevenly, owing to the presence of adhesions due to plastic exudation, tying down the iris to the anterior capsule of the lens. These adhesions, known by the name of posterior synechiæ, play an important part in the morbid changes affecting the rest of the uveal tract. They are the most numerous about the pupillary margin, because it is here that the capillary vessels are the most frequent. Changes in the color and texture of the iris are also always present. These alterations appear prominently on comparing the diseased with the healthy eye, should one have escaped. The brilliant luster of the iris is wanting, its fibrous texture looks indistinct, blurred and muddy, and its color is markedly changed. This color, which in a light iris becomes greenish, and in a dark one brownish-red, may appear of different hues according to the stage of inflammation and the fancy, or defective color-perception, of the examiner. It is due partly to the hyperæmia of the iris, and partly to the turbidity of the aqueous humor.

These two broad symptoms being attendant on all cases of inflammation of the iris, their presence assures the diagnosis. But deceptive resemblances are sometimes present, and care is necessary not to be deceived. A hazy cornea may diminish the mobility of the iris by shutting out a portion of the light, and alter the apparent color. Being often farther attended by symptoms which are attendant on keratitis as well, viz., pericorneal injection, impaired vision, pain, photophobia, and lachrymation, an error may be easy to a hasty observer. Doubts on this point may usually be set at rest, however, by the application of a four-grain solution of atropine. Should the pupil dilate in about twenty minutes and preserve a circular outline, iritis can hardly be present. There need be no hesitancy in making the test in any doubtful case, as the application will be rather beneficial than otherwise. In testing the mobility of the pupil, the sound eye should be shaded from the light, owing to the sympathetic action of the pupils, and the affected eye exposed and covered alternately. A study of the third symptom, the pericorneal or sclerotic zone of vessels, permits of a more or less easy discrimination from keratitis, and other conditions, and in the same proportion aids the prognosis. For while by this symptom alone iritis cannot be diagnosticated from keratitis, iritis being assured by the symptoms heretofore given, its severity can be estimated by the kind and amount of this congestion, a congestion usually limited to a zone of subconjunctival vessels about one-twelfth to one-eighth of an inch in width, and taking a nearly straight course, varying in intensity and with the degree of inflammation. These vessels are the episcleral branches of the anterior ciliary arteries. In some cases the conjunctival vessels are congested also, being those mainly radiating from the ciliary system. This zone is usually colored pink or red, but may be blue or brown, the latter formerly erroneously considered symptomatic of syphilitic iritis. The true cause of the latter color is unknown; the others are supposed to be due to the predominance of arterial or venous blood. Pain is usually present sometime in the course of the inflammation, greatly varying in degree. It may be readily excited by pressure on the eyeball. Sometimes it is excruciating, extending over the space traversed by the branches of the fifth nerve and involving the space in an agonizing pain, while again it will be so feeble as to barely elicit mention; but in nearly all cases it will be intermittent, of increased severity toward evening, aggravated or intense during the night, and passing away toward morning. Not unfrequently the lids, especially the upper, become swollen and red, but seldom require any special treatment. In cases of severe pain constitutional symptoms may appear, such as diminished appetite, vomiting, fever, etc., rendering it possible for the disease to be mistaken for a severe bilious attack. Photophobia and lachrymation are accompaniments, and like the

pain, may be very light or exceedingly annoying. Vision is always decreased, variable in degree, and may with advantage be accurately tested at the beginning of the disease. Its loss may be attributed to various causes, but is at first generally due to the turbidity of the aqueous humor and changes in the posterior elastic plate of the cornea. The duration of these symptoms may vary from a few days to several weeks, and is largely dependent on the treatment.

The tension of the globe remains normal, except in the serous form, it being then increased; there should be no pain on gentle pressure in the ciliary region, nor more contraction in the field of vision than would be due to contraction of the pupil; the contraction should also be regular, and not of a glaucomatous nature. Should these symptoms be present, or should there be any great loss of vision without closure of the pupil, the disease has implicated the ciliary body or choroid. In such a case the accommodation is affected, and the vitreous humor deranged, diffuse opacities often appearing in it. Despite the best endeavors, atrophy is a frequent sequence to such a chain of troubles. The various complications ensuing from neglected or badly treated cases are not only highly injurious to, but often destructive of, the integrity of the globe. A further consideration of these dangers, with their results, may be found in the next section of this paper.

Although an entirely arbitrary arrangement, advantage is experienced from dividing the inflammation into three groups, the (*a*) plastic, the (*b*) serous, and the (*c*) parenchymatous, and separately considering them. All of them may be acute or chronic, but such distinctions are of little value inasmuch as a chronic form frequently becomes temporarily acute and subsides into its old course, and an acute iritis becomes chronic with no very apparent line of demarcation.

(*a.*) *Plastic Iritis.*

Synonym.—Simple iritis.

Symptoms.—This form is characterized by a tendency of the neo plastic, or newly formed, adhesive elements in the substance and on the surface of the iris to organize into little membranous bands known as synechiæ, and tie down the iris to the anterior lens capsule, and bind together the contractile tissue of the iris itself. The accompanying symptoms are often but slight in intensity, and the whole process is so speedily effected as to escape more than casual notice. Rheumatic iritis is generally of this form, though often running a protracted course of varying intensity; but it presents no special characteristics, and may assume another variety. Gonorrhœal iritis also shows a preference for this kind, but may assume another.

Treatment.—The treatment should be pervaded by one grand principle, the avoidance of all irritants. In conjunctival troubles

which to an inexperienced eye simulate iritis, astringents are extremely conducive to resolution, but they are as strongly contra-indicated in corneal and iritic affections, except when wisely handled by the thoroughly experienced. An incipient inflammation of the iris, stimulated by a silver-nitrate solution, will be provoked to the attainment of an inflammatory degree otherwise impossible, while under the influence of an indicated mydriatic it will be as speedily lulled. Proper treatment consists in perfect rest for both eyes, the shutting out of bright light, and protection from injurious changes of temperature. Serious cases, especially those in which both eyes are involved, or of a traumatic character, will progress most satisfactorily if the patient can be kept in bed in a darkened room until the active symptoms are over. In milder cases the patient can go about with a pad and light bandage to the affected eye to prevent movements of the lids, as well as to exclude the light, and a shade, or a flat, dark-blue glass to the sound eye. All unnecessary confinement, however, and especially in darkened rooms, is to be avoided. When the pain is severe, it may be controlled by hot applications, either of water, such as poppy fomentations, or by means of pads of wool or other heat-retaining substances. The internal administration of *Allium cepa* θ, in drop-doses, will be found a valuable adjuvant. Complete rest for the iris should be insured, it being as necessary as immobility for a fractured bone. This immobility of the iris is best secured by an atropine solution (℞. Atropiæ sulphatis, gr. ij ad iv: Aquæ dest., ℥j) of which a drop should be placed in the conjunctival sac every three to four hours until full dilatation of the pupil is secured and maintained. When well borne, the value of this drug can be hardly estimated; its dangers are very few. When not readily borne, duboisine, hyoscyamine, daturine or homatropine may be tried, or a belladonna fomentation to the closed eye. Internal remedies should then be given according to indications. The results of imperfectly treated or neglected cases are often most serious, and demand delicate surgical relief.

(*b.*) *Serous Iritis.*

Symptoms.—The distinguishing feature of this form is the hypersecretion of the aqueous humor, which is diffusely cloudy and often filled with little shreds floating in it. No synechiæ are present in a typical case, easily distinguishing it from the other forms. The symptoms of acute iritis are seldom well-marked, it being an insidious trouble, and stealing on often so quietly as to long exist previous to the discovery of its exact nature. The tension is increased, often markedly so, the iris loses but little of its color, the pupil is often dilated instead of contracted, the anterior chamber deepened, the iris being pushed backward, and the cornea seemingly bulged forward.

A marked tendency exists for the disease to extend backward and involve the deeper structures of the uveal tract. *Per contra*, it is also an accompaniment of the diseases of the deeper parts, and glaucoma and sympathetic ophthalmia sometimes appear in this form.

Treatment.—The treatment must be directed to the relief of the distension, and in severe cases this is most readily effected by paracentesis repeatedly performed, or an iridectomy. Extremely mild cases which accompany protracted neuralgia may be relieved by hot applications. Internal remedies, notably *Gelsemium*, *Rhus toxicodendron* and *Bryonia*, are very valuable. As the trouble is more likely to attack those who are reduced in vitality, strict attention to a proper regimen, and a sequent restoration of the nervous and physical forces, should be enforced.

(*c.*) *Parenchymatous Iritis.*

Synonym.—Suppurative iritis.

Symptoms.—The formation of well-marked nodular beads on the surface of the iris characterizes this form, which beads may be so large as to touch the cornea, or so small as merely to give the iris a mottled appearance. Usually of a reddish-brown color at first, they change into that of a yellowish nature, and often look like little collections of pus; they may either be absorbed or suppurate. They sometimes form anterior adhesions, requiring operative interference to detach them; on suppurating, the pus gravitates to the bottom and forms an hypopyon. Syphilitic iritis, although it has no characteristic variety, and can only be justly inferred by the existence of constitutional syphilis, plainly shown by its characteristic symptoms and localizations, often appears in this form, in which case the gummy nodules are usually well defined. The plastic exudation is into the parenchyma of the iris, the pupillary space along its circular edge, and the posterior surface of the iris, whence result extensive posterior synechiæ. A similar kind of inflammation in the remainder of the uveal tract may accompany this malady.

Treatment.—The treatment should be similar to that heretofore laid down under the other forms, making due allowance for the often slower nature of this form. Atropine should be used, synechiæ prevented, and the formation of pus and resultant hypopyon controlled by *Hepar sulphur*. Not unfrequently *Mercurius* is strongly called for, and *Mercurius iodatus* especially. Well-fastened synechiæ require detachment, and their removal invades the domain of operative surgery.

Internal Remedies.—Fortunately the valuable internal remedies are not limited in this class of troubles, and their indications may be clearly recognized, having abundant clinical verifications.

Aconitum napellus may be found useful in the first stages of iritis when there are heat and dryness of the eyes. It is particularly valuable after surgical operations upon the iris, when there is restlessness, with constant turnings of the patient, and a seeming tendency to inflammation of the iris. All the symptoms of the patient are accompanied by much general febrile excitement, denoted by a quick pulse, dry and hot skin, thirst, etc. There is also a direct indication for its use when there is marked ciliary congestion with contracted pupils, and severe throbbing pains. It will also be found especially useful for persons of full habit and sanguine temperament, and where the disease arises from a cold. Pressure and burning in the eye and over the brow, with aversion to light, accompanied by anxiety and restlessness and a fear of death, are also excellent indications for its use. Its seeming inefficiency in a certain class of iritis often misleads, and causes its abandonment when strongly indicated in those cases arising from traumatism.

Allium cepa, in the tincture, is a valuable remedy for pain, and prevents the extension of iritis further along the uveal tract.

Arsenicum album is called for by burning pains, the burning being likened to fire. Great anguish and restlessness are present, the patient having intense thirst, and drinking little and often. All the pains are worse at night and after midnight, and better from warm applications. The pains are aggravated by light and by moving the eyes, and there is great prostration of mind and body, accompanied by photophobia and lachrymation.

In traumatic iritis in conjunction with Aconite, **Arnica** is called for when there is hæmorrhage, and ecchymosis from blows and wounds of any description.

For severe burning pains above the eye brows, **Asa fœtida** is the remedy. The pains are also throbbing, beating, boring or burning in character in the eye, over or around it. It is highly useful in syphilitic iritis and after the abuse of Mercury. The pains are usually from within outward, and are relieved by rest and pressure. It is also particularly adapted to nervous, hysterical persons with hypersensitiveness of the whole system.

The internal administration of **Atropine** is not often called for in iritis; but for ciliary neuralgia, and all forms of neuralgia of the eye, it may at times be useful. Internal congestions of the eye in the serous forms of iritis, with increased tension of the globe, will sometimes yield to it.

Aurum metallicum has been successfully used in syphilitic iritis, and after the abuse of mercury and potash. The pains indicating it are dull and burning in character, compelling one to close the lids occasionally. They are worse in the morning, and ameliorated by the application of cold water. It will also be found a valuable remedy in cases of syphilitic iritis where there are great depression of spirits and a strong tendency to suicide, with tearing, pressing pains, seemingly deep in the bones surrounding the eye, and aggravated by touching.

Belladonna will sometimes be useful in the early stages. It is particularly suited to plethoric persons, and to those of a stout, full habit. Sharp pains in the orbits, extending to the brain, pains appearing and ceasing suddenly, a dimness of the vision, red eyes with congestion, and bright redness of the vessels, are especial indications for its use. Throbbing pain in the head and eye with flushed face, a red appearance of everything, and passage of sparks of fire before the eyes, are all symptoms relieved by this remedy.

Bryonia alba is a useful remedy in iritis due to rheumatism, and in the serous forms generally. The symptoms controlled by it are a sensation of pressure from within outward in the globe of the eye; sensation of soreness and aching in the ball and around it, sharp shooting pains in the eyes, extending into the head and down into the face, or pain as if the eye were being forced out of the socket. All the pains are aggravated by moving the eyes in their sockets. By warmth the symptoms are aggravated, and they are generally worse at night. The patient is also exceedingly irritable at night, but not so much so during the day; often the head aches as if it would split open.

Cedron is indicated in periodical supraorbital neuralgia. The pains are sharp and shooting, starting over the eye, and extending along the branches of the supraorbital nerve.

Severe ciliary neuralgia in scrofulous children is relieved by **Chamomilla.** The child is irritable, wants to be carried, etc.

China often relieves when the pains are variable and show a marked periodicity. Continued by loss of vital fluids or malaria, iritis will yield to this remedy.

Cimicifuga is indicated for rheumatic iritis, with increased intra-ocular tension and much pain, intense and persistent pains in the eyeballs, of a dull, aching, sore nature, and pain in the center of the eyeballs. The pains in the head are from within outward.

Cinnabaris has been used very successfully in condylomatous excrescences on the iris, edge of the pupil, or edge of the lids. Its value in syphilitic iritis is well known.

Rheumatic cases, with great soreness of the eyeballs, are well met by **Colchicum.** It also relieves violent, tearing, sharp pains in the eye and around the orbit.

Cutting pains around the eye are controlled by **Colocynthis.** Pains relieved by it are better on pressure.

Conium.—Burning heat in the eye; it is well suited to the forms aggravated by the debility of old people.

Euphrasia has been used in rheumatic iritis with constant aching and occasional shooting pain in the eye. The lachrymation is profuse, the tears acrid and excoriating. When the iris has become bound down by adhesions, and there is ciliary injection, photophobia, cloudy aqueous humor, and discolored iris, this remedy acts well in relieving, as far as is possible, these symptoms.

Gelsemium acts well in severe iritis and diseases of the uveal tract, and is much used. When there is greatly increased intra-ocular tension and much pain, it, or Rhus toxicodendron, is invaluable.

Hamamelis is a valuable local application in traumatic iritis, and may be used internally at the same time. Hæmorrhage into the anterior chamber may be hastened in its absorption by its use also.

Hepar sulphuris is one of the most valuable remedies in cases where suppuration has taken place, or is inevitable, as in kerato-iritis, or suppurative iritis. The pains are throbbing, piercing, or aching in character, aggravated by cold, and relieved by warmth. Great photophobia, with swollen and sensitive lids and burning pain in the orbit are relieved by it. Its value in absorbing pus in the anterior chamber is well marked. It is, moreover, particularly adapted to scrofulous persons with enlarged glands, every cut or wound suppurating, and to systems which have been abused with mercury.

Kali iodatum is a valuable remedy in choroiditis, or in acute or chronic iridochoroiditis. It also follows well in syphilitic iritis after the patient has been drugged with mercury, or when secondary symptoms accompany the eye inflammation.

Lachesis is indicated when there is much pain in the eye, with sharp pains in the upper teeth, and complaints of suffocative feelings. Stitches as from knives in the eyes, the sensation coming from the head. The eye complaints are worse after sleeping, and the pains rapidly change from the eye to other parts of the body, and back again.

Mercurius.—The preparations of mercury have been long and successfully employed in iritis. They are valuable in all its forms, and especially in the syphilitic. The symptoms comprise a great variety, and the choice of a particular kind will depend upon the general characteristics. In the syphilitic form, *Mercurius corrosivus* and the iodides are esteemed the most effectual, the *Merc. solubilis* being the next in importance. The *Merc. dulcis* is recommended when the iritis is associated with corneal ulceration or found in scrofulous subjects. The pains are usually severe, and may be either cutting, tearing, biting, or boring, and are worse at night and in damp weather. There is also heat and soreness around the eye and soreness of the same side of the head. The eye-discharges are acrid and make the lids and cheeks sore. There is much sensitiveness to heat and cold, and the symptoms are made worse by looking into the fire, or from the heat of a stove. After exudations have taken place from the iris, which appears discolored, or the area of the pupil is covered by a film, with a tendency to posterior synechiæ, no remedy is better to promote absorption. Hypopyon and condylomata yield to its influence. While the eye symptoms may call for this remedy, general characteristic symptoms may be found with them.

Nitric acid is especially useful in treating syphilitic or gonorrhœal iritis. It also follows well after the abuse of mercury. Although not strictly applicable to many eye diseases, it is adapted to the treatment of affections of the iris arising from suppressed syphilis, and to secondary affections of syphilis in broken and cachectic constitutions.

Pulsatilla relieves iritis in characteristic subjects. After suppressed gonorrhœa,

this remedy will often restore the discharge. The symptoms are all worse toward evening, relieved in the open air, worse on returning to a warm, close room, better from cold things, worse from warm. The form of symptoms is very changeable, worse one moment, better the next, or at longer intervals. The sluggish circulation is manifested by constant chilliness, coldness, and paleness of the skin, disorders of digestion and menstruation.

Rhus toxicodendron is a remedy especially valuable in suppurative inflammation of the iris, the latter involving, or showing a strong disposition to extend backward and involve the rest of the uveal tract. It has no superior in this respect, unless it be *Allium cepa*. Iritis occurring in rheumatic subjects, or arising from exposure to cold, is well met by this drug. The pains are worse at night, and relieved by warm applications, also worse before a storm and in damp weather. Further indications for its employment are vesicular eruptions on any part of the body. Photophobia and lachrymation well marked. Rheumatic pains that affect any part of the body, aggravated by rest and relieved by motion, also call attention to this remedy.

Silicea promotes a tendency to absorption, and will be found to exercise control wherever this point is desirable.

Spigelia is useful when in cases of rheumatic iritis the pains are sharp and shooting, or severe, pressing and jerking, and radiate from points in and around the eye. Intolerable pain in the superciliary ridge, pain sharp and sticking as from a poniard, aggravated about 2 A.M. The pain is much worse from moving the eye in any direction.

Iritis in scrofulous subjects will often be benefited by **Sulphur.** In chronic cases and when the pains are sharp and sticking, like pins sticking in the eyes, and after suppressed eruptions, its administration is called for. General characteristic symptoms must often determine its choice. It is adapted to lymphatic temperaments, to persons disposed to hæmorrhoids, with constipation or morning diarrhœa, and to scrofulous diseases, which seem to get almost well only to recur again and again.

Thuja is indicated in syphilitic iritis with condylomatous excrescences upon the iris. The pains are ameliorated by warmth.

IV. OF THE UVEAL TRACT.

Irido-choroiditis — Inflammation of the Iris and Choroid — Cyclitis — Inflammation of the Ciliary Body. — Irido-cyclitis — Inflammation of the Iris and Ciliary Body.

Synonym.—Sympathetic ophthalmia.

Ætiology and Symptoms.—In a certain number of instances the inflammation which may have arisen in the iris does not remain confined to that tissue only, but extends backwards in the choroid or ciliary body. While the reverse also obtains, the extension forwards from these latter structures is usually a matter of small moment as compared with the opposite result. The most serious of all, commonly known by the name of sympathetic ophthalmia, or sympathetic inflammation, is where a disease similar to the original is set up in a previously sound eye by the transmission through the ciliary or optic nerves, or both, of a nervous influence from a companion eye which is suffering from disease, or more usually from injury. Such a condition may come on immediately after the companion eye is injured, or years may elapse in apparent security when, without warning at least sufficient to attract the patient's attention, this violent form of inflammation breaks out. Of all the inflammations of the eye there is none over which the surgeon seemingly has less control than sympathetic

inflammation, and an error in the treatment, or a vacillating delay, often reaps a terrible punishment. The exudation into the structures is usually of a plastic nature, thoroughly gluing them together, and whether the disease arise idiopathically, from extension from the iris, or through the mystic influence imparted by a companion eye, the result is usually disastrous in the extreme. Not unfrequently also does the exudation assume a purulent or serous form, but in no way altering the usually unfortunate termination.

The symptoms, when plain, are easily recognized, but the disease, especially when sympathetic, often steals on quietly without subjective warning. A prodromal stage of sympathetic irritation often, and usually to a greater or lesser degree, precedes the inflammation, and may be recognized by an irritation and slight injection of the eye, neuralgic pain, slight photophobia and lachrymation, and the eye quickly tiring at near or fine work, showing a weakness of accommodation. But when assured, great tenderness will be evidenced on pressure over the ciliary region with anything as delicate as a wisp of paper, a symptom to which attention has been called as never present in iritis. Such tenderness is accompanied by turbidity of the aqueous and vitreous humors, loss of accommodation, photophobia and lachrymation, impairment of vision, rosy zone of vessels around the cornea, and an increase of the intraocular tension. Discriminating care to distinguish between the prodromal and declared symptoms should be exercised, as the former may frequently occur and pass off with no remaining organic lesions; the latter extremely seldom, if ever, occurs without organic lesions resulting.

Treatment.—Occurring with iritis, irido-choroiditis requires the same treatment. Irido-cyclitis, when of primary origin, should have complete rest of the structures affected, protection from extraneous influences, indicated internal remedies, and, when well borne, instillation of an atropine solution, a careful watch being meanwhile maintained on the companion eye for the earliest symptoms of transmitted irritation. But if the origin be sympathetic, the enucleation of the injured eye offers the only means of effectually severing all nervous connection, and affords the surest warranty of a removal of the cause. Such a case often severely tries the judgment and skill of a surgeon to determine whether he may spare the offending eye. It cannot be denied that there is often a great, but not necessarily destructive, risk of a sudden invasion of the healthy eye by not enucleating an eye seriously torn or injured by a wound or disease. Yet it is pardonable in an experienced surgeon, even in certain extreme cases, to watch them diligently for the earliest signs of sympathetic invasion, even when sight is lost; but so long as there is useful sight in the injured eye, and no symptoms of sympathetic irritation in the companion eye, under such care the former may be allowed to remain. But all

such cases should be placed where they may have the supervision of an experienced and carefully trained judgment, and by no one be lightly assumed.

Internal Remedies.—The choice of an internal remedy depends so much on the antecedent or accompanying trouble, that the remedies appropriate will not be again introduced; but examination should be made of the remedies already considered, among which hints will be found leading to the selection of the appropriate remedy.

V. OF THE LENS.

Cataract.

Definition and Ætiology.—The term cataract seems to have been, and still to be, used in such a vague way, that it is important that its use be at once restricted to the limits to which modern ophthalmology has assigned it. A cataract, by such authority, is an opacity of the lens; and such opacity must be at least sufficient to prevent (*a*) good vision on the part of the patient, and (*b*) an illumination of the *fundus oculi* through the opacity by means of the ophthalmoscope to a degree sufficient to prevent a detailed examination. Not unfrequently changes occur in the system or the eye, which, to a degree, impair the transparency of the lens; such lenses may be denominated cataractous, but do not form cataracts. A long-continued and severe neuralgia, or a debilitating or specially exhausting illness, not unfrequently bring about such a result.

The great cause of cataracts as ordinarily seen is old age, and such an opacity of the lens is a sclerosis; but cataracts are also common from such causes as wounds of the capsule, arrest of development, or other cause manifested only at birth, diabetes, albuminuria, etc. The intent and limit of this treatise admit of only a scanty résumé of the causes, and but a hasty mention of the many forms of lenticular and secondary cataracts, such as pyramidal, posterior polar, glaucomatous, etc., it being the intention to render only a comprehension of the class clearer.

Symptoms.—An uncomplicated cataract presents to view in maturity a clear, pearly-white, convex, and more or less striated surface behind a dilated pupil, and is easily recognized; complicated with other diseases, it is sometimes evasive, and to an inexperienced eye difficult of detection. By means of oblique illumination its details are rendered apparent and clear and easily distinguished from opacities of the cornea, with which it is often confounded. To the patient, the only symptom in uncomplicated cataract is an inability to see clearly, a defect more or less obviated according to the density of the opacity by diminishing the intensity of the illumination. For this

reason the patient prefers to sit with his back to the light, or to shade his eyes in some way. The irides should respond quickly to the alternate states of light and darkness, and the expression of the cornea be cheerful and not glassy. Moreover, the patient is always confident and anxious to see, in strong contrast to a patient afflicted with one of the deeper diseases, the victim of the latter being despondent and distrustful of his own powers in this direction.

Treatment.—It is not to be questioned that some of the many forms of cataractous lenses have been relieved, and possibly cataracts have been cured, by internal medication; but in the present state of knowledge little can be definitely asserted in this direction, and the means used have been of too vague a nature to be of general applicability. Deeply interested in this question as one of an intensely practical nature, the writer found on recent general inquiry, that his views were quite as advanced as those of his professional brethren, whose opinions, by reason of specially pursuing ophthalmology in common with himself, were entitled to the greatest consideration. Theoretically there seems no reason why the pathology of those forms not sclerotic may not in time be fully unfolded and they become as amenable to medication as those diseases of a seemingly more intricate nature. The inability to solve the problem of the nutrition of the lens is at present an efficient bar to such a scientific discovery, and none other than one founded on science can rest on an assured basis. Palliative treatment in some forms is found in the instillation of atropine; iridectomy in some other forms renders further operative interference unnecessary. But the sclerotic, and a majority of the other kinds, are only amenable to removal of the opaque lens by one of the many forms of modern operation, for a description of which, as well as the methods of needling the soft, the reader must consult one of the works specially devoted to the consideration of these tests of a delicate handicraft.

VI. GLAUCOMA.

Synonym.—Arthritic ophthalmia.

Ætiology and Symptoms.—The present acceptation of the term glaucoma bears no especial reference to the derivation of the name, it being now applied in a general way to those diseases of the globe in which an increase of the tension is the prominent diagnostic feature and leading symptom. Unquestionably it is one of the most dangerous and perhaps least generally understood diseases of the eye. The causes are somewhat obscure, it frequently arising from a prolonged grief, neuralgia of the fifth nerve, or from irritations of the ciliary nerves. But to hereditary influences must at present be assigned the origin of most cases which come under notice, though the predisposing

cause at least may often be traced to violent emotions, and deficient, vicarious, or vicious nerve action.

The symptoms of the acute form are those of acute inflammation, preceded by more or less of these well recognized prodromata: rapid increase of any existing presbyopia, colored rings around a light, intermittent obscurations of sight, ciliary neuralgia, slight variable increase of intra-ocular tension, narrowing of the visual field, and dimness of vision. Following on these it bursts forth with the addition of severe headaches and terrible ciliary neuralgia, cloudiness of the aqueous and vitreous humors, dilatation and sluggishness of the pupil, which may be filled with a greenish reflex, photophobia, lachrymation, and conjunctival congestion; and if the case be a severe one, this formidable array of symptoms is further augmented by fever and vomiting. The cornea soon becomes clouded, and the anterior chamber being obliterated from pressure, the iris is jammed down upon the posterior layer of the cornea, and the tension of the globe increased until the ball may become of stony hardness. Should the lens and other refracting media retain sufficient transparency, marked changes may be noticed in the fundus. These are pulsation of the arteries, a swollen beaded appearance of the veins, often a slight retinal hæmorrhage, and in advanced cases a peculiar cupping of the optic disk, the latter in its distinction from the physiological and atrophic forms, marking the eye with its own characteristic impression. This consists of a depression, very deep, and occupying the whole surface of the disk. In its early stages the walls may be straight, steep, and only moderately deep, but as the disease progresses the cavity deepens and the edges of the disk overhang the sides. In the first case the continuity of the central vessels may be traced, though they necessarily describe a very sharp curve on passing the edge; but when the sides become excavated laterally, parts of these vessels are lost to view. Vessels from the retina upon reaching the margin seem to abruptly break off, but remnants of them may again be dimly seen near the center of the floor of the excavation. A shadow surrounds the sclerotic opening, through which the central artery of the retina enters the eyeball in the form of a ring, and changes with the movements of the ophthalmoscope. This shadow is cast by the walls, and was formerly the cause of an optical illusion, cupped disks being simply regarded as prominent ones. Deeply cupped disks have a mottled appearance, the result of atrophic changes and the manner in which the light falls upon them; the usual color is gray or grayish-white, it may be greenish or even very white. Another characteristic appearance in the glaucomatous cup is the so-called parallax of glaucoma. This is made apparent by using the indirect method of ophthalmoscopic examination, and slightly moving the object-glass from side to side. As the object-glass is moved, both the floor and the margin of

the excavation move too, but the latter much more rapidly than the former, and it requires no great movement of the lens to cause the margin to move some distance across the bottom of the excavation. Arterial pulsation, so often noticeable in glaucoma is another distinguishing point, but the characteristic displacement of the vessels, the abrupt sides of the cavity, and the other points already described, can hardly fail to show the nature of the glaucomatous cup.

Chronic glaucoma (synonym, simple glaucoma), on the other hand, is an insidious disease, stealing on unawares often. The prodromal symptoms are usually mild, and often needlessly overlooked, so that the disease steals on to become hopelessly incurable, or bursts into an acute form. Its symptoms are increase of tension, mild hyperæmia and inflammation, the peculiar excavation of the optic nerve, and decrease of vision with narrowing of the visual field. Not infrequently these all progress so slowly as scarcely to elicit a remark from the patient, until an overwhelming consciousness of their terrible reality excites alarm.

Confirmed glaucoma (synonym, *glaucoma absolutum*) renders the globe as hard as stone, the pupil becomes dilated and remains so, the lens opaque and apparently of a greenish hue, the cornea dull and insensitive, and the anterior chamber shallow or obliterated.

The most rapid form has been called *lightning glaucoma* from the speed of its effects. It differs in no way from the acute form as described, except in the rapidity with which its effects are manifested.

When glaucoma is once evidenced, whether primarily or secondarily, the intervals of attack, or periods of remission, may vary between days and years. Both eyes are usually affected, first one and then the other, and hypermetropic eyes are most liable to its attack. Females are also most usually affected, and at and beyond the change of life are notably susceptible.

Treatment.—It is freely admitted that internal remedies have a decided action in controlling many of the preliminary, attendant, and sequent symptoms, and their use according to indications often gives gratifying results. But a reliance on them alone is not permissible. Owing to its great similarity, glaucoma being often mistaken for brain disease, a class of remedies found valuable in that malady is also to be used to advantage for this disease. The system should be built up, if possible the cause removed, often a difficult task, and the surroundings made cheerful. Complete rest of the eyes when the attacks follow each other quickly, and but moderate use of them at any time, should be strictly enjoined.

A fully declared glaucoma, however, requires immediate operative interference, paracentesis or iridectomy to be chosen according to the severity and nature of the attack. Since its first application until recently, great stress has been laid upon the necessity for a broad

iridectomy quite up to the ciliary margin, and explicit directions have been given for ensuring this result. It is now by no means evident that such is needed, and experienced judgment is the best guide as to the size required. If performed early, good results are almost certain; tardy hesitating treatment is punished generally with loss of vision. In the earliest stages of many cases a promptly performed paracentesis is often useful, and renewed, may prove all sufficient. Sclerotomy has been recommended and good results attained. Its assurance of a permanent place in ophthalmic surgery as a remedy for this trouble is not yet decided.

Internal Remedies.—**Belladonna** has been found valuable in relieving flushed face, and throbbing headache, with sharp pains. The pupils are dilated, conjunctiva congested, with a general dry feeling, and much photophobia.

Bryonia alba is indicated when the eyes feel sore to the touch, and all the symptoms are aggravated by motion. There are sharp shooting pains through the globe.

Cimicifuga is strongly indicated for the wandering pains which often change into other parts of the body. Aching pains in the eyeball, extending to the temples, or the reverse, and sudden acute pains are all relieved by this remedy.

Colocynthis has been used where the pains are better on pressure, and usually of a sharp stitching nature.

Gelsemium is one of the most valuable remedies in this trouble, being often palliative of the severe pains, and, in general, exercising a beneficial effect and curative influence on the neurotic character of the disease.

Phosphorus is useful in clearing up the vision after an iridectomy has been performed.

Spigelia has been found more valuable than any other one internal remedy for the alleviation of the sharp, shooting, and sticking pains which accompany this disease. These pains are worse on motion and at night.

VII. OF THE LIDS.

The lids are subject to the same diseases as the other parts of the general integument, such as eczema, cancer, erysipelas, abscess, ecchymosis, warts, nævi, etc., and require the same treatment as when occurring in other parts, except that it must always be borne in mind that the danger from resultant cicatrices, and inflammatory action generally, is very great, and often entails irremediable injury—a danger which from similar inflammation elsewhere, could be disregarded.

There is a widespread impression that all such diseases as ectropion, turning out of the lids; entropion, a reverse condition; ptosis, a falling of the lid, and similar affections, come exclusively within the domain of operative surgery. While it is true that when these affections are present in an aggravated degree, such is the case, many of a minor degree or even more serious character, are cured by the appropriate internal remedy, combined perhaps with some simple local treatment. A glance only may be had at one of the commonest, yet often annoying, affections.

1. Blepharitis Ciliaris—Inflammation of the Edge of the Lid.

Synonyms.—Lippitudo, Tinea tarsi, Ophthalmia tarsi, Blepharitis marginalis.

Ætiology and Symptoms.—This affection, for which so many synonymous names have been invented, is usually the result of exposure to irritating influences, or occurs as a concomitant with other inflammations. Persons who are prostrated from an exhausting illness or general debility, or infected by filthy surroundings, are exceedingly liable to it. Not infrequently lice are found as irritating influences, and a change is immediately effected by their removal. By no means, however, is the disease confined to those who are victims of any of these causes. In those who are undoubtedly free from any of the causes enumerated, its origin must be sought for in anomalous refraction, quite often an important factor, over-straining of the eyes, either from work or dissipation, habitual reading in an improper position, and similar causes, as it is frequently an obstinate and recurrent disease. If seen early, the edge of the lid is found to be hyperæmic, and it soon becomes swollen, shiny, and smooth. Little pustules appear about the roots of the lashes, leaving often small ulcerations and fissures, and the discharges aggregate into small yellow scabs, sticking the lashes together. Progressing to a great extent, the lashes often fall out and leave the lid bald (madarosis), or it becomes hard and calloused (tylosis). Not infrequently the glands along the lids also become inflamed, an affection known as blepharadenitis.

Treatment.—The remedy lies mainly in absolute cleanliness of the edge of the lid, to which end the scabs should be gently soaked or sopped off with warm water, or equal parts of warm milk and water, several times a day, and if not irritating, a little pure cosmoline rubbed on the cleansed and dried margin. A gentle touching of the margin with a silver nitrate solution (℞ Argenti nitratis, gr. ij ad v, Aquæ destillatæ, ℥ j) is often advantageous; when due to anomalous refraction, suitable lenses must be adapted, and better hygienic measures recommended.

Internal Remedies.—**Aconitum napellus** has been found useful in the acute variety, especially when the disease is caused by exposure to cold, dry winds. The lids are swollen, especially the upper, hot, dry and extremely sensitive to the air.

Argentum nitricum is indicated when there is a profuse discharge sticking the lids together. Good indications are also found in that the disease is better in the open air and from cold applications.

Arsenicum album is often an indicated remedy in this trouble, being demanded by burning and inflammation of the margins of the lids, which are thick, red, and excoriated by the acrid discharges from the eyes. The general symptoms, such as restlessness, thirst and characteristic burning pains, often guide to its selection.

Aurum metallicum is a valuable remedy when this trouble is associated with granulated lids, this latter condition being often speedily and permanently cured.

As a remedy in syphilitic and scrofulous affections it is well known, from which it may prove useful as an intercurrent or assistant.

Calcarea carbonica is to be employed when ciliary blepharitis is found in pot-bellied, sickly children, who sweat much about the head. In the characteristic child its effect is most speedy and permanent, and merits all that has been accorded it in the way of praise.

Cantharis will be found valuable in chronic cases with indurated, red and swollen lids. It is advisable that it be given quite low, hence the accompanying train of symptoms so characteristic of its use should be watched, that the remedy may be stopped when it is contraindicated.

Graphites.—This remedy is one frequently indicated; in fact, its affinity for this complaint is so marked that it often may be used almost empirically alone. It is exceedingly valuable when the inflammation is found in scrofulous subjects, whose cheeks and lids are covered with an eczematous eruption which is moist, extending behind the ears, with fissures which bleed easily. When the inflammation is confined to the canthi, however, and especially to the outer canthus, which are cracked and bleed easily, on opening or attempting to open them, it will be found almost a specific. In eczema with a general scurfy condition of the lid margins, it is invaluable.

Mercurius, and especially the *Merc. corrosivus* is called for when the secretions are thin and excoriating, with a profuse acrid lachrymation. The lids are thick, swollen, red and very sensitive to the touch. Scabs and scales are found on the lid margins, which bleed on the removal of the crusts, unless this be very gently done. All the symptoms are aggravated by warmth, whether from natural or artificial heat, as before the fire, or in bed, or on exercising.

Nux vomica is often curative when the inflammation arises from some stomach disorder. In such cases the remedies which exert a particular effect upon gastric troubles should be considered, and when better indicated, intercurrently used.

Pulsatilla nigricans is an extremely useful remedy when the inflammation is found in the characteristic subjects. When styes are associated with ciliary blepharitis, it is curative of both. Itching, burning, possibly a bland discharge, especially in those who eat greasy food and overload their stomachs, are relieved by this drug.

Silicea has been found indicated in a scabby, scurfy condition of the margins of the lids, which slight irritation causes to bleed. The lids are not indurated and the bleeding seems wholly out of proportion to the injury done by the irritation, as on tearing off the little scales. No one remedy will be found more generally applicable and curative.

Sulphur may be employed after a suppressed eruption; and blepharitis supervening would demand this remedy. An eczematous appearance of the lids in ciliary blepharitis is well met by this remedy, especially when it is used following *Graphites*, or some similar remedy. The general characteristics of the drug may furnish good indications.

2. Tumors.

Symptoms and Treatment.—Two kinds of minor lid-tumors are very frequent, known commonly as stye (hordeolum) and blind stye (chalazion) though much differing in pathology. The former is an inflammation of the sebaceous glands of a hair follicle, and the treatment consists in the internal administration of the proper remedy —*Pulsatilla* or *Staphisagria* usually—but if not seen in time for these remedies to be efficacious, suppuration may be encouraged by hot fomentations externally and *Silicea* internally, and the resultant pus evacuated. The latter is usually about the size of a pea, and is caused by the closure of the orifice of a sebaceous gland and the consequent retention of the secretion. It is located nearest the conjunctival covering, the skin over it being freely movable and natural in color, and is filled with pus or a fatty material according as inflammation has set in or not. Like the stye, there may be several at a time, or it may be

recurrent. They will sometimes disappear spontaneously, or under the influence of a remedy properly chosen. But should they not do so, they may be removed by the knife, due care being had in its use not to injure the drainage of the lid, should they be situated so as to endanger any part concerned in this process.

VIII. OF THE LACHRYMAL APPARATUS.

The diseases of the lachrymal apparatus are often among the most obstinate of any which affect the appendages of the eye, and, seemingly easy to remove on theoretical grounds, are of a lingering and excessively troublesome nature when practically experienced. Inasmuch as syphilis plays an important part in all lachrymal troubles, its presence may be suspected.

1. Acute Inflammation of the Lachrymal Sac.

Synonym.—Abscess of the Sac.

Ætiology and Symptoms.—Not infrequently this complaint supervenes on conjunctivitis, associated with or aggravated by nasal catarrh. Chronic disease of the tear passages furnishes a fruitful cause, and exposure to rough winds brings about such an altered secretion of the mucous membrane of the eye and its appendages as to slowly produce an inflammation of the sac and connecting ducts. Its earliest symptoms are first noticed by tenderness, redness and a puffy swelling over the region of the sac and lids, accompanied by a pain often excruciating. If not arrested speedily, the abscess bursts through the skin, a point to be prevented if possible, as the resulting *fistula lachrymalis* is often exceedingly difficult to cure.

Treatment.—The lower canaliculus should be opened up, and if found necessary, the duct and upper canaliculus also, the pus let out and the channel thus made kept patent. In this operation, much ease to the operator and comfort to the patient may be gained by using a two per cent. solution of cocaine muriate. This should be instilled into the duct, and will speedily exert its well-known anæmic and analgesic effects. If the skin over the abscess is in imminent danger of bursting, it is better to open the abscess with a knife than to allow it to burst, and then hot lotions should be applied and suppuration encouraged. But in the beginning when inflammation is threatened, ice-water compresses and the indicated internal remedy will often cut short an attack. Should a fistula occur, the natural course of the discharge should be established, and then the opening healed by a stimulation of its edges; if they have become covered with skin, the edges should be freshened and united with a stitch.

2. Chronic Inflammation of the Sac.

Synonym.—Mucocele.

Ætiology and Symptoms.—The same causes which give origin to the acute form may originate this, or the acute form may slowly pass into a state of chronicity. A faulty congenital or acquired position of the puncta often bring about a similar result. There are then noticed a constant irritability and watering of the eye, and a variable swelling of the sac, which on pressure discharges pus. The greatest trouble noticed is usually from the accompaniments of the disease, which occur independently, moreover. Strictures of the lachrymal duct are common, and must be cured by operation or treatment before the mucocele can be overcome. It is at the best often of tedious recovery, and if mal-treated seldom gets well. In exceptional cases after all mild treatment has proven of no avail, harsher measures must be resorted to and the sac obliterated.

Treatment.—The passages must be freely opened and kept open by probing or otherwise. This may be done without serious pain by previously instilling cocaine muriate. Delicacy must be observed in the former and especially in probing, the latter being an operation requiring care and experience. Many cases are injured rather than benefited by forcible dilatation, and consigned to the list of the incurable. Internal remedies are of great value, and, combined with an astringent placed directly upon the diseased tissue, usually effect a resolution to a normal state. Attention to an avoidance of the exciting causes is afterwards necessary, as a recurrence is not uncommon.

Internal Remedies.—**Aconitum napellus** in acute cases will relieve the pain, swelling and inflammation, and thus tend to give the patient the desired rest, so often apparently banished, in these affections. It is indicated when there is great tenderness on slight pressure, the parts being hot and dry, with a general fever.

Belladonna is indicated in recent cases when the parts are greatly swollen, with throbbing and beating. The skin feels hot, looks red, with an excessive tenderness on pressure.

Hepar sulphuris promotes the secretion of pus, and is indicated when there is great sensitiveness to cold, as well as to the touch; when the canaliculi are opened and a free exit made for the abnormal secretions, it will promote their discharge.

Pulsatilla nigricans will be called for when the pus is bland and profuse, or stringy at times. In the characteristic subject there is often benefit at times, but in spite of the seemingly excellent indications a good result is frequently not obtainable.

Rhus toxicodendron is particularly called for when there is a tendency to abortive suppuration, or when the parts look erysipelatous. It has been found very useful in cases which seemed to resist the other remedies when the patient was known to be of an erysipelatous family. The parts seeming unduly painful, with much apprehension of the result on the part of the patient, has been given as a characteristic symptom.

Silicea of all remedies has been found the most useful in the chronic form. The patient is sensitive to cold air and particularly so to the touch of the parts. To alleviate the resultant soreness after probing, to control the discharge, and generally as a remedy in chronic cases, it is invaluable.

AN EPITOME OF THE COMMON DISEASES OF THE EAR.

BY C. H. VILAS, M.D.

I. OF THE EXTERNAL EAR.

Auditory Canal.

Foreign Bodies.—All descriptions of foreign bodies find a lodgment in the external auditory canal from accident or design. Insects are apt to prove the most injurious and annoying, their titillations producing alarming roaring and pain. Their death and removal is easily accomplished, the former by filling the canal with sweet-oil, and the latter by syringing the canal thoroughly with hot water. The greatest danger with other foreign bodies results usually from injudicious attempts to remove them. Nothing should be done until a thorough illumination by an otoscope has been made, and it is better to continue its aid during all attempts at removal, especially if a probe or instruments are being used. A great many ingenious devices are made for the removal of foreign bodies in the ear, but for the most part they are unnecessary. Patient syringing will dislodge and remove almost every kind. Anæsthetics are seldom required except for children or very nervous adults.

Inspissated Cerumen.—Hardened or dried ear wax is frequently found in the auditory canal, and should be removed on the same general principles as any other foreign body. Its presence must be regarded as a symptom of disease, and its removal but the precursor of other treatment.

The symptoms of its presence are ringing in the ears, deafness, sense of fulness, more or less pain, and in severe cases, reeling and staggering. It is easily seen with the otoscope. It is sometimes not advisable to remove it all at one operation, unless it is small in amount and easily loosened. When intensely hard, as it often is, some solvent, such as ten or twelve grains of soda bicarbonate to an ounce of distilled water, or even a saturated solution, may be instilled hot several times before its removal is attempted. Force should not be used to draw or wrench out of the auditory canal any foreign body, the canal being too delicate for violent treatment.

Boils.

Symptoms.—The auditory canal becomes excessively tender, so much so that an examination becomes a great dread. The swelling is not always well-marked and on account of the closely swollen condition of the canal, it is often difficult to find the exact seat of the furuncle, but with a slight touch of a probe the resultant pain, which is often extreme, marks the seat. When seated in a hair follicle or ceruminous gland, the furuncle has in its center a circumscribed core which must be discharged before recovery takes place. But if seated where the swollen and inflamed connective tissue cannot extend itself, as upon bone, the symptoms of tension will be much more severe, and the pain much greater. The latter in all cases is accompanied by more or less systemic disturbance, such as fever, sleeplessness and loss of appetite, and in mild cases is of a burning, sticking or itching character. The most distressing part of the disease is that one may recover only to be succeeded by another, and sometimes one but inaugurates what is called a furunculous rash, a series of small, sluggish and imperfectly developed boils, which agonize a patient almost beyond endurance.

Treatment.—The general system is usually noticeably affected ere they set in, they often completing a season of dissipation; but not infrequently they are a result of some dyscrasia. This should lead to a careful examination into the state of health and an endeavor be made to revive the general tone. They should be incised promptly with a sharp knife, or if not well-marked the most tender point should be freely cut, and hot water used to promote suppuration. An oleate of cocaine muriate will be highly soothing when applied directly on the inflamed tissues. *Silicea* or *Hepar sulphur* may be given internally.

Eczema.

Symptoms.—Eczema is a most troublesome affection, but gets well under patient treatment and good hygienic conditions. The acute form generally begins with more or less systemic disturbance, and appears locally by the formation of vesicles upon the auricle and within the canal. These soon burst with a discharge of a thin serous fluid which spreads over the skin and dries there, forming crusts or scales. The bursted vesicles form scabs, which, if pulled off, expose a red surface. The denuded skin under these vesicles ulcerates, and pus forms. If a cloth is applied to the discharge from the vesicles, it soon becomes stiff, the discharge drying rapidly. The effusion being always considerable, the auricle becomes swollen and stiff, cracks and fissures, and the swelling of the canal causes some tinnitus and deafness. The itching and burning is most annoying, but if the vesicles be scratched or torn, the trouble is only increased.

In the chronic form the febrile symptoms and local swelling, itching and burning subside, the vesicles collapse, and dry scabs or crusts take their place. Underneath the scabs will be found considerable pus. The skin is no longer moist, but dry, rough and generally dirty. Where this form is consequent on the cessation of menstrual life, taking the place of the usual headaches, it is often exceedingly annoying and obstinate. The irritation from the clothing sets up and perpetuates a discharge which soils the garments, and extends down the neck.

Treatment.—Syringing with hot water allays the itching and keeps the ear clean. All hair-medicines, face-powders, brass ear-rings, etc., must be done away with. A mild solution of silver nitrate lightly painted on does good service occasionally, but the greatest reliance must be placed on internal remedies.

Internal Remedies.—**Alumina** is indicated in eczema with chronic inflammation of the auditory canal, accompanied by dryness and smarting.

Apis mellifica often cures when the parts are red, œdematous and there exists stinging, burning pains.

Arsenicum album is to be given when the eczema has burning, stinging and biting discharge, and intense itching. The discharge is also thin, ichorous and excoriating.

Croton tiglium is called for when the auricle and canal are hot, flushed and covered with pustules; when the itching of the canal is intense and worse at night, it may also be demanded.

Graphites meets eczema well in scrofulous subjects. The various parts of the ear fissure and crack easily, and are surrounded by thick moist scabs. There is heat, dryness and pressure in the canals, and scurfs, moisture and soreness behind the auricles.

Mercurius is indicated when there are sharp irritating discharges, worse at night.

Pulsatilla nigricans should be administered when the discharges are mild and bland, and form in the characteristic subject.

Rhus toxicodendron should be thought of in the form with the characteristic rhus eruption.

Silicea is excellent where there is a dry, bran-like scurf, and when used as an intercurrent.

Sulphur may be used as an intercurrent, it being particularly suited as such with *Arsenicum* and *Rhus tox.*

Tellurium will be found useful when accompanying eczema, there is an otorrhœa which smells like fish-brine. The discharge causes a vesicular eruption upon the external ear and neck wherever it touches the skin.

II. OF THE MIDDLE EAR.

Acute Catarrh.

Ætiology and Symptoms.—Unquestionably this disease has its most frequent origin in repeated colds in the head, and exposure to cold and wet in any form. The exanthematous and continued fevers contribute a fair quota of such cases, and the affection may even arise spontaneously.

In the heaviest form acute catarrh is usually ushered in by a sensation of fulness in the ear, hardness of hearing, noises in the ear, often very annoying, pain which is aggravated towards night, when delirium may set in, vertigo and nausea, catarrh of the pharynx, anxious expression of the countenance, and a general fever with great restlessness. Inspection with the otoscope shows the membrana tympani swollen and injected. But a light form is often present, and is very insidious in its course, affecting generally only one, though it may both ears. It has no pain, causes little deafness, but produces an uncomfortable stuffiness of the ears and usually slight tinnitus. Inspection of the membrana tympani usually yields negative results, but a slight injection may be noted, The patient thinks it worthy of no treatment and but little attention, and it goes away in a few days, often to early return again and again until it becomes firmly seated. Acute catarrh is an inflammation which causes a secretion of mucus but stops short of the production of pus. Absorption usually takes place, or the secretion is expelled through the Eustachian tubes. In its severer forms it may easily be confounded with cerebritis or meningitis. The inflammation generally starts from the pharyngeal end of the tube, but may be reversed. Alteration in the tone of voice and subjective sounds often accompany this malady. The pain is not generally so severe as in acute suppuration, being of a darting nature, and not especially limited to the ear, and is often mistaken for simple neuralgia. Of all the exanthematous fevers, the scarlatinal form is most apt to implicate the middle ear, and as the result is generally of the suppurative form, neglect brings the most terrible results. The ear-ache of childhood is identical with the milder form of this disease.

Treatment.—In the early stages there can be nothing better than the prompt application of the hottest water that can be borne, constantly increasing its heat as it can be tolerated. The aural douche, of which there are many forms in the market, is best for this, or a bag-syringe, the bag being hung up at a sufficient height to give the requisite gentle force. A few drops of a two- to five-grain solution of atropia sulphate dropped into the ear, provided the drum-head is imperforate, will quickly, in combination with the hot water, relieve the worst pain. Children only require a solution of one-half the strength. The tubes and tympanic cavity should be freed of the mucus collected there, for which purpose Politzer's apparatus may be used, or if too much is secreted for this to have the desired effect, or if inflation be impracticable from any cause, paracentesis of the drum-head should be done and repeated as often as necessary; or the opening, which preferably should be of a **V** shape, kept free with probes. In mild attacks all this is unnecessary however; as inflation and internal remedies will control them. The great object of the

treatment is to prevent suppuration, for when it has once set in, the case belongs to the suppurative form, which see.

The patient should be prevented from stuffing the ears with oils, molasses, onions or other troublesome foreign bodies. If the mastoid region becomes involved, a free incision should be made and the case treated as detailed under *Mastoid Complications.* Poultices are not recommended as they are dangerous to the internal parts, it being difficult to limit their effects.

Acute Suppuration.

Ætiology and Symptoms.—Acute suppuration finds its origin most often as the direct result of a somewhat prolonged acute catarrh, being always preceded by it, though in many cases the catarrh is overlooked and the discharge of pus the first thing noticed. The great tendency of acute suppuration is to break down and destroy the original tissues, in marked contrast to acute catarrh, the tendency of which is to harden and stiffen them. In severe forms the symptoms are rapid and violent, all those of acute catarrh being present, and as a rule greatly intensified. The pain is intense, causing great suffering, and is generally referred directly to the ear, though extending to the eye and temple, and backward to the occiput. The general fever and tendency to delirium are usually well-marked, and an increasing liability to confounding the disease with brain trouble present. Otoscopic inspection shows the membranum typani bulged out, swollen and injected, and not infrequently tinged yellow from the pus behind. Its distinction from the acute catarrhal form may be assisted by the fact that any given quantity of mucus in the tympanum will not cause the bulging out of the membranum that a like quantity of pus will. The pain is usually much more intense than under the catarrhal form, and a general systemic disturbance accompanies it. With all this, however, the auricle and meatus may be quite insensitive to gentle traction, freeing the case from all suspicions of external otitis as the cause of the pain.

In general it may be remarked that acute suppuration is an inflammation which quickly passes over the mucous stage and hurries on to purulent inflammation, and, unlike acute catarrh, it is almost never insidious in its attacks, but bold and pronounced. In such attacks the tympanum is practically, by reason of the closure of the Eustachian tube, a shut cavity, confining a raging abscess. On account of the close proximity of the cranial cavity and its contents, and its intimate connection with the tympanic cavity, the life of the patient may often be greatly endangered, and by no means infrequently lost, unless the disease be recognized at the outset and speedy relief afforded. The sweeping away of the drum-head and the contents of the cavity is the great tendency. Such dire results are to be carefully guarded

against as destructive of hearing, and entailing a long after-treatment to render useful the remnants of the damaged structures, as when the disease passes into the chronic form, the treatment is often tedious and unsatisfactory.

Treatment.—Special attention should be given to the free action of the skin, relieving pain, and producing sleep. The local congestion and pain should be reduced as quickly as possible, and experience finds no more effective agent than the hot water as mentioned under acute catarrh, combined with the atropine in the earlier stages. All forms of continued poulticing should be avoided and a paracentesis done early to let the pus out if it has formed; if none has collected the relief to the pain is very grateful, and renders a knowledge of the condition of the tympanum certain.

Internal Remedies.—These acute troubles so often originate from causes which suggest remedies, that more suitable ones can be chosen by such originating symptoms than from any remedies prescribed on their general indications. The following remedies may be employed as indicated, however, but exclusive reliance should not be placed in them.

Aconitum napellus will be exceedingly useful in the early stages. When there is a high febrile excitement with acute pains running along the Eustachian tubes to the ear, sudden sharp pains in the ear, and dryness and burning in the throat, it is fully indicated. Severer symptoms, such as fulness in the ear, deafness, and vertigo, with violent pain in the ear and over the whole side of the head, also call for this remedy.

Apis mellifica is most useful when there are stinging, burning pains, with intense itching. Inflammations following eruptive diseases are well met by this remedy.

Arsenicum album is indicated when there is great prostration and irritability following or accompanying these troubles. The pains are periodical and there is chilliness and shuddering, attended by humming in the ears and loss of hearing.

Belladonna is called for when there is local congestion, manifested by throbbing pains, cerebral excitement, or delirium, wild expression of the eyes, and intense pain.

Cantharis is valuable in the dull, heavy, and extremely sore throat often accompanying these troubles.

Hepar sulphuris is very useful in promoting resolution when once suppuration is established, or immediately threatening. It arrests and cures ulceration of the throat and membrana tympani. Abscesses are also speedily cured by its administration.

Mercurius has a pronounced action on the Eustachian tube and mucous membrane of the tympanum. When sharp, stinging pains extend into the ears, and tend to abate towards morning, with perspiration profuse but not relieving, it is very useful.

Pulsatilla has a controlling action on catarrhal affections of the Eustachian tubes, and is a valuable remedy in the characteristic subject with a mild bland discharge.

Chronic Catarrh.

Ætiology and Symptoms.—No branch of aural disease requires such a complete understanding of the entire subject as this often formidable affection. The incomplete knowledge of the pathology, the

inaccessible position of the parts affected and to be treated, and the often vacillating mind of the patient alike combine to render the treatment the most unsatisfactory of all aural therapeutics. Once fully declared, it is advisable to take a retrospect in each particular case to ascertain, if possible, the originating cause of the affection. Most likely it can be traced to repeated attacks of acute catarrh of the middle part of the ear conjoined with chronic catarrh of the throat. It follows often rapidly on diphtheria, and scarlet fever causes in its final result many intractable cases. Defective hygienic care of the patient, as want of proper exercise, food, etc., or a feeble state of the system, due possibly to acquired or hereditary syphilis, phthisis, and similar dyscrasia. Certain climates, especially those of a damp, chilly nature, or situated on the sea or lake shores, excite it, especially in a constitution previously depleted by an exhausting illness.

Its symptomatology is well-marked, viz.: fulness of the ear; more or less deafness; often some vertigo with the noises of varying sound, so graphically described and of which great complaint is made; imperfect action and changes in the Eustachian tubes, combined with a chronic naso-pharyngeal catarrh and a sensation of bubbles of air breaking and cracking in the ear. Inspection reveals changes of more or less injury to the drum-head, such as alteration in position and shape of the cone of light, deposits in, or sinking and atrophy of, the membranum tympani.

The ear-wax diminishes in its secretion, becoming brittle, and later on stops altogether.

The earliest subjective symptoms are generally noises and growing hardness of hearing, which usually come on suddenly, and oftenest affect the left ear first, and then may pass to the companion ear. Sharp twinges of pain are felt every day or two. All the subjective symptoms are intensified by fatigue, prolonged conversation or nervous exhaustion of any kind.

It must be admitted that the disease is often very tedious in its cure, and many patients fall out by the wayside on account of its chronicity. Two classes seem to be well-marked, the moist and the dry, and materially affect the prognosis, the former being far more amenable to treatment than the latter. In the former, under suitable medication and local treatment, a more or less satisfactory restoration of hearing and cure may be foretold; in the latter, in the hypertrophied stage, the prognosis is unfavorable, and in the atrophied stage hopeless.

The special pathology is that of proliferation, and bands are thrown out quite like spider webs and tie down with firm grasp the delicate structures. A peculiar odor, well simulated by moistening the finger with saliva and allowing it to slowly evaporate, may be noticed about the breath of the majority. It is undoubtedly due to a changed action of the buccal and lingual glands, and is most marked in females.

Relapses are very common, and while not discouraging to the physician, who expects them, tend to cast down the high hopes of the patient and render the treatment an affair of compulsion or neglect.

The noises in the ear are often most distressing, and have been known to cause suicide, so terribly do they weigh on the mind of those already thoroughly depressed.

There is no particular sound indicative of special lesions, although much effort has been made to so associate them. Each patient is prone to liken them to some familiar sound.

For convenience in treating of the subject, and the more properly to describe a large number of cases, a class lying in the tract between the acute and chronic forms is called subacute. They are such cases as have passed through the acute and linger on the border of the chronic form. There is no special line of demarcation, but such cases yield under less treatment, though were time of existence the only element, they would justly be classed as chronic.

Treatment.—A hap-hazard empirical plan of trying this and that in the expectant hope of relief has nearly always been pursued ere the patient comes under scientific treatment; and even then floating memories of old-time necromantical cures are liable to tempt the patient away to return worse than ever. The injudicious determination of those who suffer with acute affections "not to tamper with the ear, but let the disease wear off" places hundreds on the list of incurables.

Every attempt should be made to keep the spirits of the patient up and encourage a hope of restoration. Politzer's apparatus should be used to loosen up adhesions and gently vibrate the stiffened ossicula, and free the Eustachian tubes. Any chronic pharyngitis should be cured, and the cure encouraged to extend by contiguity of tissue up to the tympanic cavity. All precautions should be taken to guard against injurious changes of temperature, patients often being exceedingly sensitive to them. Electricity properly applied will sometimes render good service, and may be tried.

The limits of this essay do not permit an exhaustive examination of the various remedies at hand, and larger works must be consulted; but great aid will be derived from the carefully selected internal remedies.

Chronic Suppuration.

Ætiology and Symptoms.—Acute inflammation and suppuration of the tympanum are the two great factors in originating this disease. Like its colleague, the acute form, though with slower pace, its great characteristic is a tendency to break down and destroy the original tissues and sweep them away in a foul discharge. It is readily recognized by a purulent discharge of a more or less offensive odor from the tympanic cavity into, and often out of, the external auditory canal.

The pus cleansed away, there may be seen perforation of the drum-head, most frequently in the posterior inferior portion, though it may be anywhere and varying in size from a pin-hole to a large section of the membrane. A drop of pus is often adhering to the perforation, and may pulsate synchronously with the heart's action. The external meatus and the outer surface of the membranum tympani have a bright-red appearance due to the constant bath of pus, and more or less pus secreted from the walls of the external meatus may also be present. The general health is often, though not necessarily, below the normal standard, and the pharynx is seen to be in a catarrhal state.

Otorrhœa has been the bane of many old-time practitioners who warned their patients to do nothing, telling them that the discharge was innocuous or beneficial, or that a stoppage would be injurious. The light thrown on the subject by otic surgeons of the present day has justly changed all this, and it is now known that no harm ever comes from properly stopping an otorrhœa. Improperly stopped or corked up, under the impression that when no longer seen suppuration no longer exists, it has often ruined the hearing power, and, perchance, cost many their lives. Death is by no means an infrequent result of a neglected ear discharge, and it cannot be gainsaid but that it might follow ignorant and unskilful treatment.

Treatment.—This should be both local and general, and fails, when it does, oftener from carelessness and inattention of the patient than from any other cause. Patience and perseverance are essentials to a thorough cure, and when accompanied by intelligent treatment, it is seldom, if ever, that they are not rewarded by success.

There can be no success without absolute cleanliness of the tympanic cavity and the external meatus. The anatomical relations are such that the foul discharge remains a source of constant irritation and self-perpetuation, instead of flowing away as in other similar diseases. The ear should be carefully syringed out with hot carbolized water, or mopped out with dry absorbent cotton, as often as is necessary to ensure cleanliness. There seems to be no occasion to wrangle over the means by which cleanliness is brought about, provided injury is not done the parts. From five to twenty drops of a saturated solution of carbolic acid to a pint of hot water, will be found an excellent solution, and a two- to four-ounce hard-rubber aural syringe may be used. Politzer's apparatus, or other means of inflation, should be practiced under competent supervision to free the tubes and cavities.

Caustics and astringents are not necessary in all cases, and too much used are injurious. They are generally valueless, unless used of great strength, and in the same ratio liable to do damage. Silver nitrate, alone and in combination with potassa nitrate, and cuprum sulphate, are the most reliable, and may be used in varying strengths. Solu-

tions of from twenty to forty grains of either of the former to the ounce of distilled water, and of from ten to twenty grains of the latter to the ounce of distilled water, are the strengths recommended, though the two former may be used much stronger. Boracic acid in the form of an impalpable powder, closely packed in the ear, is of great service in many cases, but too much reliance must not be placed upon any one local remedy. Internal remedies are of the greatest aid, and require careful study. In connection with their use, the system should be thoroughly built up if at all weakened, good air, exercise, and a proper diet being enjoined. Cool salt-water baths, succeeded by a moderate friction of the general surface, are not to be disregarded.

Polypi.

Ætiology and Symptoms.—Those parts of the canal and cavity bathed in a long-continued, badly-treated, or neglected suppuration, frequently become a fertile soil for these excrescences. Though sometimes confounded with malignant growths, their diagnosis is usually easy. They generally consist of loose connective tissue, cells, and bloodvessels, partaking of the nature of fungous granulations, and grow most commonly from the mucous membrane of the tympanic cavity, more rarely perhaps from the surface of the inner half of the external canal. They are of a bright-red color, usually granulated like a strawberry, though sometimes smooth, and vary in size from a pin-head to a long tortuous body, closing the external canal entirely, and even appearing beyond the external orifice. They are attached by a more or less narrow peduncle (pedunculated), or sit upon a foundation approximative to their size (sessile). They are usually soft and excessively tender, bleeding on slight contact, and, being constantly bathed in pus, are offensive in odor. Not always are they of such a character, however, being sometimes elastic, tough, and firm, and with great difficulty cut, presenting a strongly resisting, grisly substance to the knife. When of a spongy nature they are often so pliable as to render their mechanical obstruction of the canal a source of great danger, as they firmly crowd the exit and cause a retention of the pus.

Treatment.—Their treatment should consist in removal by any means best suited to their nature. It is seldom that those of a spongy nature require more than a compressed plug of cotton, thoroughly impregnated with a saturated solution of potassium bichromate, closely pushed upon them. If of a firmer nature, a drop of acid, of the chromic, nitric, mono-chloro-acetic, or carbolic forms, will usually remove them. But the larger forms, or those of a firm texture, require instrumental force. Full descriptions of the instruments required, and their expert uses are detailed in all the larger works on otology.

Mastoid Complications.

The mastoid portion of the temporal bone is known as the "mastoid region," where are found what are known as the mastoid complications, an exceedingly dangerous region when involved in aural disease; a glance at the most common complaints seems desirable.

(*a.*) *Periostitis.*—Of all complications periostitis is the most common, and is readily diagnosticated by tenderness on pressure, which often becomes exceedingly sensitive, swelling, redness, and pain of more or less violence. These marked symptoms should not be confounded with a redness and swelling not infreqently present in the mastoid region in connection with aural disease, which require no treatment, or, perhaps, a few doses of *Capsicum.* Neither should a mild form of swelling anterior to the auricle in connection with a mild redness of this region excite alarm, as it is quite harmless, though often bitterly complained of in consequence of the attendant soreness on touch.

Treatment.—When the existence of mastoid complications is fully declared, the treatment should be prompt. A free incision over the mastoid process down to the bone should be made and poultices applied. If the incision be made parallel to and about one-quarter of an inch behind the auricle, about one-half of an inch to an inch in length, and care be taken to cut upward, the operation is a simple affair. In the early stages no pus will be found, but the relief to the tension will be most grateful.

(*b.*) *Caries and Necrosis.*—These are consequences of the extension of the inflammation just described, but in this connection can have but a mere reference.

(*c.*) *Exostoses and Hyperostoses.*—These bony growths when congenital occasion little or no trouble; when the result of local irritation and sequent to periostitis, they require the aid of operative surgery.

Internal Remedies.—**Arsenicum iodatum** is useful in profuse ichorous discharges, accompanied by great prostration.

Asa fœtida meets purulent discharges, with diminished hearing after the abuse of mercury.

Aurum metallicum is particularly valuable in troubles of syphilitic origin, when there are thickening of the membranes and swollen cervical glands, worse on touch. The tissues of the external meatus are bathed in a fetid pus, the odor being characteristic of necrosed bone. It is also valuable in fistulous openings and sinuses, in the mastoid process, and in caries of the mastoid process and ossicula.

Baryta iodata is highly useful in chronic thickening of the mucous membrane, and in reducing enlarged tonsils.

Bryonia alba is particularly useful in the otalgia of rheumatic subjects, accompanied by great intolerance of noise.

Calcarea carbonica is one of the most useful remedies in these diseases. It meets polypi, associated with purulent discharge, scrofulous affections of the bones, thickening of the membranum tympani, and inflammatory swelling of the parotid glands. Patients with large abdomen and warts on the hands; scrofulous subjects; fat, rapidly-growing, large-headed, soft-boned children, specially demand this remedy in these troubles.

Cantharis is particularly suited to chronic inflammation of the Eustachian tube and tympanum, and to low grades of inflammation in the external auditory canal.

Capsicum is indicated in redness and swelling over the mastoid region, with itching and pressure deep in the ear. When there are acute symptoms in chronic cases, the mastoid cells becoming involved, it is also useful.

Carbo vegetabilis relieves mechanical obstruction to the Eustachian tubes from swelling of the tonsils.

Causticum has been found valuable in the non-suppurative proliferating form of catarrh, and relieves paralysis of the auditory muscles.

Kali iodatum has a favorable action on thickened mucous membranes.

Mercurius has a decided action on thickened mucous membrane, and, hence, is especially valuable in the proliferous form of middle ear disease. Hardness of hearing due to swollen tonsils, and when due to obscure troubles, or syphilitic origin, is well met by this remedy. The discharges characteristic are thin and acrid; the ears, teeth, and face ache, and all symptoms are worse at night. The ear troubles are accompanied by a vesicular eruption on the face and lower limbs.

Mezereum finds a sphere of action in chronic ear complaints, associated with syphilis. The pains in the bones of the skull are increased by touch and worse at night.

Nitric acid is useful in caries of the mastoid process, after the abuse of mercury, and in diseases of the ear following syphilis.

Pulsatilla nigricans has a good action in chronic, mild, bland discharges in the characteristic subject.

Silicea has a direct action on the middle layer of the membranum tympani. It also promotes suppuration, and is invaluable in obscure ear troubles. Collections in the Eustachian tubes are relieved by it.

Sulphur meets offensive purulent discharge with eruption on face and body, and relieves ear complaints from suppressed discharges and eruption.

Tellurium is indicated by an offensive otorrhœa, smelling like fish brine. The characteristic patient is almost the exact opposite of the *Pulsatilla* subject, being angular and sharp.

Tinnitus Aurium.

Noises in the ear, although infringing on internal ear diseases, may be considered here, for they are not only a more or less constant symptom of most forms of ear disease, but also troublesome indications of disease, as oftentimes they linger to the great torment of the patient, after all apparent disease has passed away. These noises are the result of nearly every kind of irritation of the auditory nerve, either in its course from the brain, or its final distribution in the labyrinth. Any change of the normal pressure of the labyrinthine fluid, as when the stapes is pressed in or drawn outward, produces noises in the ear varying in direct proportion to the force exerted. It is impossible, with some general exceptions, to tell from the nature of the noises where the cause is, for the pressure sufficient to produce these noises may be occasioned by a collection of fluid, or a swelling of the lining of the tympanic cavity; by all obstructions of the Eustachian tubes sufficient to interfere with the ventilation of the tympanic cavity; by the exclusion, by obstruction from any cause, of the air from the external meatus, etc. These noises, too, are generally likened to some sounds with which the patient is associated or familiar, thus not infrequently removing the only guides there might be. Crackling noises are caused by air passing through the mucus in the tympanum in the

moist stages of chronic catarrh, suppuration, etc. Now and again a patient will be found who can voluntarily produce such noises in the ear.

Pulsating noises are heard when from any cause there is an interference with the arterial circulation. In cases of aneurism these sometimes become so loud as to produce deafness.

A changed condition of the blood, as in anæmia and chlorosis, produces a tinnitus similar to the venous blowing heard in chlorotic females. All labyrinthine diseases, and often blows on the head, and violent concussions from any cause, are productive of noises in the ear.

A number of elaborate, and so far as the state of the art admits, quite exhaustive, treatises on the subject have been written, detailing theories and the minute direct causes embraced under the above general heads, but are far from satisfactory in the amount of knowledge given, as well as in their deductions.

Treatment.—This must be directed to a removal of the cause, so far as it can be ascertained. Many of our remedies are valuable in this direction, a knowledge of which may be gained by consulting in this encyclopædia the disease whence originates or accompanies this symptom. But the prescription of a remedy from its merely embracing the symptom of noises in the ear, will for the reasons stated, generally be productive of no appreciable result.

B. CONSTITUTIONAL AFFECTIONS.

INFLAMMATION.

BY WALTER Y. COWL, M.D.

Definition.—An attentive consideration of the causes and phenomena of inflammation leads to the conception of it as a specific alteration of local nutrition, resulting in certain symptoms, certain anatomical changes, and a certain definite physiological course, which with more or less rapidity reach a culmination at various stages or degrees of intensity, and eventuate more or less slowly in restoration of the part or in various further effects differing in severity and permanency according to the intensity of the cause, the part affected, the constitution of the individual, and the treatment employed.

This alteration partakes of the nature of a perversion rather than altogether of an increase or a diminution.

As is very evident from the gross as well as from the minute effects of inflammation, this perversion consists, in the first place, of an increase of nutrition under abnormal conditions, and later on in a diminution or cessation under conditions still more abnormal.

The restorative process is begun when the nutrition commences again to increase, in other words, at the crisis or culmination of the attack.

The course of the perversion is due to the peculiar nature of the causation.

Causation.—The efficient cause of inflammation is a change in the calibre of the vessels furnishing blood to a part, whereby the amount of this fluid contained within the part is excessively increased, whilst the rapidity of flow and rate of supply are diminished.

This applies simply to the area in any case actually inflamed, and does not wholly relate to the zone of collateral congestion and œdema.

In this collateral zone the amount of blood passing through the vessels continues to be increased, and at a certain distance from the focus of inflammation largely so.

In all the part much more heat is given off than normally in periods of functional rest, because of the increased supply of blood, and not because of abnormal production of heat in the part.

It has been shown that section of the main sympathetic nerve of a part, with the consequent non-inflammatory turgidity, will yield a higher local temperature than a corresponding inflammation.

It might likewise seem from this experiment, as well as from physio-

logical observation, that it is not the simple determination of blood to a part which is the efficient cause of inflammation; but it is to be remembered that whilst a section of a sympathetic nerve-trunk cuts off the vaso-motor centres of the brain and cord, and results in a remarkable degree of vascular dilatation over a large extent of territory, it cannot completely paralyze the local sympathetic ganglia or the immediate vaso-motor nerves proceeding from them, which ultimately govern the circulation in each minute district of a part.

In producing inflammation in animals, moreover, we need, as a rule, some substance which shall act directly upon the tissues and their local nervous arrangements, whilst in man we usually have a combination of causes of which a remote or general sympathetic cause, if such be present, is only one.

Realizing furthermore the physical changes, such as suppuration on the one hand and sloughing on the other, as well as the impairment or abolishment of function in inflammation, we must accept it as a fact that the nutrition of the part cannot simply be said to be increased or diminished, but must be said to be perverted; and without assuming the existence of any supposed trophic nerves directly governing the nutrition of the tissues, we can only hold that inflammation comes about through a peculiar alteration in the blood-supply.

In order to understand the essential nature of inflammation and the action of this alteration of blood-supply we must first ascertain the operation of the ultimate causes of the process.

As with reference to disease in general, we may divide the causes of inflammation into predisposing and exciting, into those more prolonged, more insidious, more preventable, and into those more sudden, more striking, and more resistless.

The predisposing causes, which are the more important by reason of their indications, are principally constituted by special vulnerability, local or general, by scrofula, lack of nutrition, cardiac weakness, nervous depression, want of respiratory hygiene, overwork, general or local, the rheumatic and gouty diatheses, and chronic poisoning, as by inhalation, by contact, by food, by water, or by other drink.

The exciting causes are comprised under trauma, including the presence of foreign bodies, gross and minute, excessive physical action, local or general, as by heat, cold, electricity, etc., chemical agents, such as caustics and other active elements or compounds, certain specific agents, whatever their ultimate nature or mode of action, including mineral, vegetable and animal poisons and the viruses of septic and infectious diseases, together with certain low forms of organism capable of living within the body and of feeding upon its contents, its solids and its juices.

A cause of inflammation, usually predisposing, when suddenly begin-

ning to act or on becoming intense, may constitute the exciting cause of the attack; a simple wound in a healthy dog, for instance, will become inflamed if he be fed on putrid meat, in which case the ingestion of putrid matter becomes the exciting, the determining cause of the attack; whilst in a dog similarly fed before receiving the wound, the same would but predispose thereto.

The distinction between predisposing and exciting causes then is extrinsic rather than inherent, is of relative time rather than of kind; a due regard for it, however, as a practical division founded upon observation, very clearly discloses that, whatever almost the exciting cause or causes of the attack, there are also predisposing causes which, in common with the more apparent factors determining the attack, are to be sought for, and mitigated or removed.

The action of the predisposing causes of inflammation is mainly to diminish the vigor or impair the normality of the blood-supply. In this their action is the same as that of the predisposing causes of disease in general, whether it be by vitiation or impoverishment of the blood, by abnormalities in the formation or function of the heart, the bloodvessels, the lymphatics or the vaso-motor nervous arrangements, or by lesions or deficiencies of parts or organs.

Respecting the action of the exciting causes of inflammation, we likewise need only particularly regard the physiology of blood-supply, but in this case more in its local than its general aspect.

It is not necessary, if it were possible, to ascertain the precise action, physical or "vital," of the various irritants or other causes producing inflammation. It is sufficient for practical purposes to know that inflammation is the result either of an attempt at tissue repair, of compensation for circulatory disturbances in the system, or of depression of the sympathetic, constituted by an over-action from which the vigor of the part or of the individual is unable to effect a normal recuperation.

This over-action must be in the nature of a nervous impression, sensible or unfelt, reflected upon the vaso-motor nerves of the part attacked, whether remote or identical with that irritated, and causing an excessive vascular dilatation which is then followed by certain specific changes in the vessels, the blood, the tissues and the lymphatics.

We now know that there are local vaso-motor ganglia which largely govern the calibre of the bloodvessels and the supply of blood to each minute district of the body. An increase of congestion and inflammation may be incited by local irritation in a part cut off from connection with the vaso-motor centres of the brain and cord, and already greatly congested in consequence thereof.

An example of local vaso-motor action in the human individual apparently illustrative of the fact of such action, is the redness which

shortly follows the point of the lancet in the vaccination of an infant making no sign of hurt, an example, however, which is exceeded in point of interest by the typical course of inflammation in the properly vaccinated spot itself.

A local irritation, then, when sufficient, produces, first of all, a profound effect upon the local sympathetic ganglia, and gives rise to a paralysis of the vaso-motor nerves proceeding therefrom; this renders powerless the muscular tissue of the vessels which especially abounds in the smaller arteries, whereupon these, in common with the veins, relax, and are dilated to about double their diameter by the force of the pulse; the capillaries then become stretched to their utmost limits, although increasing less in size than the arteries, and particularly the veins. The other changes of the process thereupon follow.

Instances of such directly incited inflammation are cases of destructive and infective traumatism, corrosive chemical action, excessive elimination of poisons by the various emunctories, the destructive action of heat, cold, electricity, etc., and the presence of wandering and growing parasites, such as the *trichina spiralis*, and others more minute.

When an inflammation is excited at a point remote from the excitation, as a nephritis or orchitis from the passage of a sound, or a pelvic cellulitis from the insertion of a uterine probe, by means of nervous reflex, such may be due to a depression of the sympathetic acting through the vaso-motor centres with or without marked symptoms referable to the cerebro-spinal system.

In respect of other instances of inflammation at points distant from the action of the cause, it can be said that we know the entire vascular system to be compensatory as to calibre; in other words, an increase of intra-vascular pressure beyond the needs of the moment is compensated by a relaxation of the vessels of one or more parts.

When this increase of pressure is not physiological, and particularly when due to the contraction of bloodvessels over a considerable area of surface, the compensation must needs be great, and in weak or depressed parts overmuch.

Thus, in a pneumonia or pleurisy, or in an acute nephritis from catching cold, beside the loss of heat of the part itself, or the added work imposed upon it, which would not be sufficient to cause the disease, we have in the initial chill or chills a marked or profound circulatory disturbance for which compensation must be made by the vessels of other parts, normally where they are normal, abnormally where they are abnormal or under strained or abnormal conditions.

It is apparent that this over-compensation is liable to take place in the part at the time most congested or most subject to congestion.

Course.—Succeeding the dilatation of the minute arteries of a part in which inflammation is about to pronounce itself, and closely follow-

ing the acceleration of the blood-current which results in all the part from the passive dilatation of the capillaries, there begins in the midst a slowing of the current to below the normal.

The primary cause of this retardation is not known, but it is evidently due to some acquired condition of the walls of the capillaries and minute veins; for white blood corpuscles will be noticed, in experiments upon frogs, bats, rabbits, and even the *frenum linguæ* of man himself, to cling momentarily to points along the wall of a capillary or vein within the affected area, whilst showing no such disposition in the vessels just beyond.

It may be said, however, that from the excessive stretching of the walls of the vessels concerned, nutritive changes probably ensue in the cells which form these walls, and either thus give rise directly to an adhesive surface, or, on becoming abnormal as to their surface, a layer of non-fibrillated indiscernible fibrin is deposited upon them—much as it is upon a microscopic slide from slowly clotting blood, in which, so long as the *liquor sanguinis* be present, the fibrin may not be observed.

The white blood corpuscles, which normally move along the walls of the vessels larger than their diameter with a somewhat slow, hesitating, rolling motion, whilst the red corpuscles with a rapid movement pass through the central portions of the vessel, now become attached to the wall of the vein or capillary, and shortly form a layer there by fresh accretions.

Having come to rest, they begin motions, known as amœboid, and which consist in an extrusion and retraction of processes from the cell.

Those corpuscles lying next certain minute demonstrated openings (*stomata*) in the wall of the vessel, formed or enlarged by vascular dilatation, and to be observed at the junction of the cells forming the wall of the vein or capillary, impelled by the greater pressure within than without the vessel, thrust processes through these openings in this direction of least resistance, whereupon in further obedience to the blood-pressure, now so much more considerable than normal as to produce a pulse in the veins, the semi-fluid contents of the cell gradually fill the extruded portion, and soon the evacuation, the emigration, the diapedesis of the leucocyte is complete.

That the amœboid motion of the leucocyte is not sufficient to effect, nor alone to begin, diapedesis, is shown by ligating the inflamed extremity or other part of an animal (frog, bat, rabbit,), when this phenomenon, which has been denominated "emigration," will be observed to cease until the blood-current flows again.

Along with the early exudation of the white blood corpuscle, and before it occurs, a largely increased amount of blood plasma is thrown out. The amount thus passing into the tissues and absorbed from

them, so long as their spaces are not blocked-up by the further progress of the inflammation, is so great that eight times the normal amount of lymph has been collected from a main trunk leading from the inflamed paw of a dog. A large portion of this increase doubtless comes from the zone of congestion and œdema surrounding the district actually inflamed.

Owing to their non-circulation and amœboid motion within the vessels and the extra-vascular suffusion of blood-plasma, the leucocytes, both retained and exuded, now rapidly multiply by division—they proliferate by fission.

The young leucocytes in the vessels emigrate in common with those furnished by the current of blood, and the tissue spaces, as well as the minute vessels, become filled with cells.

It was held by the solidists before the discovery of diapedesis, and indeed long after its discovery, that the cellular products of inflammation, *i. e.* pus cells, more especially, originated from the tissues and from the cells thereof; but this view, although yet iterated, has in its support only the instance of the proliferation of cartilage cells in inflammation, whilst on the other hand the cells of the cornea, which more nearly approach those of the other tissues, do not proliferate. It is a theory which, in the presence of the known rapid proliferation of exuded white blood corpuscles, may therefore practically be disregarded.

Blood disks, as well as leucocytes, are exuded in inflammation, but are usually found in small numbers outside the bloodvessels. In certain cases of asthenic inflammation, however, where the vascular stomata are unusually free, and the deposit of fibrin slight, the number of red disks is so considerable as to give rise to the appellation of hæmorrhagic inflammation.

In all cases of typical inflammation, if not always, there is a deposit of fibrin in the tissues which is attested by the brawny feeling of the parts. In inflammation of serous surfaces it forms a free exudation, and in the more intense forms of inflammation of the mucous membrane—croupous, or plastic and diphtheritic—its presence is so marked as to be visible in the gross.

This fibrinous deposit obstructs the tissue spaces and blocks the primary lymphatics. The consequence of the resulting diminished absorption is diminished nutrition. The tissues become full of spent blood-plasma. Its replacement is greatly retarded.

From an excessive amount of nutrition at the start, there is now at the focus of inflammation, between the progressive retardation of the blood-supply on the one hand and the diminution of absorption on the other, a condition of starvation which is the quicker of effect by reason of the presence of the proliferated leucocytes. These, being

young and rapidly produced, require rapid nutrition for their preservation.

Upon the diminution of nutrition, the new cells largely die and undergo fatty degeneration, in which process they are more or less accompanied by the cells of the tissue. This especially occurs where the wandering cells are many. But in this degeneration they are also joined by the obstructing deposit of fibrin, until the way for absorption is made clear and the nutritive stream of blood-plasma may again go freely on. At this point the culmination is reached, and resorption at once begins.

When the cells of the tissue are destroyed by a complete cessation of nutrition over but an inappreciable area, perfect resolution—restoration—may take place. If, however, the accumulation of leucocytes be so great and so extensive as to effect a considerable fatty degeneration with consequent disintegration of the cells proper of the part, or, in the case of an organ, of the parenchymatous cells, a loss, a lesion will remain. If the amount of leucocytes be great over an extensive area without complete degeneration of the tissue, a condition of purulent infiltration is the result. If the degeneration of the tissues about the focus of the inflammation be such as to break down the connective tissue framework of the part, an abscess is formed when the process is beneath the surface, or an ulceration if upon it.

Necrosis of the tissues results when the circulation comes to a lasting stop over any appreciable area of the inflamed district; this is especially liable to occur where the vessels are greatly blocked with accumulated and proliferated leucocytes.

Upon, or near, the surface this death in mass of the tissues is followed by the process of sloughing or the separation of the necrosed portion from the tissues in which circulation and absorption still continue. This separation is effected by fatty degeneration and disintegration along the line of demarcation.

In those portions of inflamed district where the process has been intense, but without proceeding to necrosis, a subsequent increase in the amount of connective tissue in the part occurs. This is variously held to be due to proliferation of the connective tissue cells of the part, and to organization of the emigrated and proliferated leucocytes. It may be questioned, however, whether the latter are inadequate to continued life or to the formation of fixed tissue.

The further results of inflammation partake in no sense of the nature of the process itself.

Symptoms.—The symptoms of inflammation are pain, swelling, heat and redness, together with tenderness, inelasticity, hardness, and loss of function in the part. If the attack be extensive, fever, with its accompanying symptoms, will be added.

As with the other features of the process, the symptoms may vary

as a whole in point of intensity, of extent, of suddenness and of duration, and also relatively among themselves from the action of various causes, local and general, causes which are partly, if not largely, uncertain or unknown.

Pain, doubtless, depends upon pressure, and is therefore most severe in those parts limited as to swelling, as the brain, the eye, the bones, periosteal tissue, and other parts normally or abnormally confined. A sudden cessation of pain in some instances is indicative of necrosis. The character of pain furnishes special information. Pain altogether is a fortunate and valuable symptom. Pain is also largely proportionate to the normal sensitiveness of the part.

The amount of pain as well as its expression likewise is dependent upon the constitution of the individual.

As pain is a sensation, and not a physical condition, it would seem to be a general rule that individuals succeeding best in devoting their attention—their powers of sensation—to other things, suffer less pain. Many facts conspire to confirm this view.

The amount of swelling depends in part upon the looseness of the tissue affected, and in part upon the sthenic nature of the attack. It may, other things equal, be proportionate to the amount of fibrinous obstruction of the tissues with diminution of absorption.

The amount of heat simply depends upon the excess of blood furnished to the part altogether. Were the district actually inflamed not surrounded by a zone of active congestion, which is extensive in those parts where increased heat is evident to the senses, it is doubtful if the inflamed tissue would preserve its normal heat. The excessive flow of blood through the parts surrounding may, and probably does, act to prevent necrosis by keeping up the heat and by favoring nutrition thereby. The temperature of an inflamed part never exceeds, nor indeed reaches, that of the left ventricle.

The amount of redness simply depends upon the amount of blood in the part without reference to the rate of exchange. Although usually greater in sthenic inflammations, it may be prominent in those pursuing a less acute course.

Tenderness is similar in general to pain in its manifestations, although sometimes indicative of inflammation where pain is absent. Inflammation in deep parts, with scanty distribution of sensor nerves, is likely to be betrayed by tenderness rather than localized pain. The electrical current in such cases is an aid.

Inelasticity and hardness suddenly appearing, form, when accompanied by tenderness, unequalled indications of inflammation beneath the surface. An instance is furnished by peritonitis, wherein they are particularly valuable as signs when the affection runs an asthenic course with little fever.

Impairment of function is likewise a sign of value, especially in

cases of inflammation of nervous tissue, and also in supposed malingering in connection with slight anæsthesia or other measures.

Certain peculiarities of inflammation in various conditions may be noted in connection with its symptoms.

Occurring in the young, the inflammatory process is liable to be acute, and it either terminates fatally or in a rapid recovery. In the aged it is generally subacute and often unnoticed. This is true of many fatal inflammations.

The inflammatory process is peculiarly liable to be asthenic in the insane. It is generally sthenic in the plethoric.

Its course is usually severe in pregnant women.

A scorbutic individual is inclined to suffer from hæmorrhagic inflammation.

In the scrofulous, inflammation is disposed to the formation of pus, often without much hardening of the tissue during the attacks; burrowing is, therefore, likely to result. The course of inflammation in such persons is always more tedious, generally less acute, and frequently resulting in the formation of a large amount of new connective tissue, which remains as an induration or cicatrix.

Tissue Effects.—The gross anatomical changes in inflammation vary much with the stage of the disease, the part affected, the intensity of the process, and the nature of the cause.

In the earlier stages there is a reddish, succulent hardness and immobility or non-pliability of the tissues, with congestion and œdema in the adjacent parts.

The tissues later on become softer, and upon dissection are found more friable than normal, indeed, at times extremely friable. A marked instance of this is the lung in lobar pneumonia, which, from a normal toughness, offering marked resistance to the knife, becomes capable of dissection with the finger.

Sloughing externally is indicated by a desiccation of epithelium, or by a yellowish color of raw surfaces. In deeper parts it may be merely shown by a greenish hue, or even by a simple loss of redness.

Pus can usually be squeezed from the tissue about a demarcated slough, but often not in advancing necrosis.

A tissue may be infiltrated with pus, or an abscess may form, without sloughing.

These variations probably depend upon the action of the special cause of the inflammation, the part affected, its vigor, and the condition or constitution of the individual; but, further than this are, in common with many other facts relating to inflammation, unexplainable in the present state of our knowledge respecting the physiology of the blood and of infective agents.

The induration remaining after the subsidence of inflammation is chiefly due to increase in the connective tissue of the part, which may,

or may not, be resorbed. When considerable in amount, more or less contraction inevitably takes place upon its conversion from the cellular to the fibrous condition, and with a degree of deleterious effect dependent upon its situation and the firmness of its connection with important adjacent parts.

This sclerotic, cirrhotic, or cicatricial tissue may constringe the parenchyma and impair or abolish the function of organs, may compress vessels and nerves, or may lessen needed mobility of parts.

The quantity of adventitious tissue remaining long after an inflammation depends more upon the duration of the process in the parts affected and upon the convalescence, than upon the extent or intensity of the attack.

When there has been a loss of tissue by necrosis, by ulceration, or abscess, or merely by the death of the parenchymatous cells of the part, a cicatrix, composed of newly-formed connective tissue, fills the space or covers its surface. This cicatrix contracts with an effect often severe upon surrounding or included parts. A dense and extensive cicatrix may in time proceed to the dislocation even of bony structures, and not unfrequently contracts so firmly as to cut off the nutrition of its central portions, when, if at the surface, a simple ulceration of the anæmic district follows.

In certain organs possessing a scanty connective tissue framework, such as the spleen, inflammation may produce a very marked degree of softening.

Cheesy deposits, composed of the inspissated remains of degenerated and disintegrated pus cells are not unfrequent in scrofulous individuals, and occasionally in others. Chalky deposits may replace the cheesy formations. Certain calculi are thus formed.

Beyond the minute tissue-changes noted in treating of the course of inflammation, it need only be said that wherever parts containing other than connective tissue elements are affected, at first a cloudy swelling, later a granular appearance, and lastly a distinctly fatty change is to be observed in the parenchymatous cells. Fatty degeneration in a part normally containing no fat can be demonstrated by macerating the tissue in sulphuric ether, which, upon separate evaporation, will show the fat.

With reference to the predisposition to subsequent attacks of inflammation or to other morbid changes resulting from the occurrence of the inflammatory process in a part or organ, it is to be remembered that resolution may not be perfect as to the primary absorbents which have been occluded, owing to the formation of a slight amount of connective tissue. Such a persisting occlusion of the lymphatics, to a considerable degree, is indicated where œdema long remains after an attack of inflammation. In a lesser, perhaps normally imperceptible, degree it doubtless tends to a recurrence of inflammation upon the

action of slighter causes than determined the primary attack. In abnormal, probably more than in normal, conditions of the blood-circulation the absorbent vessels become relatively important.

The tendency of inflammation under circumstances not altogether favorable to spread to surrounding parts, taken with the liability of recurrence at the point first attacked, goes, furthermore, to explain the discrepancy between the essentially acute nature of inflammation and the clinical picture of a region chronically inflamed.

The congestion and tenderness, beside the other effects often remaining in a part previously inflamed, still further convey the idea of chronic inflammation, or rather give the idea of a simple difference in duration between typical and what of various phases is called chronic inflammation.

A chronic suppuration, such as sometimes remains after the subsidence of pain, heat, swelling, and redness in an inflamed part, evidently cannot be considered as a continuation of the inflammatory process. Lacking the cardinal symptoms as well as the more characteristic anatomical changes of inflammation, it is rather to be considered as a more or less permanent change in the vessels permitting the escape and proliferation of leucocytes.

Treatment.—The treatment of inflammation in general comprises the special hygiene of the individual and the local care of the part on the one hand, and the therapeutics on the other.

Owing to the great diversity in the manifestations of inflammation from numerous causes, its therapeutics in general may be said to resolve itself into the prescription for the individual affected.

Different forms of inflammation, nevertheless, are particularly liable to occur under certain circumstances or in certain conditions of the individual, and observation has shown them to frequently require certain medicinal agents.

The consideration of the remedies for these different manifestations of inflammation belongs more properly to special pathology and therapeutics.

The general symptoms of inflammation, however, such as fever, the nervous phenomena, etc., are prominent in the pathogeneses of certain drugs, and among these the drug *Aconite* presents the most marked instance of similarity, whilst its use has, perhaps, been oftenest followed by beneficent results. In certain cases it will abort inflammation, even when pronounced.*

The general management of inflammation, as well as its therapeutics, likewise varies so much with the locality of the attack, the nature of

* This has been accomplished as well by certain able members of the old school of medicine, and in the instance of pneumonia, with the drug in minute doses, as late as he fourth day.

the cause, and other circumstances, that specific directions cannot be laid down.

There are, however, certain general considerations which appear clearly from the clinical history of inflammation as well as from its pathological character.

The first indication, as in all treatment, is to remove, so far as may be, the causes which have conspired to effect the morbid process. The only general caution in this respect is to be sure that all the ascertainable data bearing upon the causation are known. The minor, or less evident, effect usually coming from the satisfaction of the *indicatio causalis* should not lead to less care in making out the cause than in determining the diagnosis and the active treatment, for failure may be complete in consequence.

In removing the causes of the attack, predisposing and exciting, the best possible hygienic surroundings should be secured, and the most needful of these, perhaps, is pure air.

The next most important indication is rest, equally in any considerable inflammation, for the individual and for the part affected. The relaxation of the circulatory system in general rest reduces the blood-pressure and lessens congestion.

Quietude of the part itself should be insured by some means effecting immobility. Slight movements, though causing no annoyance, keep up a tension in the part; this tension aggravates the morbid process. This is usually evident after restraint has been applied with greater ease of the part. Immobility may be secured by means of splints, strips of adhesive plaster, bandages and cotton, etc. These may take their hold from surrounding parts. They will not only be grateful, if well applied, but accessory to early resolution. The value of immobility is not to be measured by the amount of pain on movement of the part. The advantage, for instance, of an adhesive strap around the chest in pleurisy is no greater than that of a splint over a joint subacutely inflamed, although much more apparent to the individual.

Relief from the effect of gravitation of the blood is an aid which is usually evident to the patient, and special means may be devised or adopted to effect an easy elevation of normally dependent parts. Much is often to be done for the relief of pain and the hastening of recovery by attention to rest and position.

The relief of the chief symptoms of inflammation by cold has been a favorite means of treatment in the past, but whilst its value for certain inflammations, as of the eye and for the relief of pain in meningitis, has been proved, it may well be questioned whether cold is ever of real benefit after inflammation has fairly begun.

Wherever hæmorrhage beneath the surface is to be checked, cold may be valuable as an agent, contracting the bloodvessels and favor-

ing the formation of a clot; but in inflammation the diminution of congestion resulting from its use is followed after a brief period, as a rule, by a marked and lasting increase of passive engorgement. Cold, long applied, is liable to be followed by sloughing or tardy resolution.

It has of late years been found that heat actively employed in the early stages of inflammation will often abort the attack. The effect of heat at any time previous to the culmination of the process is, with few exceptions, a beneficent measure, and usually in proportion to the persistency and vigor of its employment.

The too long continued use of heat may be detrimental. This applies, as a rule, only to cases where pus has collected and is not soon evacuated, or where the raw surfaces after evacuation are not properly dressed.

It is a fact not generally realized that the main virtue of a poultice is simply the heat it conveys; in other words, it is not frequent that they are ordered to be used thick, hot, and often enough. A little instruction concerning their proper use would, in many instances, hasten very considerably the period of resolution. It is apparent that the earlier this period begins, the less severe the tissue-effects. In full, perhaps, as much as by medicinal means, the course of local inflammation can be prevented from proceeding to suppuration and sloughing by rest, protection, and heat.

It is popularly supposed that the application of heat is for the purpose of effecting suppuration; but inflammations in which heat is most actively used may be, and often are, attended by less suppuration than others less rapidly brought to a culmination. A similar remark may be made respecting the action, in indicated cases, of certain medicinal agents supposed to favor suppuration, notably the Hepar sulph.

When convenient means are at hand, and especially in early inflammation, hot baths to the part, or irrigation by a constant stream of water as hot as can be borne, for from five minutes to half an hour at a time, forms the most effective method of applying heat. It may be accomplished simply with a rubber tube (or a Davidson syringe, having the valves removed) used as a syphon, and causing a stream to flow upon a piece of cloth applied to and depending from the part, in order both to distribute the heat and to carry off the water. It is perhaps needless to add that all should be borne that can be, and that the heat of the water can be progressively increased from the start. In the intervals the part may be dried and wrapped in flannel, or, if convenient, a continuous milder application can be kept up. Relief of pain is often marked and permanent.

The effect of an intermittent application of heat, whether by poultices, local baths, or irrigation, is to produce a contraction of the vessels in the intervals, and thus to lessen the blood-stasis and other phe-

nomena of the inflammatory process. This period of vascular contraction, following the marked dilatation produced by heat, is much more lasting than that immediately following the application of cold; the effect of heat, however doubtless, cannot entirely be attributed to the reaction; it must in part be directly conservative.

In parts or at times when extraneous heat cannot be well applied, a measure approaching it in value is the retention of the heat of the part by some efficient protective means, such as cotton, spongio-piline, etc. Less effective agents are ointments or other applications preventing the loss of that part of the heat which is due to the evaporation of moisture from the surface constantly taking place, however dry the integuments. It is doubtful whether the air of itself is harmful to an inflamed surface.

Relief of tension forms an indication to be followed to all reasonable extent in inflammation. A part bound fast by horny epithelium should be actively macerated until the cuticle can be loosened or removed. This may be done by hot water or poultices, or more rapidly by a weak, hot solution of caustic potash (as 1 : 100).

The question of incision through the tissues usually depends upon the known existence of pus, and the relief resulting is generally considered to be due to the cessation of pressure by the collected matter. It may be questioned, however, whether the good effects of the operation are alone due to this fact, for relief of pain and arrest of the inflammation not unfrequently result when incision is made without discovering pus, whilst its mere withdrawal, as by aspiration, although generally effective, is not so markedly beneficial as free incision. Furthermore, in the present era of aseptic and antiseptic surgery incisions have become more quickly and safely healing, and it is always to be remembered that the organism is built so as to withstand and recover better from injuries in general than from disease. On the other hand, nevertheless, by various means, medicinal and other, we may at times and in cases where the danger of confined pus and necrosis is slight, abort or so modify inflammation as to secure its rapid termination.

In the treatment of injuries of various kinds where inflammation has not yet begun, but is about to occur, much may often be done toward mitigating if not preventing the attack.

The general indications are to lessen the pain and shock to the nerves, to protect the part, and to use means, general and local, to lessen the impending or existent congestion.

Aconite or *Camphor* may be administered internally. The tincture of aconite root may be applied locally to lessen pain and as a temporary dressing. It may be followed by carbolic acid, which is not only anæsthetic but antiseptic as well, and capable of forming a protective coat of coagulum over a raw surface, or of hardened epithelium over

an abrasion. For burns, scalds, and small cuts there is, perhaps, nothing more effective. The pure phenol may be painted on, or an application of a saturated solution in water (1 : 20) made. Over the application a thick dressing of cotton should be bound. In the case of burns and wounds this is best composed of an inner thin layer—preferably of absorbent cotton—to remain adherent, and an outer protective envelope, which may be removed for the liquid applications.

Bruises likely to cause extravasation or to result in abscesses, are best treated by early and repeated applications of water as hot as can be borne.

ULCERATION AND ABSCESS.

BY WALTER Y. COWL, M.D.

Definition.—*Ulceration* is the gradually progressive death of a part from lack of nutrition,—a necrosis of the tissues proceeding slowly, cell by cell, rather than by simultaneous or rapid death of a considerable area. The term is usually confined to losses of substance upon surfaces, although the process may occur in the depth of the tissues.

Ulceration may or may not be accompanied by suppuration.

An *abscess* is a mass of pus contained within the tissues. It is the result of an inflammation eventuating in suppuration and ulceration of the tissues at the inflammatory centre.

When this inflammation is sthenic, the abscess is said to be acute, and when presenting few, or no, marked symptoms, it is called cold or chronic.

An abscess may vary in size from microscopic fineness to a cavity containing over a gallon of pus. Minute abscesses, when significant, are multiple, such as those of pyæmia. Large abscesses are most frequently the result of the coalescence of smaller collections, such as many abscesses of the liver.

Causation.—Ulceration starts most frequently as a small abscess or traumatism, less frequently as the result of a stoppage of the blood-current over a small area.

Abscess is always the result of an inflammation or of the suppuration remaining thereafter.

The absence of suppuration in wounds treated by the methods of antiseptic and simple aseptic surgery, together with the very uniform occurrence of *micrococci* or other bacteria in pus, and their normal absence in the healthy tissues, goes far to confirm the view that suppuration and abscess are due to the irritation or other effect of minute organisms finding a congenial soil in which to feed and multiply. They may initiate or simply intensify the inflammatory process. Inoculation with bacteria will frequently produce suppurative inflammation. The Listerian view of suppuration likewise derives support

from the investigations of the metastatic abscesses of pyæmia, which are crowded with bacteria.

Course.—In both ulceration and abscess there occurs a progressive fatty degeneration of the tissues involved, with a consequent disintegration of the cellular and fibrous elements.

This degeneration results from either a diminution of the blood-supply or a cessation of absorption, or both.

The increase in size of an abscess is not simply due, however, to progressive ulceration of its walls, but is consequent in greater measure upon the distension of the cavity with leucocytes from the blood-vessels. The blood-pressure, acting through capillary orifices, aided, perchance, by the impact of the pulse, renders this distension forcible.

If the distension of the abscess-cavity be not relieved, it goes on to effect further degeneration and ulceration of the bounding walls, and prevents resolution in their tissue by tension and interference with nutrition. This proceeds to a certain indeterminate point, when the inflammation and ulceration cease, and a lining membrane of connective tissue is formed which more or less effectively limits the collection of pus. This membrane, in time, if the abscess persist, becomes tough and fibrous, and in some cases of considerable thickness. It has been called the pyogenic or pus-generating membrane, and such, if the cavity be evacuated and exposed to the atmosphere, it becomes; but until then it is more a simple limiting membrane which tends to check rather than to favor the increase of pus.

If not evacuated upon a surface by ulceration or by artificial means, the pus of an abscess may burst its walls and burrow, causing suppuration in the track it dissects, increasing in amount, and forming the most usual variety of cold abscess.

Burrowing of pus is liable to occur after an asthenic inflammation, owing to the slight hardening of the surrounding tissues and the thinness of the resulting abscess-wall.

The lining membrane of such an abscess, which in time may thicken so as to limit its extension, is also called a pyogenic membrane. It may, in fact, be very thick or entirely wanting.

On the other hand, pus confined may, upon fatty degeneration and disintegration, remain as a persistent cheesy mass, owing to the absorption alone of its fluid portion.

Cheesy masses may be replaced by calcareous matter.

The contents of an abscess are composed of pus-cells and *liquor puris*, which, when typical, form a light-yellow diffluent mass, separating on standing at rest into a larger, more solid portion, and a lesser fluid portion.

The latter is of a yellowish opalescent hue, of a specific gravity of about 1030, and beyond containing a larger amount of fat, is much like blood-serum in constitution.

Pus-cells under the microscope are white in color, of an irregularly globular shape, and possessing a diameter of from $\frac{1}{4000}$ to $\frac{1}{3000}$-inch.

They present a more or less finely-granular appearance, and with the high powers or on the addition of dilute acetic acid, saturated salt solution, etc., show one or more nuclei. Their surface is finely irregular, and they may be demonstrated to possess a cell-wall by the use of aniline blue which stains the nuclei upon the bursting of the cell.

They are readily stained, as a whole, by rosin and other aniline dyes which usually differentiate the nuclei. The addition of an alkali on decomposition with the formation of ammonia destroys the cells and converts diffluent pus into viscid muco-pus.

Pus is said to be laudable when inoffensive in odor and of creamy consistence. Sanious pus is tinged with blood or blood-coloring matter, and is often watery.

Ichorous pus irritates tissue over which it flows, is offensive, and usually watery. Fetid pus is due to decomposition with or without the formation of ammonia.

Upon the evacuation of an abscess and the relief of tension in its walls, the circulation becomes more free in the part, and reparation is usually at once begun.

A line of demarcation is formed between the tissue which is to live and that which is incapable of nourishment, soon followed by a casting off of the latter, and the appearance of what are known as granulations. These at first are constituted simply by branching capillary vessels which form loops and push out from the surface in obedience to the blood-pressure.

They allow of the escape of leucocytes, which constitutes suppuration on such a surface, until, becoming surrounded by stable connective tissue cells and somewhat compressed, the growth of epithelium is permitted at the edges of the surface, and a covering is begun.

The cicatrization is thus continued until complete. Substantially the same process takes place in the healing of an ulceration from other causes than abscess.

The color of healthy granulations is a blood-red. In this condition they gradually grow and soon make good the continuity of the part, unless the surface be extensive, when skin-grafting is required in the mid-portions of the surface.

Healing by granulation is effected in part by providing for the extension of epithelium and in part by means of the contraction of the new connective tissue. Losses of substance are mainly effaced by the cicatricial contraction.

When the process of granulation is delayed, however, and incompetent to the extension of epithelium, in other words, when the granulations are weak, soft, pale or exuberant, the formation of connective

tissue goes on to thicken the base of the sore rather than to lessen its area.

This thickening may so cut off the nutrition of the surface as to prevent its healing until removed or otherwise treated.

The sign of a healing sore is a white line of new epithelium at its edge. A yellowish color of the base or an abrupt edge indicates the reverse. This abruptness of the edge may be either in the nature of an excavation of the raw surface or a projection of exuberant granulations.

Symptoms.—Beyond the symptoms of inflammation the chief local sign of abscess is the existence of softening in the midst of the inflamed tissue, accompanied, when the pus is near the surface or large in amount, by fluctuation or a sense of fluid in a sac.

The presence of pus beneath the integument is also sufficiently probable for incision when the surface begins to look purplish or when marked redness with pointed swelling is present. Severe throbbing pain is often caused by confined pus.

The hypodermic needle or an aspirator may be used for diagnosis, and where pus is very deep or near important structures is often advisable. A failure to secure pus is not positive evidence of its absence, and not unfrequently it is better to form an opinion from the symptoms alone than to hazard a negative aspiration.

The general symptoms indicating the formation of abscess of any considerable size are those of hectic; namely, intermittent fever and sweat, with or without rigors and chills.

This may run a daily course and convey a false idea of malarial poisoning. The hectic, with certain large abscesses, notably of the liver, may be slight and only discovered upon an attentive search for the causes of the marked anæmia and emaciation usually incident to such collections.

Severe pain during the formation of an abscess is generally indicative of confined pus. The most marked instance of this perhaps is a whitlow. A continuation of such pain for more than a short time indicates necrosis of tissue, soft or bony.

Tissue Effects.—From both simple ulceration and abscess a permanent loss of tissue may result.

This occurs or remains apparent only where the size of the ulceration has been considerable. Scars due to previous inflammatory or simple ulcerative processes have a marked and long-continued tendency to contract. Where their attachments are not to fixed parts, they will reduce to less than one third of its size the original raw surface.

Their color, as a rule, changes during this contraction from a reddish hue at first to a paler tint than that of the normal surface. Cicatrices are sometimes pigmented.

A condition of chronic suppuration may remain after abscess, or continue upon the cessation of ulceration in a part. A healthy sore should suppurate, and often does so profusely until healed, but the process, when excessive, may prevent the extension of epithelium which is necessary to cicatrization.

When the process of healing has been slow, the cicatrix will be thick and contract forcibly; when rapid, it is thinner, more flexible, and less deforming.

A part once suppurating or ulcerated, becomes subject to abscess and ulceration upon slight or moderate provocation.

This tendency is increased where a condition of chronic congestion remains, such as is not unfrequent, for instance, about the rectum and in the lower extremities. Suppuration in a part lessens its future power.

A deep abscess ill-treated or occurring in a weakly individual may leave a sinus leading from its seat to the surface, walled by dense connective tissue, and not disposed to heal.

Treatment.—In the treatment of ulceration and abscess the cardinal maxim is the riddance of effete matter and the preservation of the utmost cleanliness of the raw surface.

Of course, it is not always possible nor advisable to get at the abscess in order to evacuate it, or to directly treat the ulcerating or ulcerated surface; in such cases we must rely upon internal medication, special hygiene, and less effective local measures than incision.

As detailed in the remarks on the treatment of inflammation, poultices, or other means of applying heat, such as hot baths or irrigation to the part, are to be used until the culmination of the attack is reached, and indeed may be valuable for a short time thereafter, although usually then to be supplanted by other measures. But in all cases where safety is not compromised, and when the chance of aborting the inflammation has passed, we should endeavor to remove the pus and start the process of healing. If too early to secure pus, we may prevent its formation as already mentioned. On the other hand, as a rule, a delay in evacuating pus usually renders the inflammation more extensive, the course more prolonged, and the after-effects more severe. As noted under the head of inflammation, we may have less hesitancy in making incision or in opening cavities to the atmosphere at the present time than formerly, owing to the possession of antiseptic means and of local measures now known to prevent the dangers and to enhance the effects of operative procedure. And in this category we may perhaps put above all others, simple, exceeding cleanliness and the use of heat.

It may, nevertheless, be said that when an early incision is made into an abscess, as before pus has collected to any amount, the relief is not nearly so marked as later in the course of its progress, and usu-

ally less than is expected, whilst the shortening of the process altogether is likely to pass unremarked.

Again, it may be important to wait until the extension of the inflammatory process has sealed up overlying vessels, and consolidated the walls of sacs which must, or may, be cut. This action, however, is a rapid one in sthenic inflammation. The palmar arch, for instance, may be cut through on the fourth day of a panaritium (frog-felon) without hæmorrhage, owing to inflammatory occlusion of the vessel. On the other hand, perityphlitic abscess, which, previous to the institution of the operation for its relief in 1868, was uniformly treated by internal medication, with frequently fatal ending, has now at the hands of many surgeons become subject to operation as early as the seventh day of the disease, without a recorded death among such early operations. Furthermore, the experience of surgeons at the clinique shows that bony necrosis or tendinous contraction seldom ensues with either of the varieties of whitlow when free incision is made early in the course of the affection, whilst the proportion of necrosed phalanges or of permanent contractures in individuals delaying operation is large. It is likewise to be remarked that the early evacuation of an abscess yields much less deformity than a delayed or natural opening.

The incision may be made in the case of small abscesses with a *sharp* thumb lancet; for larger collections a curved bistoury is better. The knife, as a rule, should be thrust through the parts and cut out. The incision should extend to the most dependent portion of the sac, and be greater at the surface than in the underlying tissues. The skin is the main obstruction. Incisions are liable not to be free enough for effective after-treatment and rapid healing. Where hæmorrhage is feared the integument may be first freely incised and the parts beneath dissected with a director.

The flow of blood accompanying the opening of an abscess is usually from the over-filled capillary vessels alone. Further bleeding usually comes from small veins unable to collapse in the hardened tissue, and may be disregarded, as the pressure of the dressing will cause it to cease if exposure to the atmosphere does not. An intermittent flow should lead to a thorough search under a strong light for the bleeding vessel which is to be tied; but this accident is of unfrequent occurrence.

After the incision is completed, the cavity may be once thoroughly compressed to rid it of pus, and then, if there has been no arterial hæmorrhage, it should immediately be filled with the dressing, which is preferably composed of lint moistened first in a solution of Carbolic acid (1 : 50) or Corrosive sublimate (1 : 1000), and then spread with Balsam of Peru. This should be packed in gradually with a probe, beginning at the deepest corner of the cavity and using the lint in

strips of from one-fourth to one inch wide. The lint absorbs the discharges and leaves a clean surface when removed at the next dressing, if not long delayed. It also prevents the incised integument from uniting at the ends of the incision, which is apt to occur and to interfere with the subsequent cleansing of the cavity.

The insertion of a drainage-tube is to be avoided wherever it may be. With its use the raw surface is constantly bathed in the discharge, and in the majority of instances the amount of drainage it does is insignificant. The subsequent cleansing will likewise be more tedious than with the proper use of lint.

A moderate pressure by the enveloping bandages or plaster strips aids in the resolution and healing, and vigorously granulating parts furthermore may be frequently caused to unite over considerable areas by well-applied pressure maintained for twenty-four or forty-eight hours.

The Balsam of Peru will rapidly cause healthy granulations to appear—when the sore is properly cleansed—and may be continued until the surface is covered. It is antiseptic, pleasant in odor, of a convenient consistence, and rarely irritant to the integuments.

If excessive suppuration be present, an application of Calendula θ, one part to six of water, may be used for a time or altogether. The simple carbolic acid dressing, particularly if strong, often represses granulation and somewhat delays healing. The same may be said of most mineral antiseptics.

The subsequent dressings should be as minute as the primary one, and if very rapid healing be desired, even more minute and frequent; to such end, every particle of pus or removable matter upon the surface, granulating or about to granulate, should be gently removed with small bits of absorbent cotton, wound on the sharp end of a probe, and very slightly moistened. After this, the Balsam of Peru may be dropped upon the surface itself, in addition to its use upon the lint. This should particularly be done where the base of the sore is very irregular.

If upon opening the abscess the pus be fetid, or if upon subsequent dressing the yellowish dying surface be found thick, or if later on granulations do not spring up, a hot poultice mass, composed of one part of pulverized charcoal and three parts of ground flaxseed, should be packed in the cavity, and renewed once or twice if advisable. Pain caused by the action of the charcoal when reaching, or in contact with, healthy tissue, may be relieved or prevented by a local anæsthetic, such as cocaine or opium applied to the raw surface.

Healing will be known to have begun when the edges of the raw surface have become red, whilst the integument just beyond has lost its redness.

Excessive granulation (proud flesh) may be reduced by the appli-

cation of lunar caustic, of anhydrous sulphate of copper in powder, or of burnt alum. Borders of a sore which are not even with the integument will not begin to heal until raised by healthy granulation or reduced by caustic to the same level.

The treatment of ulcerations, old and recent, from other causes than abscess, is the same as that just described, with the exception that non-granulating chronic sores, with a dense yellow base of connective tissue, may require further measures. In such cases the charcoal poultice may be sufficient, otherwise caustic may be repeatedly applied over the whole surface.

Either measure is well supplemented by pressure as strong as will not interfere with circulation. This is best applied by a dried compressed sponge held in place by a bandage or adhesive strapping. Upon an extremity, simple alternate, diagonally crossed and overlapping adhesive straps will be found remarkably effective in softening the base of an old ulcer and in starting granulations. The pressure causes an absorption of the morbid tissue.

If compression of the part effect no change, be illy borne or inconvenient of application, such surfaces may be incised for a short distance —one-half to one inch—at near points. The cicatricial tissue will then contract and permit of fresh granulations in the widened incisions. Pressure may be combined with incisions to get rid of a thickened, unhealthy surface.

Sinuses may be first provoked to granulation, and then caused to unite by pressure where it can be well applied. They often, however, require stronger measures at the start. A surface of bone, exposed by abscess or injury, instead of slowly granulating and giving rise to a depressed adherent cicatrix, may at times be covered over with tissue, if a vigorous, granulating flap be present which can be pressed upon it after a minute cleansing of the surface.

In the healing of raw surfaces on dependent parts, advantage should be taken, as far as may be, of means of elevation. A chronic ulcer of the leg will sometimes refuse to heal until the patient be kept recumbent.

A subsequent inflammation occurring in the walls of an abscess or in a simple ulceration, is to be combated by poultices and the other means detailed under the head of inflammation.

Respecting the therapeutics of abscess it may be remarked, as of inflammation in general, that, owing to the great diversity in the manifestations of the affection, resulting from the number of parts in which it may occur and the various causes from which it may arise, the medicinal treatment of abscess quite resolves itself into the prescription for the symptoms of the individual. Nevertheless, certain remedies present in their pathogeneses symptoms common with abscess, and are frequently useful in modifying the process. Among the prin-

cipal of these are: Hepar sulph., Mercurius sol., Mercurius biniod., Silicea, Calcarea carb., Sulphur, Lachesis.

TUBERCULOSIS.

BY HERBERT C. CLAPP, M.D.

Tubercle, either as a primary or as a secondary deposit, is found, according to Rokitansky, in the following organs and textures, arranged in the order of its relative frequency in them: Lungs, intestines, lymphatic glands, larynx, serous membranes (especially peritoneal and pleural), brain, spleen, kidneys, liver, bones, uterus and its appendages, testicles, prostate gland, and seminal vesicles. In children the lymphatic glands and spleen head the list.

If we look only at the *primary* deposit of tubercle, the order seems to be changed as follows: Lungs, lymphatic glands, the urinary system, the female sexual mucous membrane, the bones, testicles, prostate gland, and seminal vesicles. On the other hand, the intestines, larynx, trachea, serous membranes, spleen and liver seldom, if ever, become the primary seat of tubercle; and it is not found, either as a primary or secondary deposit, in the ligaments, aponeuroses, or tendons.

It may be asked, why is it that tuberculosis attacks one part of the body rather than another? For certainly, in most cases, it is at first a local disease, even if it afterwards extends to other parts or throughout the whole system. Seemingly, this is owing not so much to the facility of introduction of the real cause of the disease (the bacillus tuberculosis), as to the particular predisposition to it of the invaded structure. The lungs are most frequently attacked, and to them the bacillus, wafted in the air in the dried and pulverized sputa of consumptives, finds most ready access. But it also finds ready access to the larynx, which is seldom affected primarily. Again, without much doubt, tuberculosis is also sometimes transmitted by means of food—the milk and meat of affected animals—and, perhaps, by water, and yet the stomach and intestines, which first receive the germs, are seldom affected primarily. Certain portions of the body, such as the bones, glands, testicles, etc., more or less removed from the great doorway, of the system, may be first invaded. Evidently the virus has some method of discriminating, and does not affect every tissue or organ with which it comes in contact, passing by some which do not afford for it a fit nidus, and, being transported by means of the lymphatics and bloodvessels to other parts, finds for itself in them a more congenial soil, where it flourishes. This is perhaps no more strange than that some *individuals* have a manifest predisposition to the disease, while others have none. However this may be, certain it is that occasionally the tubercular virus spreads like wildfire throughout the

whole economy, sparing almost nothing in its rapid course (as in acute miliary tuberculosis), while at other times it gets hold of one structure (a lymphatic gland, for instance), and from this focus gradually invades other structures, apparently according to their susceptibility; or else, hedged about and confined to the structure by some unknown power (the flow of lymph perhaps being interrupted, and the general circulation shut off from the infection), dwells there in solitude for weeks, months, or years. Wherever it is found, the poison is the same, although the symptoms and consequences resulting from it vary immensely, according, to a great extent, to the tissue attacked.

Tubercle in the *lungs* (its favorite seat) has been discussed at considerable length in the article on "Phthisis Pulmonalis," in volume i., page 220. There is so much in the ætiology, pathology, histology, etc., of tubercular disease of the lungs as there explained, which is equally applicable to tubercular disease as it exists elsewhere in the system, that, to avoid needless repetition here, the reader is referred to that article. Tuberculoses of some other parts have likewise been described in volume i., page 142 (*larynx*), page 328 (*pleura*), page 420 (*pericardium*), page 543 (*pharynx*), page 683 (*stomach*), page 840 (*peritoneum*), and page 955 (*pancreas*); and also in volume ii., page 899 (*spine*), page 558 (*meninges*), page 40 (*spleen*), etc., and need not, therefore, be in this article further referred to. It remains to say a few words here in regard to its occurrence in some other parts of the body.

Tuberculous Lymphatic Glands.—These are more often called scrofulous, or *strumous*, a word coined to include both tubercle and scrofula, which, however, many consider to be really identical. In some of the text-books the terms scrofula and tubercle are made interchangeable, now one and now the other heading the chapter which treats of them; and in other books, even if not thus intimately associated, they are described in the same chapter, or the chapters treating of them are in close conjunction, with frequent cross references.

It is now definitely settled that real tubercle, having the same histological characters as elsewhere, and also containing Koch's bacillus, occurs in the scrofulous gland at a very early stage in the disease, and probably at the very outset.

The *cervical* glands are the ones most frequently affected, and a single gland may be the seat of the trouble, or it may spread from one to another of a whole chain. The most common age is from six to sixteen.

Lymphatic glands often become enlarged from inflammation (lymphadenitis) from other causes than the deposition of tubercle; and it would be very incorrect (although, nevertheless, it is sometimes done) to designate an individual as scrofulous simply from the size of the cervical or other glands. Tuberculous glands are excessively irritable and inflammable, and, when enlarged, will remain so for a long time, being

very obstinate and intractable. Moreover, their distinguishing characteristic is the occurrence in them of the caseous metamorphosis. On the other hand, enlarged glands in a healthy person—common lymphadenitis—will soon undergo resolution or suppuration.

Tuberculous glands at first enlarge from a great accumulation of round cells, chiefly in the lymph sinuses and follicles. Caseous necrosis soon occurs, starting at the same time from different centres and extending outwards from them. This caseous material, which represents the death of the tubercular deposits and of the structures in which they lie, has a homogeneous and granular opaque appearance under the microscope. Around this is often seen a gray zone made up of living tubercle, still further invading the gland, and soon to die and be transformed into the same homogeneous caseous material. The growth of glandular tissue continues only outside of the caseous area, and after awhile stops on account of the invasion of the whole. The gland now becomes hard and misshapen, sometimes attaining the size of a hen's egg, and on section exhibits a firm, almost cartilaginous appearance. After a time slow absorption may take place, and the swellings, if not too large, may entirely disappear. The glands may remain quiescent in any stage, or continue to grow for months and years; or, after a while, the caseous mass may become infiltrated with lime salts, the organic matter be absorbed, and nothing left but a stone-like or chalky mass in the gland. Or, more commonly, the whole mass may soften and occasion inflammation in the surrounding parts, the pus from these mingling with the softened tuberculous material, and they together working their way to the surface, breaking through the integuments and leaving a chronic ulcer, generally slow to heal, and discharging for a long time infectious material which retains its virulent properties. Such an abscess is much more indolent than a common abscess, its symptoms being milder and the inflammation less intense. The liquified caseous material is a yellow, grumous, turbid fluid, resembling pus, but without pus corpuscles, and consisting mostly of granular débris. When, finally, healing does take place, a very distinct scar results, with more or less depressions and ridges, and puckerings of the surrounding skin. Sometimes this process may be repeated several times in the course of a few years without much deterioration of the general health, feverish symptoms occurring at times and not at others.

The *bronchial* glands, when affected, undergo the same changes, but are less liable to soften and discharge, excepting in connection with pulmonary tuberculosis. Even when this complication does not exist, however, they occasionally discharge into the bronchi or trachea. Scrofulous or tuberculous enlargement of these glands may follow measles or whooping cough. The symptoms of this trouble are obscure, but often comprise a dry cough, gradually increasing dyspnœa,

percussion slightly dull opposite their location in the back, and broncho-vesicular respiration in the same place. If much enlarged, their pressure on the vena cava may cause distension of the jugular veins and blueness of the lips.

Tubercular *mesenteric* glands, although very common, especially after similar trouble in the intestines or peritoneum, are also somewhat hard to recognize, unless as sometimes (though rarely) happens, especially in children, they collectively form masses large enough to be felt through the abdominal walls. They are apt to cause indigestion, diarrhœa, tympanitic distension of the abdomen, prostration and emaciation. Discharge of softened caseous material is not common, but may occur into the bowels, or rarely into the peritoneum, causing fatal peritonitis. They sometimes slowly become calcareous and encapsulated.

The axillary, inguinal, and other glands may also be affected, and go through similar changes.

Secondarily, also, the lymphatic glands become tuberculous in phthisis, acute miliary tuberculosis, etc.

Tuberculosis of the Kidney.—Local tuberculosis of this organ (or renal phthisis), although rare, may exist as a primary disease, either alone, or in connection with similar disease in other parts of the genito-urinary system, the lungs often, and the general system sometimes, being affected subsequently. Tubercular disease of the genito-urinary organs often follows as the secondary result of pulmonary phthisis or of acute miliary tuberculosis; in which latter disease numerous gray tubercles, mostly in groups visible to the naked eye, are found scattered through the kidney, but when secondary to phthisis, small yellowish-white cheesy streaks or nodules are more common.

Renal phthisis is almost twice as frequent in males as in females, and is most common in middle-aged persons. Either one kidney alone is affected, or if both, one more than the other, and the organ is generally enlarged. The generative system is more apt to be affected coincidently in males than in females, and the disease often seems to be propagated from it, or from the bladder and ureter to the kidney; or, *vice versa*, it may start in the kidney and extend downwards, involving the ureter, bladder, prostate, urethra, vesiculæ seminales, vasa deferentia, and testicles. In the kidney it begins in the pelvis, calices, or at the apices of the papillæ, and extends, as elsewhere, by caseation, softening, expulsion of débris and pus, consequent formation of irregular cavities in the substance of the kidneys, and destruction to a greater or less extent of their proper function, and by fresh deposits of tubercle, which goes through the same stages, until in some cases the kidney is entirely destroyed.

One fact among others which seems to indicate the direct extension

of the tubercular virus is that in many cases where one kidney only is affected, the epididymis or testicle of the corresponding side is diseased. The symptoms of renal phthisis are mostly those of chronic pyelitis, and often in addition those of pyonephrosis. Among the symptoms on record are the following: frequent micturition, dysuria, the urine lessened in amount and containing pus and perhaps blood, as well as often particles of caseous material insoluble in acetic acid, and fibres of elastic or of connective tissue; dull lumbar pain or tenderness and perhaps swelling; hectic, chills, night sweats, weakness, and progressive emaciation. The diagnosis is difficult, and generally has to be strengthened by the discovery of tubercular disease in other parts, especially in the epididymis, testicle, and prostate. Most cases die within a year, especially if both kidneys are affected.

Tuberculosis of the Bladder is generally a part of the preceding disease, the virus affecting it on its way up from the testicle or down from the kidney. Superficial ulcers, with raised edges, often coalescing as they spread, are to be seen on close examination of the mucous membrane.

Tuberculosis of the Uterus, often producing extensive destruction of tissue, usually succeeds similar trouble in the Fallopian tubes, and is generally associated with deposits elsewhere. Tubercle in the ovaries is exceedingly rare.

Tuberculosis of the Testicle, especially in young men, is more common than often supposed, and is frequently associated with similar disease in the prostate gland and vesiculæ seminales, spreading by way of the vas deferens. It not only occurs secondarily in connection with pulmonary phthisis, but also itself frequently serves as a focus from which the virus spreads to other parts or to the whole system. The testicle becomes enlarged, misshapen, uniformly dense and hard, or nodulated with soft spots between the nodules. The process generally begins in the epididymis, forming a firm, elongated, smooth tumor (as large as the finger, perhaps), behind the testicle. Here, as well as in the testicle, especially in its tubular structure, caseous masses form, similar to those already described elsewhere, at first isolated, but afterwards running together, then softening and bursting through to the surface, with the usual turbid discharge, slowly-healing fistulæ from the abscesses resulting, and remaining for months or years. As elsewhere, around the cheesy mass a zone of living and forming miliary tubercles can generally be seen. Both testes are often affected, although one generally more than the other. Very little or no pain accompanies the disease, except when softening and suppuration occur, and consequently it may escape the patient's attention for some time. An acute attack of epididymitis, or a blow, may act as an exciting cause in those prepared for it.

Tuberculosis of Bone.—The deposit in bone occurs in two varie-

ties, the encysted or circumscribed deposit, and the diffuse infiltration. In both the bone is enlarged. In the encysted variety the deposit occurs as a lump or lumps, as it were, at first firm and almost cartilaginous on section, but afterwards by softening and breaking down forming the true bone abscess, from which the liquified débris finds exit by means of fistulous tracts. Now section discloses a thin crust covering the internal cavity. This form is most common in the skull, and in the cancelli of the joint ends of the tibia. No inconvenience is caused till the tubercle softens, when it is apt to break into the neighboring joint, if in the articular end of a bone, and to destroy it. The diffuse infiltration, more common in the shafts of the long bones, results in a carious degeneration of the bone. Section at an early stage shows small tuberculous points in its interior, gradually turning into a granular, yellowish, softish mass. The bone wastes away and its regular outlines are destroyed, and often only a thin shell remains, sequestra from time to time coming away.

It is not at all strange that vertebræ which get tuberculous should become so much weakened as to be unable to bear the pressure of the superincumbent weight, and to get so crushed together as to allow an antero-posterior curvature of the spine (Pott's disease); even then, the disease, although tubercular, may be arrested, and new bone become formed so dense that the structure may be firmer than it was originally.

The diagnosis of tuberculous bone can usually be made from the general diathesis of the patient, with an indolent swelling of the bone, of a whitish color, occasionally redness and pain being present if the inflammation runs higher than usual. Bones are attacked in the order of frequency as follows; tibia, femur, radius, ulnar, humerus and vertebræ.

Tuberculosis of the Joints.—This is also called scrofulous or strumous or fungous arthritis or synovitis, gelatinous or pulpy degeneration, fungous caries, white swelling, etc., and occurs mostly in delicate children. The disease begins with a deposit of tubercle and of granulation tissue in the synovial membrane, which is thickened and becomes gelatinous or pulpy as a result of the chronic inflammation, and of a yellowish or brownish color. A small amount of fluid is effused, and the joint becomes larger. From this condition recovery may after a while ensue, with more or less impairment of the functions of the joint; but generally the next step is an involvement of the cartilages and ends of the bones. Granulations extend into the cartilages from their deep surfaces and their margins, and they become worm-eaten, as it were; and, by their absorption and the affection of the bones, the whole joint may become a cavity filled with débris and pus and lined with granulation tissue. The ligaments soften, sometimes allowing the bones to become partially or com-

pletely dislocated. The ends of the bones become red, soft and carious, their medullary spaces are filled with granulation tissue containing tubercle, progressive caries is established, and communications are opened between their weak spots and the joint cavity. The external joint becomes more swollen and deformed, with a doughy feel, and of a white color. Soon sinuses appear on it, through which the pus has burrowed its way in its effort to effect an escape from the joint abscess. Before suppuration has occurred, spontaneous recovery with a stiff joint is possible, but after this point has been reached, it is very rare.

The joints are attacked in this disease in the following order of frequency: hip, knee, ankle, elbow, carpus, tarsus, and, last of all, the shoulder and wrist. In the hip, the buttock flat from atrophied muscles, and afterwards œdematous, the adduction, outward rotation and apparent lengthening of the limb, and afterwards adduction, internal rotation and flexion of leg and thigh, with the sinuses, form sufficient landmarks; and in the knee, the white swollen joint and leg, the enlarged veins, and atrophied thigh are characteristic. In the ankle fluctuation first appears in front of the malleoli and then spreads over the joint, and the foot is twisted. In the elbow the swelling comes anteriorly, but the opening into the joint usually occurs posteriorly. The olecranon is the only bony landmark. In the wrist the swelling comes at the back of the hand, and the muscles of the forearm are wasted.

The disease is often very insidious in its progress. Comparatively little pain is felt at first, often described as aching. When the hip is affected, this is felt in the knee. As the disease advances, the pain increases every now and then with an acute exacerbation of the inflammation, especially at night, and becomes jumping or gnawing. This indicates that the cartilage and bone are beginning to suffer. Fever comes on more particularly with suppuration. Constitutional symptoms of the tubercular dyscrasia gradually develop, the lymphatic glands enlarge, deposits are to be looked for elsewhere, and in the majority of cases either pulmonary phthisis or acute miliary tuberculosis supervenes, unless the infection of other parts of the system can be prevented by early excision of the joint or amputation, to remove the focus.

Sometimes the disease follows a local injury, and sometimes no such accident can be remembered, when it is said to arise spontaneously. Undoubtedly, however, in all cases there is the same necessity that was seen to exist when treating of phthisis, for the peculiar *susceptibility* to the disease, as well as for the presence of Koch's tubercle bacilli, which are so plentifully distributed throughout most of the world. Schüller's experiments certainly seem to indicate that a mere injury to a joint of a perfectly healthy individual is not suffi-

cient of itself alone to produce the disease. A number of animals were rendered tuberculous by the injection and inhalation of tuberculous material. Their knee-joints were then bruised or otherwise injured, and not only were symptoms of tuberculous arthritis developed, but also this condition of the joints was demonstrated by post-mortem examination. As a counter-test, the joints of healthy animals who had not previously been rendered tuberculous by artificial means, were bruised, but no such disease was developed.

Tuberculosis of the Intestines.—This is far more common than tuberculosis of the stomach (probably because the intestines are richer in lymphatic structures), and occurs secondarily to pulmonary phthisis in from one-half to three-quarters of the cases of that disease. Chronic ulceration of the bowels, in fact, in the great majority of cases, is due to tuberculosis. The virus probably reaches the intestines in the swallowed tuberculous sputa, and perhaps sometimes in affected food, and principally affects the same structures as are attacked in typhoid fever—namely, Peyer's patches and the solitary glands. Although deposits may be found throughout the whole course of the large and small intestines, yet the ileum above the valve and the cæcum below bear the brunt of the disease. The large and small intestines together are affected oftener than either alone. Gray granules or yellow masses are seen in the substance of the glands, and their softening soon leaves ulcers with overhanging edges, which are infiltrated with leucocytes and contain miliary tubercles. Honeycombed depressions are produced by several tubercles softening side by side. Each ulcer tends to spread by tubercles forming and softening at its edges, and it may thus become quite large. In the small intestine the spreading is apt to be transverse, and a belt an inch wide, more or less, may thus be formed. Tubercles may be found in the mucous, sub-mucous, and muscular coats, and even outside the latter in the peritoneal layer. The ulcerative process generally progresses to the end, sometimes producing hæmorrhage or perforation, or ulcers may cicatrize, induce contraction of the bowel and even stricture, or, again, they may dry up and be absorbed simply.

The symptoms are those of chronic dysentery when the large intestines are attacked, and diarrhœa or constipation or irregularity may attend the deposit in the small intestine. The diarrhœa induced by tubercular trouble is notoriously intractable. The fact that other organs are generally affected with the same poison makes the diagnosis comparatively easy.

Tuberculosis of the Liver.—In acute miliary tuberculosis the liver is filled with large numbers of minute tubercles, which are generally invisible to the naked eye, owing to their small size and to the fact that they resemble in color the hepatic lobules. In pulmonary phthisis the liver contains fewer of them, and they are mostly situated

in the connective tissue. Occasionally caseous masses of the size of peas may be seen, which soften in the centre and leave small cavities. Very rarely large solitary caseous masses like those in the brain may be found.

Tuberculosis of the Mucous Membrane of the Nose, Mouth, Tongue, Throat, Eye, and Ear are not at all uncommon, especially in young children. *Ozæna*, with its terribly offensive odor, redness, swelling, soreness, sero-purulent, often bloody discharge, irritating and inflaming the skin at the edges of the nostrils and the upper lip, and with its frequent destruction of the septum and other parts, is now considered to be always either tuberculous or syphilitic, and in 99 cases out of 100 the former. This, and many cases of obstinate *otorrhœa*, *scrofulous ophthalmia*, etc., are now proved by means of the bacillus tuberculosis found in them, and by inoculation tests to be really tuberculous in their nature. Even *lupus** has thus been proven tuberculous, and also many cases of *rectal fistulæ*.

Cold or Chronic Abscesses, which form oftenest in the connective tissue, generally have a tuberculous origin, sometimes in diseased bones or glands (*psoas abscess*, *lumbar abscess*, *etc.*). Suppuration is very slow and often escapes notice for a long time, although ultimately quite a large collection of pus may form, and eventually may find an outlet. Occasionally, however, such an abscess may cease to enlarge, if the irritation which started it diminishes, and may even contract by the absorption of the liquid part of its contents and the drying up of its solid parts into a putty-like mass.

The Bacillus Tuberculosis.—There have not been wanting pathologists to advocate the tubercular nature of all these different diseases, on histological grounds, for some years, even before the recent discoveries of Koch. A brief historical account of the recognition of their true nature by competent observers, as well as much other information on the subject, can be found in the very interesting essay on Surgical Tuberculosis, by R. J. Hall, M.D., published in the *Medical News* (Phila.) for January 24th and 31st, 1885. But although some here and there took this ground, especially in Germany, and a few even went so far as the great surgeon Koenig in scarcely thinking of anything but tubercular disease, when speaking of chronic inflammation of bones and joints, yet many throughout the world, and probably the great majority, were rather diffident in accepting such extreme views, until forced to do so by what may be considered the very strong, if not conclusive, proofs brought forward by Koch, when in 1882 he announced his discovery of the real cause of tuberculosis in the

* See a very interesting article on "Lupus and its Treatment," by Walter G. Smith, M.D., in the Dublin Journal for February, 1885, copied into the New York Medical Abstract, for April, 1885.

microscopical *bacillus*, which, after an immense amount of indefatigable labor, he demonstrated to exist in many widely differing diseases in men and animals. This demonstration may be said to have now established on a firm basis the ætiological unity, and the essential pathological sameness, so to speak, of this large *class* of diseases. So different are the symptoms and prognosis of scrofulous glands, joints, bones, mucous membranes, of Pott's disease, psoas abscess, etc., from those of pulmonary phthisis and acute miliary tuberculosis, and so wide-reaching was the authority of Virchow, who taught that tubercle was a neoplasm and scrofula an inflammatory process running a peculiar course from local or constitutional causes, and of others who thought that tubercle was merely one kind of inflammatory process or degeneration, etc., that it is no wonder that so many physicians declined to believe these seemingly different diseases to be of essentially the same nature, although all considered them nearly related, even before the demonstration of Koch's bacilli. And even now, it must be confessed, there are some so conservative as to refuse to accept the new doctrines without still more convincing evidence. To those who *can* believe them it is a great satisfaction, for it takes away a part of that dread which all feel for tubercular disease in general, to know that it may sometimes be localized for a very long time without spreading, or may in many instances be capable of a perfect recovery, and that sometimes by its timely removal general infection of the system may be prevented.

In the report of the German Imperial Board of Health, issued in 1884, Koch says that in all morbid products, which, from their mode of growth, histological character, and infective properties, may be regarded as truly tubercular, certain rod-shaped bodies (bacilli) reacting to special staining agents are to be found. This is true of animal as well as of human tuberculosis, and the number of separate observations is large enough to infer that the association is constant. These bacilli have never been found in other diseases, and statements to that effect must be set down to erroneous observation or incorrect application of methods of research. The bacillus occurs in the very earliest formations (which would not be the case if simply the result and not the cause of the mischief); it seems to induce cell-accumulation, giant-cell formation, and ultimate destruction of these elements. The presence and number of bacilli are undoubtedly connected with the rapidity and progress of the disease. The bacillus has all the properties of a living organism, and propagates its kind by the production of spores. The distribution of the bacilli in the tubercular nodules varies greatly in amount and extent even in the same case. In miliary tubercles they may be seen between and in the cells, and are destroyed entirely, or yield spores which resist the staining agent, when the cells break up. Even if the rest of the tubercle does not contain them, the

giant-cell is almost sure to have one or more. Probably they first enter the Wander-cells, and induce in them epithelioid and giant-cell formation, after which the cells come to a standstill. Generally the bacillus perishes before the giant-cell: if not, when caseation or fibrous metamorphosis takes place, it is soon lost in the cheesy or fibrous products.

In acute miliary tuberculosis Koch found the bacillus in the lungs, liver, spleen, pia mater (very abundantly between masses of epithelioid cells around the small arteries), in the choroid, etc. He also found this micro-organism in tubercular disease of the kidneys, bladder, uterus, testes, brain, ulcer of tongue; in the fungous granulations of the hip, knee, elbow, foot, and finger-joints; in caries of the carpus, tarsus, vertebræ; in the giant-cells of scrofulous glands, but rarely in their caseous mass; and scantily in the giant-cells of lupus. His inoculation experiments with lupus tissue succeeded in developing tuberculosis in rabbits. Passing to the examination of diseased animals in search for the bacillus, he states that although no warm-blooded animal is proof against the virus, yet the form of the lesion differs in the different species. Thus, in the guinea pig the liver and spleen are the seats of extensive necrotic change without caseation; in the monkey there is rapid softening with suppuration of the tuberculous masses; in man, caseation is the main outcome; in the perl-sucht of cattle, calcification and caseation; and in the fowl large tumors infiltrated with lime salts.

In spite of these morphological differences, he says, *the disease is in essence the same, and the bacillus is to be met with in all its forms, and in no other disease.* No matter how much these diseases of animals differ, in their grosser characteristics and in their symptoms, from each other and from tubercular disease in man, they all start originally from the same cause, and the variations in them are not due to difference in their essential nature, but to differences in species, in individuals, and in tissue. The parasite which does the mischief is in all cases the same; it is the soil and the environment which change.

Many other investigators have verified Koch's observations, and have fortified his conclusions by cumulative evidence.

Every structure, therefore, which contains the bacillus must henceforth be regarded as tubercular; so that it is desirable to become familiar practically with the methods for detecting it microscopically. The modified method of Koch-Ehrlich and that of Gibbs have been given in Vol. I., beginning at page 255. Some of the short methods, although considered by many serviceable in examining sputa, mucous membranes and internal organs (when the bacilli, if present, may be very abundant), are not advisable when we suspect bones and joints (where they are found, if at all, very sparingly); for after the sections have been in the staining fluid for a comparatively short time only,

they are very apt to be considerably bleached by the subsequent immersion in Nitric acid, and, being very few in number, they may easily be obscured by the cells among which they lie. Hall advises not to immerse the specimens in water at any time after staining, as this fixes the remaining color and makes it difficult or impossible to remove with alcohol, thus allowing other objects besides the bacilli to retain the characteristic color, and causing many mistakes. He prefers the gentian violet as a stain, with Bismarck brown as a contrast color. Although for fluids he thinks a common microscope with powers from 300 to 700 will do, yet for sections in surgical tuberculosis he advises an oil or water immersion lens with a good Abbe condenser without a diaphragm (the condenser being here an essential), and suggests first finding in the field a giant-cell, because in it the bacilli will most likely be discovered. In the Edinburgh *Medical Journal*, for February, 1885, and copied into the New York *Medical Abstract*, for April, 1885, is an article on Gram's method of staining applied to pneumonic and tuberculous sputum, which may prove helpful.

The search for the bacillus in tuberculous joints or other structures where the micro-organisms are scarce, is often quite tedious and unsatisfactory, much more so than the examination of the sputa; and it is therefore a comfort to know that in most cases it is not really necessary for a diagnosis, for we can generally judge safely enough by the histological criteria. Before the discovery of the bacillus, these were sufficient to enable those who held the views above advocated to draw the line with tolerable exactness, and it has since been found in such structures, and probably in few, if any, others. Generally the little gray miliary tubercles, with here and there the white specks of caseous degeneration, can be recognized with the naked eye. But caseous degeneration alone, although indicating tubercle, as a rule, may occur as the result of other pathological processes, and is not absolutely distinctive. Ziegler's definition will, in most cases, answer our purpose—a non-vascular nodule, usually having epithelioid cells and one or more giant-cells, not growing beyond a certain size, and, having attained a certain stage of development, undergoing cheesy degeneration. Neither the epithelioid nor giant-cell, although entering into the make-up of tubercle in the vast majority of cases, are absolutely essential. It will thus be seen that generally the simple microscopic examination of the tissue will be a fair substitute for the often difficult search for the bacillus.

I have thought it best to give in this paper the views on the nature of tubercle and tubercular diseases which are not only the latest, but the most acceptable, so far as I can learn, to the great majority of progressive physicians. If any are interested in investigating historically the almost innumerable phases of the subject which the 19th century has produced, and the various opinions and animated discussions

which have arisen, they will find abundant opportunity for self-gratification in a great many books which will readily suggest themselves. A neatly condensed abstract can be found in Quain's *Dictionary of Medicine*, page 1662, *et seq.*

Prognosis.—This is so variable in tubercular disease, that no one statement can cover the whole ground. Tubercular meningitis is almost invariably fatal; from tubercular lymphatic glands perfect recovery is very frequent; spontaneous cure of tubercular joint disease is rare, but operative interference is often successful. Pott's disease, after destroying a certain amount of bony tissue, may eventuate in recovery with spinal curvature; chronic pulmonary phthisis, if not far advanced, is cured in quite a respectable minority of cases, while acute phthisis is very fatal. As to time, tubercular affection of the meninges lasts, perhaps, a month or less; of the lymphatic glands for weeks, months, or years; of the joints or bones, for months or years, or, in acute cases, it may produce the same amount of disorganization in a few days sometimes; of the lungs, from a month to a lifetime; and so on with its different forms. This manifold variation has hitherto been considered by some as sufficient evidence that there was nothing specific about the tubercular poison. We, however, who see abundant proof of the specificity of tubercle in the light of recent investigations, especially in the numerous inoculation experiments [see Ætiology of Phthisis, Vol. I.] so carefully conducted, and in the researches of Koch and others, recognize that in these manifold variations, although the poison is the same, the soil and the environment differ, and that the prognosis will depend, to a great extent, not only on the species and the individual, but also on the particular tissue affected.

Baumgarten reports that in every third or fourth autopsy which he has made, where the direct cause of death was *not* tuberculosis, he has on careful examination discovered tubercle in some parts of the body. Statements of other observers confirm this report. This seems to show that tuberculosis is not always the terribly malignant disease which it frequently appears to be, and we are encouraged to take a brighter outlook, and to believe that after all much can be done in some cases to stay its onward march. A large field is open, in which patient research may, we hope, in the not too distant future, bring its reward.

Treatment.—The principal remedies for the tubercular cachexia, to be given according to their homœopathic indications, are *Calcarea carbonica*, *Calcarea iodata*, *Ferrum*, *Arsenicum*, *Phosphorus*, *Sulphur*, and *Drosera*. Special indications for these and other remedies are to be found, when considering the affection of each organ or structure separately. Homœopathic remedies have certainly achieved a considerable amount of success in these diseases.

Measures relating to the *prophylactic*, *hygienic*, and *climatic* treatment of all this class of affections, measures which all will admit are exceed-

ingly important, have, *mutatis mutandis*, been so thoroughly discussed under the head of the treatment of Phthisis pulmonalis (Vol. I., page 260, *et seq.*) that their repetition in this place is unnecessary. Neither is it to be expected that the details of surgical treatment required in these diseases should find place in a work like this, for such are fully explained in works on surgery. That part, however, which relates to the advisability of removing local tubercular products in order to avoid general infection, or infection of the lungs or other parts of the system, from them as foci of disease, being of such general interest to physicians as well as to surgeons, will occupy our attention for the present.

The Removal of Tuberculous Foci.—The strong argument for the early removal of a local deposition of tubercle lies in its infective nature. When once formed, it possesses the power of reproduction, sometimes to an alarming extent. Not only does the spreading extend to adjacent parts of the same structure, where numerous colonies of a fresher and a younger growth may easily be recognized, soon in turn to be ready to send out their quota of new settlers (although it may remain limited to a single organ, as the testis), but it may also in succession from one invade a whole group of organs of the same kind, a chain of lymphatic glands, for instance; or, starting in one structure, the pharynx, for example, it may, and often does, pass through its lymphatics to the neighboring lymphatic glands. Or, the poison may be carried to the lungs by the veins from a distant part, perhaps a gland, a joint, or a bone, and may thence be disseminated to some other part of the system, or the whole may be fired up into an acute miliary (or general) tuberculosis. Sometimes the extension proceeds over the surface of a membrane first attacked, by continuity, so to speak, and at other times large gaps of unharmed tissue may be left (the ureters, for instance), although it seems perfectly evident in many cases that these, although escaping themselves, must have been the channels of communication in the spread of the virus. Of such extension through normal intervening membrane or structure there are very numerous examples; indeed, probably this is the most common way.

Thus, it becomes evident that it is even more important many times to do what we can to prevent the spread of the tuberculous infection than merely to undertake to cure its first local manifestations. If, in any case, an easily accessible local tuberculosis should be discovered, and we could be certain that no other parts were infected, our duty would be very clear, to cut away the offending portion like a malignant growth. Unfortunately, we never can be sure that no other parts are affected, and therefore have to substitute for certainty a reasonable probability, which of course always introduces an element of doubt. Many operations of this kind have been performed, appa-

rently with the best results, and already such measures have many warm advocates. Indeed, some recommend the removal of accessible deposits, even when the disease *is known* to exist elsewhere, as in the lungs, and claim that by so doing the lung symptoms are sometimes ameliorated. Few, however, are willing to go to such lengths, as in many cases such an operation only seems to hasten the catastrophe.

Under the enthusiastic leadership of Volkmann, Heuter and Koenig, even before Koch's discovery of the bacillus, the great majority of the surgeons of Germany, accepting Villemin's theory of the specificity of tubercle, operated with the view of extirpating completely all accessible tubercular material, in order to avoid general infection. In France, England and America, however, more conservatism was the rule.

During the last few years, and especially since Koch's discovery, renewed interest has been felt in tubercular diseases, and much has been written on the subject. One of the most interesting short contributions has been a paper by Prof. F. S. Dennis of New York, on the relations between tuberculous joint disease and general tuberculosis, which was published in the New York *Medical Journal* for December 27th, 1884. In this he shows that there is apt to be a close connection between the former and the latter disease; that, indeed, over 50 per cent. of the deaths from joint diseases are due directly to acute miliary tuberculosis, and over 25 per cent to amyloid degeneration; that broken-down, caseating, scrofulous, lymphatic glands are also a frequent cause, not only of tubercular joint disease, but also of general tuberculosis. He calls attention to the clinical fact that in a number of instances, where a tubercular deposit existed in the cancellated tissue of the lower epiphysis of the femur, whence as a focus the caseous products might easily discharge into the knee-joint, affecting this and perhaps ultimately inducing general infection, this catastrophe has been averted by trephining the caseous abscess, thoroughly gouging it out, carefully scraping it with a Volkmann's spoon, and packing with Iodoform. He is decidedly of the opinion that early and thorough operation in tubercular joint disease (excision or amputation) will prevent dissemination, and that the disease at the outset is purely a local infection. He strongly advocates also the removal of scrofulous, cheesy, broken-down glands as a means of eliminating one of the chief sources of general tuberculosis and tuberculous joint disease. He thinks, with Rendu, that scrofula and tubercle bear the same relation to each other as soil to seed, and that in scrofulous soil tubercles rapidly grow and multiply, until from this focus acute miliary tuberculosis is disseminated. In autopsies after general tuberculosis and tuberculous joint disease, caseous, scrofulous glands are found in at least eight-tenths of the cases, and in others they may easily

have been overlooked or obliterated. In some of the remainder, too, the joint disease may have been primarily a local affection.

In an article in the New York *Medical Journal* for January 10th, 1885, on caseous lymphatic glands and the importance of their early removal, Dr. George R. Fowler comes to the following conclusions: That what may appear, and used to be considered, an innocent cheesy gland, which had become so from inspissation of its contents, really contains caseous material which rapidly becomes propagated, and is probably either the bearer of, or the soil proper for, the cultivation of the spore or germ upon which the anatomical product known as tubercle depends for its formation. That there may be a period of quiescence for quite a while, during which there must always be recognized the possibility of an outbreak of general tuberculosis; that wherever such caseation is within reach of surgical art, the same rule that is applicable to carcinoma and sarcoma—namely, early, thorough and complete removal—should be practiced; and this rule might be of service in those doubtful cases where a persistent lymphadenitis, without caseation, occurs, and no explanation or reason for its existence can be found, as well as to enlarged and indurated glands found in the neighborhood of those which are the site of caseous infiltration.

Some advocate removal by the knife, and others recommend the *scraping-out* process, as suggested by Volkmann. In the London *Medical Times and Gazette* for January 10th and 17th, 1885, is a valuable paper by T. P. Teale, F.R.C.S., on the "Surgery of Scrofulous Glands," in which he highly praises Lister's improvement on Volkmann's scraper, and claims that with this instrument he is able to do work which cannot be so thoroughly or so easily done by the knife. He adds several wood-cuts of this scraper, and also of Bigelow's sinus dilator, and gives directions as to the details of the operation.

In the New York *Medical Journal* for January 10th, 1885, Dr. F. W. Rockwell, writing on tuberculosis of the genito-urinary tract, advocates the removal or scraping out of a tuberculous testicle, from which very frequently as a primary focus the infection is found to extend to the kidneys through the spermatic cord, prostate, bladder and ureters, or to the lungs, or throughout the whole system as acute miliary or general tuberculosis. He quotes authorities as to the success of this method of treatment, and advises the use of the curette through an incision over the softened mass, the subsequent application of nitrate of silver to the walls of the cavity, and plugging with lint to encourage suppuration and healthy granulation. This, however, is *only* where, for any reason, the more radical operation of extirpation of the testicle is not practicable. If this scraping out cannot be done early enough to encourage the hope of complete removal of all diseased structures, he recommends extirpation at once, as the course which the safety of the patient demands.

The very latest authoritative utterance on the subject comes from Professor Volkmann himself, in an important paper read before the Congress of German Surgical Societies in April, and reported in the *Medical News* for May 16th, 1885. Even in young subjects he recommends castration in preference to cauterization, partial resection or scraping, before the disease has extended to the cord, to the prostate or bladder. He reports many permanent cures by castration, showing that the disease was really localized in the testis. In the discussion which followed, von Langenbeck thought castration was unjustifiable in young persons, and advocated anti-scrofulous remedies and enucleation of the diseased lobules. Of course, it can never be positively determined beforehand that the disease has not already extended beyond the testis, but yet castration, or, at least, a through scraping out, seems a sensible procedure. Many other articles in the recent periodical literature of this and foreign countries might be quoted here, did space allow, to show that a strong current is setting in this direction.

For some years surgeons have resected the knee-joint for tubercular disease, but in adults there results a shortened limb, and in children a suspension of growth, and often angular deformity and contracted muscles. To avoid these unfortunate results as much as possible, Professor Volkmann, of Halle, in the *Centralblatt f. Chir.*, No. 9, 1885, quoted in the *Medical News* for April 4th, 1885, states that he now practices with good results only synovial arthrectomy (as he calls it), or total excision of the degenerated synovial capsule, leaving the bones and cartilages intact, as far as possible, relying on the fact that tuberculosis of this joint in adults generally commences in the synovial membrane, and extends only to the superficial part of the bones, if at all, and that in children the disease generally begins in the bone as a deposit, varying in size from a pea to a hazelnut, encroaching only partially, and sometimes not at all, on the cartilage. As a preparatory measure he straightens the limb, if necessary, by extension with weights or by manual reduction, followed by an immovable bandage. He also opens and scrapes large abscesses, etc. Tuberculous deposits in the bone, when found, are chiselled out, and sometimes partial resection is practiced, but all sound bone and cartilage are carefully preserved. As a result, he claims a natural-looking but stiff limb, without shortening. Professor Ollier, of Lyons, agrees with Volkmann in a like treatment for children, but in adults prefers resection or amputation, thinking that no less radical measures can be relied on to get rid of the poisonous material.

Thus far we have considered only views (and they might be considerably extended) favorable to the removal of tuberculous foci. Is there nothing to be said on the other side of the question, against their removal? This is, indeed, a practical point.

As against the advisability of operation with this object, instances have been related where acute miliary tuberculosis directly followed operative interference. Two only will be mentioned here, both by Koenig, one where death took place from this cause three weeks after resection of the hip, and the other where the patient died two weeks after a resection of the same joint. In the first case, however, the autopsy showed, as the starting-point, probably, both of the joint affection and the general diffusion of tubercles throughout the system, a broken-down, lymphatic, caseous abscess of the neck; and in the second, the starting-point, in all probability, was an overlooked abscess in the head of the femur. If the work had been more thorough, it may be said, this unfortunate result might not have followed, and thus this argument, so far at least as these two cases are concerned, is turned into a demand for thoroughness of removal of all tuberculous foci. There is this great difficulty, however, that we never can know when this is done. There will always be the risk of local recurrence after operation for resection, and an unsatisfactory result as to function.

The objection to operative interference with tubercular lymphatic glands is this: Owing to the facility with which the poison spreads from one to another in a chain of glands, although it often remains for a long time confined to this chain, we never can be sure that it is confined to the particular gland which we wish to remove, although this may seem to be the only one affected. In the course of the operation, however, another and another may be found diseased, and it will be impossible to say whether all have been removed or not, especially in such a region as the neck, where there are so many difficulties to be met with in dissection. Besides, the irritation produced by the removal of one or more glands may excite to increased activity the rest, which otherwise might remain for a long time quiescent.

Some also oppose the removal of the testicle (unless its continued suppuration prove to be too much of a drain upon the general health), because many times under favorable conditions it will contrive to recover from the scrofulous disease, and resume its functions in whole or in part, although at the height of the disease such resumption might have seemed impossible. The fear of infection, however, seems now to have taken such deep root, that there is a growing sentiment in favor of the prompt removal of a tubercular focus in this as in other accessible situations.

ACUTE MILIARY TUBERCULOSIS.

Synonym.—General tuberculosis.

Definition.—An acute general disease of an infectious nature, and of a febrile character, due to the deposit in most of the organs of the

body of the gray miliary tubercle. Although the distinction is not always easy, yet an effort should be made to avoid confounding it with acute phthisis (phthisis florida). The latter is especially a disease of the lungs, the acute form of caseous phthisis, although tubercles are frequently found to some extent in other parts of the body as well; while in this disease the tubercles, almost from the very beginning, are scattered more uniformly throughout the whole system. Although tubercles are contained in the lungs in both diseases, yet in acute phthisis they are more apt to form aggregations and coalesce, and the process of caseation is much more extensive than in acute miliary tuberculosis, where they generally remain isolated.

Ætiology.—The cause of acute miliary tuberculosis, since Buhl started his ingenious hypothesis of auto-infection, has pretty generally been considered to be the absorption into the general system of localized primary tubercle or of caseous matter from some cheesy centre (especially caseous lymphatic glands) in some part of the body, one or more of such foci being found in the great majority of such cases after death. This hypothesis is rendered all the more plausible since Koch's discovery, by means of the bacillus, of the real tubercular nature of old, broken-down, scrofulous glands and of other foci, such as strumous joint disease, caries of bone, cold abscess, etc. Sometimes following common chronic phthisis, the numerous caseous foci in the lungs here would abundantly answer the requirements of this hypothesis. But in the majority of cases of phthisis this acute disease does not supervene, nor does it follow a great many cases where the tubercular process is more or less localized in the joints, genito-urinary organs, etc. Why general infection should occur in some of these cases and not in others, is to us, in our present knowledge, purely a matter of speculation.

If primary tubercles or a caseous focus somewhere were all that is necessary, no case of phthisis could escape this sequela. Something evidently is wanted to perfect this hypothesis. There must be some peculiar, indescribable condition of the system, some predisposition, to account for the general infection, where it occurs. In the great majority of cases, some focus, which on presumably reliable evidence is thought to antedate the general infection, can be found post mortem. In the few cases where such cannot be found, and perhaps even in many more where it is present, the explanation, so far as it can be given, probably is that the bacilli, wafted in the air in pulverized sputa, as described in the section on the Ætiology of Phthisis in Vol. I., page 221, may gain entrance into the system through the respiratory organs, or they may enter by the digestive tract, or through other mucous membranes, or through abrasions of the skin, and after entrance, instead of exciting merely local trouble, may at once, on account of this peculiar and extraordinary susceptibility, fire up the whole system in a

general conflagration. Probably it makes no difference how the bacilli get into the system, provided everything is in readiness after they are once in. In either case, their diffusion throughout the system is effected by means of the lymphatics and bloodvessels, if we can trust to the observations of Ponfick, Weigert, Weichselbaum, and others. Numerous experiments on animals seem to show that the general infection results, not only from the inoculation of miliary tubercle or cheesy mass from a scrofulous gland, or pus from a cold abscess, or granulations from a strumous joint, but also from the inhalation of any tubercular substances.

Measles precedes the disease under consideration often enough to suggest that it has no little influence in paving the way for it.

Pathology and Pathological Anatomy.—In acute miliary tuberculosis are found, scattered throughout the affected organs, (in some of them in great abundance and with considerable uniformity), small, delicate, gray, transparent, miliary granules, varying in size from a pin's head to a poppy seed, each consisting, microscopically, of lymphoid and epithelioid cells inclosed in a fine reticulum, and often having in its centre a giant-cell, from $\frac{1}{300}$ to $\frac{1}{200}$ of an inch in size, with several nuclei and nucleoli. Giant-cells, however, are not found in tubercles of the pia mater. Tubercle contains no bloodvessels, and, probably on that account, always tends to undergo degeneration, generally of the caseous type, but in the present disease the patient often dies before much progress has been made in this direction. When life is more prolonged, those that do undergo this degeneration show as yellowish-white nodules. In the lungs, the tissue around the tubercles (which often involve or lie near bloodvessels) at first shows little or no change, but later becomes hyperæmic and œdematous, the air-cells containing desquamated epithelium and more or less of inflammatory products. Hypostatic congestion often takes place. (Congestion of the bronchial mucous membrane coexists, increasing from the main bronchi downwards.) Tubercles in the pleura are often surrounded by ecchymosis and fibrinous exudation. In the brain the granulations develop from the endothelium of the lymph spaces, and chiefly, therefore, in the pia mater. They are most numerous in the fissure of Sylvius, and near the pons and optic chiasm, and are frequently found in the choroid. Meningitis is usually produced. Occurring in the peritoneum, they sometimes do and sometimes do not produce peritonitis. The spleen containing them is usually enlarged and darkened, the heart soft and flabby. Other organs which are found more or less infiltrated with miliary tubercles are the liver, intestines, omentum, the medullæ of the bones, the kidneys and genito-urinary tract, the thyroid and lymph glands, the endocardium, and, indeed, almost all vascular tissues sometimes contain them. The blood

is dark and does not easily coagulate. The disease may occur at any age, but generally between puberty and middle life.

It is impossible for us to escape the conviction that, in order to produce these scattered tubercular deposits, there must be a specific virus circulating throughout the system, a virus which will produce its effects wherever it can find a fit nidus, a virus which we now have good reason to believe resides in the bacillus of Koch and its spores.

Symptoms.—When acute miliary tuberculosis does not supervene on a common case of phthisis, but attacks a person apparently in good health, its symptoms are those of an acute febrile affection, and strongly resemble those of typhoid fever. Among them are considerable feverishness, great prostration, frequent respiration, dyspnœa, cyanosis, cough, expectoration, quick pulse. delirium, etc.

Going a little more into detail, after some days of a languid feeling, decided chills appear, or, at any rate, well-marked chilly feelings. The thermometer soon indicates 103°, and subsequently may rise even to 106° or 107°, although there are great variations in different cases. The fever is strongly of the hectic type, the mercury fluctuating two, three, or four degrees from morning to night or from night to morning. A fall and rise even of eleven degrees in this time has been noticed. The temperature is said to be more frequently high in the morning and low in the evening than in any other acute affection. The remissions are characterized by sweats. The pulse runs from 120 to 160, and is small and weak. The circulation in the hands and feet is feeble, the finger and toe-nails becoming blue, cyanosis is evident in the lips and nose, and the face becomes pale and dusky. The respiration is rapid, from 40 to 60 in a minute, and later dyspnœa is generally well-marked, sometimes amounting even to orthopnœa. Soon comes a short and persistent, though rarely violent cough, which is dry or accompanied by viscid, often blood-streaked mucus. Hæmoptysis occasionally occurs. There is no appetite, sometimes nausea and vomiting, the urine is scanty and high-colored, and diarrhœa is the rule, even if at first the bowels are constipated. The lips and tongue are dry, sordes gather on the teeth, and the abdomen occasionally becomes tympanitic. Emaciation progresses rapidly, and one of the most prominent symptoms of all is the excessive prostration which invariably accompanies the disease. The spleen generally undergoes more or less enlargement. The face becomes dull and stupid, almost entirely devoid of expression, although the patient may understand and answer questions. He suffers from headache, ringing in the ears, wakefulness, and dreams. Delirium comes at first only when awaking from sleep, but after five or six days it is more constant, and is low and muttering. Finally come coma and collapse as the precursors of death, with subsultus tendinum, and incontinence of urine.

Such are what may be called the average symptoms of the disease;

but these may undergo more or less modification, according as the tubercular deposit in the lungs, brain, or intestines predominates. In case the lungs are more particularly occupied, the dyspnœa, cough, and rales will come into greater prominence. If the meninges of the brain contain a considerable portion of the tubercular deposit, the head symptoms naturally attract most attention, and those of the chest and bowels are dwarfed. For extreme cases the reader is referred to the article on *tubercular meningitis*. If the intestines contain a large share, the diarrhœa and tympanites obtrude themselves especially on our notice.

When acute miliary tuberculosis supervenes on common phthisis in its last stages, its onset may be suspected by a sudden increase in the rapidity of respiration, the occurrence of dyspnœa, and a decided rise in temperature, not to be accounted for by any additional physical signs.

Physical Signs.—These are mostly negative. The tubercular deposit in the lungs is so scattered that rarely is any dulness to be detected, or abnormal modifications of the voice and respiration. Often no rales are heard; when present, they are bubbling, or sibilant and sonorous, on both sides of the chest, and are rarely abundant.

Differential Diagnosis.—Pneumonia, pleurisy, and heart diseases are to be excluded by the absence of their positive physical signs. Common acute bronchitis does not have so much dyspnœa or rapid breathing, and, as it progresses, the comparative mildness of its symptoms, even when most severe, soon clears up the diagnosis. On the other hand, the dyspnœa of acute capillary bronchitis is much more alarming than that in the disease under consideration, and its duration is only from one to five days, as a rule.

Typhoid fever, however, is the only disease which really presents very much difficulty, so far as differential diagnosis is concerned. From the symptomatology of the two diseases it will be seen that there are many striking resemblances; and acute miliary tuberculosis is comparatively so rare, that it is no wonder it is often mistaken for typhoid. Even if the physician be on his guard, it must be confessed that it is often extremely difficult and sometimes impossible to differentiate the two diseases. Some of the points are as follows: Typhoid has a prodromic period of one or two weeks, while the invasion of the tubercular disease is more abrupt. The systematic, regular, and typical temperature curve of typhoid is unlike the irregular hectic recently described.

The abdominal eruption, and special tenderness and gurgling in the right iliac fossa, so characteristic of typhoid, are not found in tuberculosis. The bronchitis of typhoid comes on sufficiently late in the disease to be regarded as a secondary trouble, and its physical signs are more pronounced, while its dyspnœa is less. Rapid breathing, dysp-

nœa, and cyanosis occur in typhoid only when complicated with pneumonia, the presence or absence of which complication can be determined by physical signs. Finally, recovery is presumptive evidence that the disease was not tuberculosis, and, on the other hand, the discovery of miliary tubercles in the choroid is a positive indication of tuberculosis. Unlike tuberculosis, typhoid does not affect the very young or the very old.

Prognosis.—Few, if any, cases ever recover, and authors generally agree that if a patient, who has been supposed to have the disease, gets well, there must have been a mistake in the diagnosis. The duration of the disease averages three or four weeks, although it may destroy life in a few days, or possibly drag on for two or three months. A well-marked case under my care in a child five years old, lasted about the latter length of time. When supervening on phthisis, it is apt to be of short duration. The greater the tubercular deposit, as especially indicated by the temperature, the more rapid is apt to be the progress of the disease.

Treatment.—Encouraged by the result in many similar cases, we enter upon the treatment of a case of common chronic pulmonary phthisis, if not too far advanced, with a certain amount of confidence in our success, in spite of many failures; but a real case of acute miliary tuberculosis, as may be inferred from what has already been said of its prognosis, is so rarely, if ever, cured, that, in the present state of our knowledge, any suggestions or recommendations for the treatment of the disease must be offerred with extreme diffidence, and must be mainly theoretical.

Baëhr says that the disease generally defies every attempt to cure it, and that *Veratrum album*, *Digitalis*, *Cuprum*, *Tartar emet.*, and *Phosphorus* may be tried, but that the experiment will generally prove fruitless. Dr. Richard Hughes reports the cure of one case, which he thought seemed like this disease, with *Iodum* ^{3x} after *Phosphorus* had failed; and Dr. A. C. Pope reports a similar case where the patient got well on *Arsenicum* and *Calcarea* alternately.

Raue recommends at the commencement the comparison of *Apis*, *Arsenicum*, *Belladonna*, *Bryonia*, *Calcarea carbonica*, *Gelsemium*, *Lachesis*, *Phosphorus*, *Sulphur*, and later on in the disease *Ammon. carbonic.* *Arsenicum*, *Carbo vegetabilis*, *Lachesis*, *Opium*, *Tartar emet.*, and *Veratrum.*

From these remedies, together with *China*, *Ferrum*, *Hyoscyamus*, *Lycopodium* and *Rhus tox.*, the selection may in most instances be made. Morphine and other sedatives in physiological doses should be administered, whenever, in the judgment of the physician, they may be deemed necessary.

Prophylactic measures, such as those advocated in the article on Phthisis, should be resorted to in every case where a person is thought to be a candidate for the disease. In the preceding section on tuber-

culosis, attention has repeatedly been called to the advisability of removing any tuberculous material which has been deposited in any accessible portion of the body, such as the cervical lymphatic glands, the bones, joints, etc., not only as a proper therapeutic measure for the local disease, but also with a view to prevent general infection, (that is, the development of acute miliary tuberculosis), from the absorption of this material, which would thus act as a focus. The advisability of such removal can be readily shown from Billroth's statistics, which prove that out of six deaths from joint disease, for instance, at least 54 per cent. occurred directly from acute miliary tuberculosis.

GENERAL CONSIDERATION OF CANCER OR MALIGNANT TUMORS.

BY G. F. SHEARS, M.D.

Definition.—A cancer is a tumor consisting of immature or undeveloped cell-elements, possessing within itself the power to extend or multiply, irrespective of tissue invaded, with a tendency to ulceration, general infection, and ultimate decay of the system.

The word cancer, as used at the present time, demands explanation. By some authors it is used inter-changeably with the term "malignant growth," including all forms of growth which have a tendency to recur upon removal, without regard to structural differences; while by others the term is restricted to one division of malignant tumors, and is made synonymous with the Greek term "carcinoma." This latter restriction is quite generally accepted in the classification of tumors, but in a popular way the former meaning is still retained, and often in a clinical way is used to include all tumors of a malignant character. While recognizing the recent limitations of the word, and agreeing in the advisability of so restricting it that it may have some pathological signification, the term has been here employed in a popular or clinical way. This gives an opportunity of bringing together two great divisions of tumors which, while possessing different anatomical features, have the same general history, and demand the same treatment.

Ætiology.—The causes which determine the development of cancer are rather obscure, but they demand attention because of the influence which the theory adopted asserts upon the line of treatment employed. Two views are chiefly held concerning the nature of cancer, which may be briefly characterized as the constitutional and the local. The former view holds that cancer is either the local expression of a general disease, specific in character, or that there is a morbid material in the blood which becomes incorporated in a part appropriate to its growth, and that it is this material in the blood which constitutes the predisposing cause of cancer. Whatever produces a condition favorable to

the deposit and growth of this material is merely an exciting cause. The relation which these two causes bear to the production of the growth determines its greater or less malignancy. The larger the share taken by the constitutional element, the morbid material in the blood, the greater the malignancy and the more rapid its return after removal, while the more largely the local cause enters into its formation, the less the malignancy and the less the probability of return. It is not claimed that this material is anything visible, that it is a cancer-cell or germ, neither is it anything which chemistry can discover, as fibrin or albumin. Of the different reasons advanced for the support of this view, the certainty of return upon removal of the growth, its hereditariness, its frequent association with other forms of growth, its rapid diffusion and its power of infecting the system, are the most important. None of these, with the exception of the heredity of cancer, are unexplainable upon the ground that the tumor was local in origin, but was allowed to remain until the system had become infected by the migration of cells. That there is good ground to believe that cancer is frequently developed in the children of cancerous patients, there can be no doubt.

Of 322 consecutive cases examined by Paget, 78 gave a history of cancer in the family. In one instance the mother, grandfather, great-aunt and great-grandmother had all died with cancer. In this transmission the tumors are not necessarily of the same variety, nor are they always found in the same locality. The mother may suffer from scirrhus of the breast, the daughter from epithelioma of the uterus, the more remote relatives from colloma or encephaloma. Neither is this inheritance direct and unbroken. Not every member of a cancerous family is bound to suffer from cancer, nor is the inheritance always to be traced to parents or grandparents, but must often be sought for in relationship much more remote.

If this latter and doubtful inheritance were put aside, and the subject of inheritance were limited to the consideration of those in direct descent, the proportion of cancers in a certain family would not be greater than that of other diseases which are not usually looked upon as hereditary. What it is that is inherited or transmitted, it is exceedingly difficult for the strongest adherent of this view to state. It is not a tumor, nor a germ, and it is something more than a weakness. Paget says: "It may be that in the impregnated germ from a cancerous patient, one or more of the materials, normal as they may seem, are already so far from the perfectly normal state, that after the lapse of years, by their development or degeneration, they will engender or constitute the cancerous material in the blood."

Against this theory of a cancer poison in the blood, it may be shown that the patient, until the cancer has made great progress, is in good health; the tissues are perfectly nourished, injuries are repaired

with promptness, and other specific diseases may run their course without interruption. If this disease were in the blood itself, the general impairment of the fluid would naturally cause an unhealthy state of all the tissues nourished, whereas it is more common to find the patient well nourished and robust until the disease has made progress sufficiently great to account for the general impairment of health. That it is not a blood disease in the sense of an actual specific poison, is shown by the impossibility of communicating it by inoculation, injection, or transplantation from one person to another.

The unsatisfactory explanation offered by this theory of an actual transmission of disease, to the many phenomena observable in the history of cancer, has resulted in the more general acceptance by later writers and investigators of the theory that the disease is local in its origin, there being in some cases an inherited predisposition to the disease which may be distributed through the entire system, but which is more probably situated in some one tissue of the body. This view throws aside the idea that cancer is but the outburst of a general carcinosis, and looks for its origin and cause in local tissues and local derangements, while admitting that certain constitutions afford a more fertile soil for the development of the poison, and that in these constitutions it develops with a vigor and force not seen in others.

The influence of injury and disease upon the development of cancer is most marked, and since the less general adoption of the theory of the constitutional origin of the disease, research has brought to light many causes which seem operative in the local production of the disease. The fact that malignant growths are so frequently found in portions of the body most liable to injury or long-continued irritation cannot be overlooked. Thus they are found at the constricted portion of the intestines which are subject to the irritation of hard and undigested food or refuse-material, as at the cardiac and pyloric extremities of the stomach and at the anus, and are very unfrequent at the wide or expanded portions. They are frequent at the vulva and the neck of the uterus, which are liable to injury during labor or coitus, and are rare in the body of the uterus and in the vagina. The glans penis, which may suffer from the irritation of dirt and discharges collected under a tight foreskin, is often the seat of the disease, while the body of the organ is rarely primarily affected. The irritation of long-continued disease is often seen in the production of cancer. Thus, eczema or psoriasis of the nipple have been recognized as precursors, if not active agents, in the production of mammary cancer.

Ichthyosis or hyperplasia of the epithelium of the tongue is often followed by cancer. Long-continued irritation is undoubtedly the cause of many an epithelioma of the lip, for this disease in the lips of women is almost unknown. No one thing has shown more strongly the effect which long-continued irritation has in the production of

malignant disease than the history of scrotal cancer. Years ago, when the chimney-sweep was common, this disease was found so frequently in members of that profession that it was called chimney-sweep's cancer; since the decadence of that trade this disease has almost disappeared. A history of traumatism is not uncommon. A patient strikes the breast or wounds the eye, or injures the knee, and in a short time a tumor is formed, certainly as a result of the injury, possibly also because of a tendency of the tissue to take on malignant action upon being disturbed from its usual course.

The discovery of a parasite in disease possessing a malignancy equal to carcinoma has led to the application of this theory to the origin of cancer. It is not claimed that the tumor is the parasite, but that it contains a parasite similar to that of leprosy or of tubercle. The development of cancer, its rapid growth and dissemination, the similarity of the secondary deposits to the original growth, and the all but impossibility of the removal of the disease, bear a close resemblance to the processes at work in other diseases in which a parasite has been found, and has been supposed to be the exciting cause of disease. So far, no such parasite has been discovered; but its existence is not impossible, for it is only within the last few years that the parasite of tubercle has been found.

Evolution and Growth.—The precise origin of malignant tumors is still a question of some doubt. It seems probable, however, that all primary tumors are derived from elements of natural tissue, each tissue producing its own peculiar kind of tissue. In the early embryo there are three germinal layers, two of which give rise to epithelium, the outer to the epidermis, glands of the skin, etc., the inner to the intestinal epithelium and secreting cells of the liver, kidney, etc. The middle layer gives rise to the connective substance, bones, muscles, lymph vessels, and distributory nerves. If then this law holds good, there may be two kinds of malignant growths, the epithelial tumor formed from the epithelial tissue, and the connective-tissue tumor formed from connective tissue. While being the product of normal epithelial or connective tissue, and preserving a similarity to its parent tissue the cancer possesses this peculiarity that its cellular elements are not perfect or developed, but rather embryonic or undeveloped, and unlike those found in the natural process of repair or development. It is this difference of type, although formed from the same histogenetic elements, which constitutes the wide difference between cancer and other forms of tumors. Once formed, the cancer tends to increase its size and bulk independent of the condition of the part in which it is found, or of the whole body. The body may emaciate, but the tumor grows; indeed, its growth seems often in direct proportion to the general decay of the organism. The growth is not limited to the tissue series in which it may have originated, for a tumor of epithelial

origin may extend into connective tissue, and a tumor of connective-tissue series may extend into tissue composed of epithelium, but the influence of the parent tissue has much to do with its growth and manner of dissemination. The cancer may be said to grow by infiltration. The cells proliferate, migrate, or penetrate the continuous loose connective-tissue spaces, grow, and become a part of the parent growth. In this way all kinds of tissue may be caught within its grasp, some with greater, some with less ease. The hardness of the tissue is not the only form by which resistance is effected, for bone gives way more rapidly than cartilage or tendon. As it grows, the tumor may push its way in between resisting substances and, in time, encircle them, while not infecting. It may surround arteries, nerves, and bone, but in time they all lose their integrity, and are incorporated in the general cancer mass.

Division.—According to the tissue from which it is developed, the cancer may be either classed under the head of sarcoma or of carcinoma. If from the connective tissue, the former; if from the epithelial tissue, the latter. It seems wise that these two forms of malignant growths should be considered separately, at least so far as their anatomical and physical features are concerned, because such a method will give better opportunity for the study and presentation of the peculiar features of each.

Sarcoma.

The sarcoma is a malignant tumor (cancer, if you choose) which has its type in embryonic tissue, and is made up of undeveloped cells of the connective tissue series. These cells are massed together in irregular forms, having no similarity to normal adult structure, and showing no tendency to advance to higher development. In place of a few perfect cells, which would form the normal tissue, there are an immense number, none of them perfect, but, rather, rudimentary or embryonic in character. According to the predominating cell present, the sarcomata are either, (*a*) round-celled, (*b*) spindle-celled, (*c*) giant-celled or, (*d*) mixed-celled. Whatever the variety, the bulk consists of cells bound together by a scanty intra-cellular substance. The round-celled sarcoma, known also as the medullary, the encephaloid, the lymphoid and, less frequently, as the granulation-sarcoma—on account of the similarity of its tissue to that of the upper layer of granulation tissue—consists chiefly of small cells, held together by an almost imperceptible semi-fluid connecting material. In this class is found the lowest type of cell—simple lumps of nucleated protoplasm. The tumors are soft, yielding, and in many respects similar to the encephaloid cancer. The bloodvessels are numerous, and are merely channels through the tissue, seeming to have no walls, except such as are formed by the tumor cells. Under the microscope the

cells look much like leucocytes, being almost the size of an ordinary blood or lymph corpuscle. Immense tumors—for this form is the most rapid in growth and the most malignant in tendency of all the sarcomata—will consist entirely of an aggregation of these simple little cells. Upon section, they are sometimes soft, closely resembling brain-matter, but more frequently they have a light-gray appearance, tinted with red. Upon scraping, there exudes a clear fluid, which has sometimes been called "cancer-juice," but which is different from that furnished by the scirrhus. They affect, most frequently, the periosteum, the brain, the eye, the testes, and the tonsils.

The spindle-celled sarcoma, so called from the fusiform shape of its cells, is by far the most common. In this form the cells are elongated, large in the middle, and taper to the extremities. All cells have not the perfect spindle shape, for cells are found which vary from an extremely slender cell, hardly distended at the centre, to a very plump one with scarcely a perceptible taper. They are believed to be composed of more highly developed tissue, and certainly do resemble the fibrous cell, or, at least, granulation tissue developing into the fibrous texture found in a scar. With this higher development, some of the malignant traits possessed by the round-celled sarcoma appear to have been lost; at least, the tumor is much less active in its progress and dissemination. The tendency toward recurrence manifested by this tumor gives opportunity for many examinations of different growths, and almost without exception the cells assume a plumper and more rounded form with each recurrence. With this change there is an increased tendency to infiltrate surrounding tissue, or, in other words, to greater malignancy. They form in the skin, aponeuroses, the sheath of the bloodvessels and nerves, more rarely in the bones, the breast and the testes. In the earlier stage it grates under the knife and has a tough, fibrous appearance. After repeated intervals, and as the cells assume a plumper form, it becomes softer and more like the medullary variety. True cysts are more often found with this variety than with the round-celled, but in certain localities, as the breast and testes, are not so frequent.

The giant-celled sarcoma is looked upon, by some, as a variety of the spindle-celled. It is distinguished by the large size of its cells. These cells are large, irregular, and plate-like in appearance, resembling much the cells found in fœtal marrow. Each cell contains one or more nuclei. This form is usually much firmer than the other forms mentioned, and, upon section, has a smooth, fleshy look. As a primary growth it is usually found in or upon the bones, and has a marked predilection for the jaw, the femur and the tibia. Giant-celled tumors may be found in other and soft structures, but they are not typical giant-cells, or, at least, do not occur as primary growths. No tumor should be classed as giant-celled in which the giant-cells

do not predominate. In no tumor do the large cells constitute its entire bulk, but they are found associated with other, and smaller, cells.

When the bulk of the tumor is made up of round cells, spindle-cells, or giant-cells, there is no hesitancy in classifying the growth, but, as it sometimes happens, these different cells may be so evenly distributed throughout the growth that no variety seems to predominate; in such instances the tumor is called a mixed sarcoma. The best examples of this form of sarcoma are found in connection with bone. Not only are the cells present in their various forms, but many tissues, as fibrous tissue, bone and cartilage, may be mixed in with the sarcoma tissue. Such tumors are usually very malignant; whatever the variety of cell, round, stellate, spindle-shaped, or giant, the relation of the cell to the remaining structure of the tumor is the same. The cells in sarcoma form the greater part of the tissue, and seem to be crowded into the connective tissue.

The sarcoma has no predilection for either sex, being found as frequently in the male as in the female, but choosing, in most instances, different localities. No age is exempt from the ravages of this disease. It may appear in early infancy or in old age. Cases of congenital sarcoma have been observed by several surgeons, and sarcomas in children under five years of age are not uncommon. In nearly all these instances the tumor involved either the eye or lower jaw. Indeed, the age of the patient, to a certain extent, seems to determine the position of the tumor. Thus, sarcoma of the bones occurs most frequently in young persons; sarcoma of the testicle about the age of puberty: sarcoma of the retina in infancy, while other forms are more pronounced in adult age. While adults are more liable to sarcoma than children, sarcoma must be looked upon as the malignant disease of childhood, for carcinoma is exceedingly rare in children. Leaving aside the more exceptional cases, sarcoma is most frequently found between the twentieth and fortieth years of age.

Localities.—Sarcoma may originate in any portion of the human organism, although there are certain tissues which seem to be particularly obnoxious to tumors and especially to sarcoma. Thus, the skin, the bones, the breast, the upper jaw, the lymphatic glands, the eye, the testicle and lungs are very commonly the seat of disease, while the tongue, the œsophagus, the stomach, the rectum, which are frequently attacked by other malignant troubles, are very rarely the seat of sarcoma. The tissue in which the tumor originates has much to do with the character of its cell. The skin produces most frequently spindle-celled sarcomas; the bones giant-celled, especially in the central portion of the bones; the lymphatic glands round-celled; the eye round-celled; the testicle and breast round- or spindle-celled, and the lungs round-celled. While this rule is so frequently noticed

as to occasion comment, it is not unusual to find other forms, or even several forms, in the same tissue.

Growth.—In most instances the sarcoma is a roundish, sharply bounded tumor, and distinctly nodulated to the touch. It may be firm or soft, according to its location and variety. It may commence as a single tumor, or several tumors may make their advent at the same time. Whatever the mode of appearance, the growth is usually rapid, immense tumors often being formed within a short time. A case of this kind came under my observation recently. In this instance six weeks elapsed from the commencement of the growth until the whole breast was involved and a tumor as large as a child's head was formed. So rapid was the growth, and so threatening were the symptoms, that several surgeons were at first inclined to call the tumor a mammary abscess. All tumors, fortunately, do not follow this course. The situation of the tumor exercises much influence on the manner and rapidity of growth. Tumors which are loose-textured and in parts abundantly supplied with blood, grow more rapidly than those which are bound down by firm membranes, and have little blood-supply. The increase of volume, although in part due to the central proliferation of the cell-elements, is also accomplished by continued invasion of the surrounding tissue. If a firm cartilage or aponeurosis presents, progress may be stayed for a time, until these impediments may have become infiltrated. Occasionally the tumor is arrested in its growth, and makes no progress for years. Although it does not progress, it does not retrograde, and eventually it is sure, under the influence of some cause or other, to take on new life and increased activity. A case of this kind occurred recently in private practice. Ten years ago the patient noticed a tumor, the size of a hazelnut on the under surface of the left thigh, midway between the knee and groin. In six months it had reached the size of a walnut, and the patient was considering the question of its removal, when it ceased to grow. For nine years there was no change in the size of the tumor, when, one night, a severe pain was felt in it, and from that time it commenced to enlarge, until within a few months it had quadrupled in size. These rapidly-growing tumors are usually round-celled in variety, those of slower growth consisting mostly of spindle-cells.

Metamorphoses.—Varied anatomical metamorphoses may take place. Thus, a tumor may take on fatty or caseous degeneration, so that here and there may be found streaks of fat, or even masses of cheesy substance, but this change rarely affects the entire mass. Parts of the tumor may even seem to be retrograding, but the remainder of the tumor only increases the more rapidly. The more the tumor is composed of cellular tissue and the less the vascular supply, the greater the possibility of fatty degeneration. In sarcoma of the nerves, the lymphatic glands, and the breast, a portion of the tissue frequently

takes on a mucous degeneration, forming a glairy grumous substance in place of the firm substance which originally composed it. Calcareous and osseous transformations take place often in tumors which are connected with bones or periosteum, the bone forms in such cases, a mass of irregular spiculæ or thin plates, faintly resembling the expanded articular ends of the long bones. During the various changes which take place cavities may be formed and become filled with fluid, so that the tumor may be said to have taken on cystic degeneration. These varied changes have led to a variety of terms being used to designate the kinds of tissue present, and we have osteo-sarcomas, mucous sarcomas, cystic sarcomas, etc.

Ulceration.—Ulceration, except in sarcoma of the integument, is rare, and does not occur until late in the history of the disease. When it does take place, it is the result, not merely of pressure, irritation, or inflammation of the skin, but of the extension of the disease. The skin has become infiltrated, and is a part of the tumor. When it gives way, and an ulcer is formed, it is not an opening through the skin by which the tumor may be seen, but simply a portion of the tumor removed. The surface of the ulcer increases rapidly, and is often covered with a profuse granulation, giving forth a putrid discharge, and very prone to hæmorrhage. The pain which, previous to the ulceration, has been slight or absent, increases with the increase of the size of the ulcer, and may be very severe.

Multiplication.—The malignant tendencies of sarcoma are shown, not only by its rapid growth and local destructive changes, but by its constant tendency to diffusion and the formation of tumors in parts remote from the original seat of the disease. These new growths may be in contiguous lymphatic glands, or in organs more remote. As a general rule, it may be said that secondary tumors of the glands are of unfrequent occurrence, and do not occur until later in the disease; but this rule has its pronounced exceptions. Thus it is true that sarcomas of the eye, the jaw, the larynx, the breast, the bones, rarely or never affect the glands. Sarcomas of the larynx, and especially of the testes, are accompanied by early sarcomatous deposits in the neighboring glands. This increased tendency of sarcoma, in certain localities, to increase and invade the lymphatic glands, does not seem due to the increased number of lymphatics in the parts diseased, or to the character of the cell forming the sarcoma. Round- or spindle-celled tumors of the testes are invariably followed by glandular disease, while neither variety, when situated in the mammæ, seems to increase the liability of the axillary gland. Beside the possibility of gland-infection, separate centres of disease may be set up in more distant organs. Secondary nodules, presenting the same type as the original, may be found in the lungs, the liver, kidney, brain, bones, periosteum, and heart; indeed, most of the tissues liable to the original disease,

are liable to the formation of secondary deposits. Exceptions may be made in favor of the eye, the breast, and the upper jaw. The dissemination of the sarcoma is believed to take place through the blood, by transportation of germs or cells which have passed into the vessels. These little germs, as they pass through the vessels and come in contact with a soil fitted for their growth, are arrested in their passage at some part suitable for their development. Here they grow, proliferate, and become independent growths. Why the deposit is made at that particular point is as difficult to tell as it is to explain why a cold will sometimes affect the nasal mucous membrane, at others the pulmonary, and at others the intestinal. That the disease is transported by the veins seems probable, for these secondary deposits may be made while the lymphatics and lymphatic glands are entirely unaffected.

Recurrence.—A noted characteristic of sarcoma, and one which early placed it in the list of malignant tumors, is the almost positive certainty of its recurrence after removal, either at the seat of operation or in some distant organ. The tendency to local recurrence is especially marked. A tumor is removed and healing proceeds without the occurrence of a single bad symptom until the cicatrix is formed. In a short time, under or near the cicatrix, a new tumor makes its appearance. This is removed, and but a short time elapses before another is noticed. This condition of things may occur again and again, until further operations are impossible, or the patient dies from the disease attacking some internal organ. It is not uncommon to meet cases in which the tumor has recurred *in loco* five or six times, and Gross cites a case in which, during a period of ten years, the tumor had recurred twenty-two times, twenty-three operations having been performed for its removal. In this case the tumor was situated in the mammary gland, and was of the spindle-celled variety.

Symptoms.—It is a matter of great difficulty to narrate a set of symptoms which would accurately describe the progress and growth of all sarcomas, for no class of tumors, or no family of diseases, present so many and opposing variations. Tumors not affecting bone substance often present symptoms similar to the following: A small tumor of irregular or lobulated feel is noticed under the integument. It is soft and fluctuating, and almost seems to contain fluid. In a short time it has reached a large size, spreading on all sides, but showing little tendency to contract adhesions to the skin, or to infiltrate it with cancerous material. The pain is slight, the general health of the patient good, and the contiguous glands present no evidence of disease. As the disease progresses, the integument covering the tumor sloughs, leaving an ugly looking ulcer. The ulcerated surface extends rapidly, its edges are irregular and everted, and hæmorrhages are not unfrequent. From the surface of the ulcer masses of granulations spring up, which bleed readily, and give forth an offensive muco-purulent

discharge. The patient, from the commencement of the ulceration, begins to fail rapidly. As the disease advances, profuse perspirations or copious diarrhœa reduce still further the strength, and hasten the termination of the disease. The advent of ulceration is often hastened in rapidly growing tumors by their being mistaken for abscesses and being treated by poultices and incisions. In such cases, as soon as the skin is broken, the pain and constitutional symptoms which were absent make their appearance, and the disease progresses with more than ordinary rapidity. All tumors of soft tissues do not go on to ulceration, for often, after having reached a large size, symptoms of secondary deposit in the lungs or liver are manifest, and the secondary disease assumes the most prominent place. Attacks of acute pleurisy, bronchitis, or pneumonia may carry away the patient, or he may die from exhaustion.

The symptoms of sarcomas of the bone are at first vague and ill-defined, it being difficult to separate the symptoms present from those of other bone disease, as rheumatism, chronic periostitis, and the like. Unlike sarcoma of the soft part, the first symptom noticed by the patient is sharp and, at times, intermittent pains. This pain varies in intensity according to the location of the growth. If in a part admitting of expansion, it is slight; if in a deep-seated structure, it is either dull, aching and continuous, or sharp, neuralgic and intermittent. In time an enlargement is noticed, which increases rapidly in size, is immovable, and not sensitive to the touch. As the tumor increases in size, the health becomes rapidly impaired, metastatic deposits take place in the internal organs, and the patient dies without ulceration having taken place; or if the disease is superficial, the soft parts become affected, and the same change of symptoms follow as in disease of the soft parts. The outer volume of the tumor is not always a true index to the extent of the disease, for the disease may extend, involving the entire bone, destroying the medullary canal, and filling in the spaces of the epiphysis, before it extends to the soft parts and presents the external symptoms of the disease.

Diagnosis.—The early diagnosis of sarcoma is attended with difficulty. The form, color, consistency, and other external characteristics are possessed in common with other growths, and are, therefore, not to be relied upon. The points chiefly to be depended on are as follows: (1.) Rapid growth. This is almost always marked. Many cases have been mistaken for abscesses and simple inflammatory troubles because of the wonderful rapidity of the growth. (2.) The painless character, at least until the later stages of the disease. This symptom is common to non-cancerous diseases, and hence cannot be used to differentiate from benign growths, but it is useful as a point of differential diagnosis from carcinoma. (3.) The age at which it makes

its appearance. Sarcoma, with the exceptions noted, develops between the twentieth and fortieth years of age—different organs being more or less susceptible at different periods of life. It is during the most active period of life that these tumors are most prevalent. Billroth says: "Usually sarcomata develop in strong, well-nourished and, often, in particularly healthy and fat persons," and my observations lead me to the same conclusion. (4.) Late involvement of the lymphatics, except in the case of disease of the testes and larynx. This peculiarity is often a valuable aid in contrasting sarcoma and carcinoma. (5.) Little tendency to ulceration. This peculiarity, with the absence of a cancerous cachexia, is quite opposed to the prevailing tendency of carcinoma. (6.) Its microscopical characteristics. Of all the diagnostic signs, none are so positive as the structure of the tumor shown by the microscope. The distinguishing feature is the relation of the cells to the tissue in which they are found. The tumor consists, essentially, of a mass of cells on a basis of connective tissue, and presents little of the alveolar formation so characteristic of carcinoma. To epitomize: a rapidly growing tumor, painless, showing a tendency to involve all kinds of tissue, with slight tendency to ulceration and involvement of the lymphatics, is probably a sarcoma. If an operation is performed and the microscope shows the characteristic minute anatomy, the diagnosis is complete.

Prognosis.—The prognosis, in a general way, has been foreshadowed in the preceding remarks. It is always unfavorable. Like other forms of growth, the sarcomata differ among themselves, according as they are found in different individuals. The progress of one case is not always a reliable guide in prognosticating the termination of another, even if the cases appear to be similar and occur in corresponding localities, the predisposition to the disease being greater in some persons than in others. In certain localities much more rapid progress may be expected than in others; thus, subperiosteal sarcomas, sarcomas of the foot and tonsils, are very malignant, death often taking place within three or five months. Soft tumors are more malignant than hard ones; round-celled more so than spindle-celled; vascular more than non-vascular; and tumors of rapid growth more than those of slow growth. The soft tumors are usually rich in cells of a very low development, including such tumors as have received the name of medullary and hæmatoid fungus. They possess less cohesive power, ulcerate early, and easily spread the disease throughout the organism. The prognosis in these cases must be much more guarded than in the case of the firm and apparently encapsulated sarcoma. The important part which the arteries and veins play in transporting morbid material make the highly vascular tumors much to be feared, systemic infection being much more rapid than in the less vascular and slower growing tumors.

All sarcomas may be expected to return. This recurrence may take place before the wound made has healed, or several years may elapse before the tumor again makes its appearance. If it returns immediately upon the cicatrizing of the wound, a subsequent operation may retard its return for many years. Billroth reports a case in which twenty-one years have elapsed from the first removal of the disease until the death of the patient from the disease, and from eight to ten years is not uncommon. There is no rule to guide us in determining the time or location of the recurring growth except the tendency to local recurrence. In many instances there is no local return, but the lung, liver, or some internal organ is immediately attacked. When these become involved, the prognosis is grave. In many instances the lungs seemed to be attacked almost simultaneously with the mammary gland. In such cases there is little to be gained from an operation. While a cough in connection with a sarcomatous disease is significant, it cannot be considered a positive proof of the presence of sarcoma in the lung; dulness on percussion is the only positive sign. Sometimes a persistent cough is relieved by the removal of the sarcomatous mass. As a sarcoma of the bone increases, it may be accompanied by all the evidence of implication of the lung and deterioration of the general health. All these symptoms may be cleared up by the removal of the sarcoma, and the patient obtain a good degree of health.

Carcinoma.

The carcinomatous family of malignant tumors contain the tumors to which the term cancer, as understood at the present day, is properly applied. A carcinoma is a tumor made up of atypical epithelial new formation-cells, of epithelial origin, but imperfect embryonic cells. Structurally it consists of cavernous, fibrous stroma, in the interspaces or alveoli of which are found the epithelial cells suspended in a serous fluid. The cells are not separated by any visible intercellular substance. Even the bloodvessels run in the fibrous stroma and not between the cells.

The development of cancer from epithelium has been clearly shown in certain localities where morbid processes are taking place. Some years ago, Paget called attention to the point that a certain eczema of the nipple is often the precursor of cancer. In cases of this kind, it has been shown that the proliferation of cells which is active over the denuded portions is continued down into the milk-ducts until these ducts have become filled and expanded by the over-accumulation of imperfectly formed cells. At the same time, the connective tissue surrounding the duct takes on an increased vascularity from the irritation, and is infiltrated with small cells resembling leucocytes. There is no direct connection between the cells of the duct and those found

in the connective tissues outside. The latter are not migrating epithelial cells, but appear as the product of inflammation. As the ducts become filled and their walls distended, they give way, and the epithelial cells infiltrate into the surrounding tissues where they proliferate and become centres of disease. It is probable that this is a good illustration of the process at work in the development of cancer in other portions of the body.

It is believed by some pathologists that the entire growth is not due to the proliferation of epithelium, although originating in this way. Endothelial cells, connective tissue cells, and indifferent corpuscles in the presence of, or by contact with, a growing carcinoma, it is claimed, become infected and transformed into cells similar to those of the tumor itself. While this may be true, the progress of carcinoma in its extension to the lymphatic glands does not support this theory, for instead of infecting and transforming the gland as a whole, the mode of invasion is between and around the lymph corpuscles, they being effected only by the pressure of the rapidly growing masses. As the cells increase and distend the connective-tissue spaces, the fibrous tissues are pressed back and welded together, and the stroma of the cancer makes it appearance. The stroma is not real cancerous tissue, but the natural tissue of the part is sometimes increased by unnatural activity of the surrounding tissue. The bloodvessels of the stroma, like the fibrous tissue, increase in size, so that the stroma becomes much more vascular than the original fibrous tissue.

Ætiology.—The female sex, on the whole, is much more exposed to cancer than the male, on account of the greater liability of the female organs of generation. The breast alone probably furnishes as many cases of carcinoma as all other portions of the body. The exact proportion it is difficult to determine on account of the inaccurate records which have been kept, and of the many cases of internal cancer which have escaped detection.

Carcinoma is essentially a disease of old age. It is so rare before thirty years that the age is often the most important consideration in the early diagnosis between benign and malignant growths. After thirty years of age it becomes more frequent, but it is not until the acme of life is reached and the organs begin their natural retrogression, that cancer becomes common. At, and after, the climacteric in women, and at a somewhat later period in men, the cancer is most active. So well recognized is this fact that a tumor appearing at this time of life is always regarded with suspicion. Mr. King, of Guy's Hospital, has said as the result of one thousand post-mortem examinations: "Of all women who die at about forty-four years of age, nearly one-half have cancers; of men, one-eighth. Of men who die above sixty-five, one-fifth have cancers." Certain localities are attacked much earlier than others. In early adult life it is found most fre-

quently in the testicle and labia; from thirty-five to fifty, in the breast, uterus, the tongue, and the penis; from fifty to sixty-five years, on the lip and œsophagus. It is a noticeable fact that the organs in which natural degeneracy of function takes place are the organs most frequently attacked.

Growth.—The carcinoma is a tumor of rapid growth. It never remains idle, and, with the exception to be noted, never decreases in size. In the manner of its extension, locally, it resembles sarcoma. Thus, while it may start in one form of tissue, it very readily attacks and occupies all kinds of tissue. A carcinoma of the breast extends to the integument, the muscles, and the ribs. A cancer of the lip extends to the muscles, the glands, the gums, the jaw-bone. Once started, it seems to extend by its own inherent power, abstracting from the blood the elements necessary for its growth and transforming them into cancerous material.

Ulceration.—The carcinoma is liable to many changes, but one of the most constant features is the tendency to ulceration shown by the growth. This condition may come from destruction of the infected integument covering the growth, or from disintegrating changes taking place in the mass itself. The process, therefore, may be superficial or deep. In the former, the surface, in one or more places, becomes raw, or else the tense skin gives way under the pressure of the tumor, and a thin crust appears. This, after a time, takes on the appearance of an ulcer, and extends widely, coalesces with the other ulcer, but does not extend down into the substance of the tissue. The ulceration has a certain resemblance to that which sometimes occurs in a malignant growth as the result of distension or irritation, but differs in this, that ulceration does not result so much from distension of the skin by the mass beneath as from its infection and infiltration. In those cases in which the disintegrating changes take place in the substance of the tumors, the process and results are somewhat different. Here are found regular cavities in the centre of the cancerous mass, having for boundaries cancerous tissue. The contents of these cavities are an ill-formed pus and shreds of tissue. As the material is discharged, the walls do not collapse, but continue to ulcerate, the ulcer thus continually enlarging. No matter how rapid the ulceration, the bulk of the tumor is not decreased, for upon the advent of ulceration the growth of the cancer becomes more rapid than ever before. As the cells increase under the skin, they raise the edges of the ulcer and evert the margins, giving it a peculiar but characteristic appearance of an ulcer with irregular everted and thickened edges and a hard nodular base covered with large, flat granulations.

Glandular Involvement.—The reproduction of cancer in an associated lymphatic gland is of such frequent occurrence that it is looked upon as one of the most certain signs of carcinoma. There are exceptions

to this rule, but they are unfrequent. The glands affected are usually those having a direct anatomical connection with the affected part. Thus the axillary glands follow infection of the breast; the lymphatics in the groin, carcinoma of the testicle; and the submaxillary or sublingual glands, infection of the tongue or lip. The infection of the glands delays, at times, the progress of the disease in its constitutional expression. The cancerous material seems to stop and concentrate in the new locality instead of going on to the formation of metastatic deposits in distant organs. These glands become new foci of disease, and from them the disease may extend as from the original site. All enlarged glands in the immediate vicinity of carcinomatous tumors are not, necessarily, carcinomatous, although they should be regarded with suspicion. That they sometimes enlarge as a result of inflammatory or irritative hyperplasia, there can be no doubt, for it sometimes happens that after the removal of the cancer the swelling of the gland will subside and the patient present no signs of carcinoma. Such cases are unfrequent, and cannot be taken into consideration in forming an opinion concerning a suspicious tumor. Sometimes the glands become the seat of carcinoma, but take on no active growth until the original tumor has been removed. In such instances its growth has the appearance of an entirely new formation, and has been believed to be separate and distinct from the original growth. This is not the case. The glands were infected, but the growth was retarded by the more rapid growth of the original tumor.

There seems to be no limit to the number of glands which may be involved. From one to fifty have been found enlarged, varying all the way from the size of a pea to that of a walnut. Usually the glands are separate and distinct, but in some cases they are united, forming one large irregular mass.

Metastatic Deposits.—From the glands the cells pass into the thoracic and right lymphatic ducts, and thus reach the circulatory system, by which they are transported to the internal organs and even the bone and muscles. It is probable that the germs are carried by the blood-vessels as well as by the lymphatics, and are deposited in some part best fitted for their occupancy and growth.

The organs most prone to develop secondary deposits are those through which the blood passes in its return to the general circulation. The lungs, whose capillaries are the first to receive the blood, are most frequently affected. Next in order comes the liver, the chief organ of the portal circulation. Besides the greater exposure of these organs to the cancerous infection by the early reception of the cancerous material, the high functional activity of these organs, and their consequent liability to disease, would make them, naturally, the seat of cancerous deposit. Some investigators find the liver more frequently implicated than the lungs, but, however statistics may differ

on this point, they all agree in the greater liability of the liver to secondary deposits of a carcinomatous nature. This is in marked distinction to sarcoma, which rarely infects the liver by secondary deposits. Wherever located, the secondary tumor has a strong resemblance to the primary growth. These secondary deposits are usually numerous and are not confined to one organ, but may be found in nearly every tissue.

Varieties.—The chief forms of carcinoma are the scirrhus, encephaloma, epithelioma, colloma, and melanoma. Each of these forms has its own peculiarities, its time of appearance, its favorite locality and mode of growth, while retaining the general characteristics which place them in the same great family.

Scirrhus.

This tumor is so called from its firm, hard, dense feel, having a similarity, in this respect, to normal cartilage. It is most frequent of all the forms, and has been observed and recognized from the earliest times. It has received a variety of names, and includes what has been variously denominated as the withering, the tubular, and the fibrous carcinoma. It is very rare previous to the fortieth year, being most frequent between the forty-fifth and fiftieth years. Of 436 consecutive cases, over fifty per cent. occurred between forty-five and fifty years. Occasionally a case of scirrhus of the skin is seen in early life, but it is exceedingly rare.

The disease, in its primary form, is found most frequently in the female breast. It may, also, be found in the liver, the pylorus, the rectum, the œsophagus and other organs and tissues. The lungs, brain, spleen, urinary organs, nerves, lymphatic vessels, bones, muscles and tendons are rarely, if ever, affected. In size the scirrhus is not large. A tumor may have existed several years and yet be no larger than a walnut. In many instances it is smaller than the tissue which it occupies was under normal conditions. Sometimes it seems to share the prevailing atrophy. Its shape varies according to the part occupied, but usually it is irregular and somewhat nodulated. It cuts with a sharp, crispy sound, like that of cartilage. The cut surface is usually concave, with a whitish or pearly-white color. It gives forth, upon being scraped, a peculiar fluid, sometimes thick and creamy, sometimes pale grayish and resembling gruel. This is what is known as cancer-juice and what was at one time considered a positive evidence of the nature of the growth. Bloodvessels are very rare in scirrhus, and consequently its circulation is very feeble. This poverty of vessels is probably the cause of its comparatively slow growth and of the small size it attains.

The progress of the disease varies, but is usually slower than that of the other forms. Occasionally, when occurring in the breast, espe-

cially in the case of lean, withered women, several years may elapse, during which the tumor seems to make no progress. Generally, however, the tendency to ulceration shows itself within the second year, and from this time the progress is steady and uninterrupted.

Symptoms.—The precursory or prodromal symptoms of scirrhus have never been determined. The patient is usually in good health, and often the first indication of any trouble is the discovery of a hard nodule in some portion in which it should not normally be found. This is not the precursor of a cancer; it is already a cancer, and upon removal will present all the evidences of fully developed scirrhus. At this early period it is movable under the integument, can be easily circumscribed, and often occasions no pain. Even at this period it has the firm, incompressible, inelastic feel which is so characteristic of this variety. As the tumor enlarges, the peculiar pain of scirrhus makes its appearance. It is sharp and lancinating, darting through the tumor as if a hot wire were thrust into the tissue, passing away and leaving a sore feeling, as if bruised. The pain is sometimes constant, but usually intermittent. The regularity with which it appears often leads to a mistake of it for simple neuralgia. It is worse at night, during damp weather, and during fits of mental depression. Anything which deranges the general health increases the pain. Gradually, the tumor increases in size, the cancerous material dips down and reaches the lower tissues, while the cells infiltrate the skin and bind it down to the parent mass. The tumor is no longer movable under the skin, and the integument has lost its soft, elastic feel, and has become firm, hard, and irregular. It is now a part of the tumor. It has also lost its natural color, and has become of a dark, purple, or livid color, enlarged and congested vessels covering its surface. After an uncertain time, but usually within the second year, erosive action sets in, the parts give way, and an unsightly ulcer is formed, having a hard, irregular, everted edge, and a foul-looking base, covered with a sanious, fetid discharge, very irritating in character and peculiarly disagreeable in odor. The odor of the discharge, while not peculiar to scirrhus, is certainly found in none other than cancerous tumors. It is most offensive and penetrating, adhering to everything with which the discharge comes in contact, so that it is usually difficult to remove it. While these conditions are going on locally, the disease has been extending. A firm, hard nodule will be found in the line of the nearest lymphatics, and, in a short time secondary tumors, similar in size and general tendency to the original one, will be easily recognized. With the advance of the disease and the formation of glandular tumors, the general health begins to deteriorate, the appetite is impaired, the sleep is interrupted, the bowels become irregular, and the face thin, pale, pinched, and of a leaden hue. As the ulceration extends, diarrhœa and night sweats make their appear-

ance, the limbs become œdematous, the stomach refuses food, and the patient dies from exhaustion, or from the formation of cancerous material in other organs interfering with their natural functions.

While this is the general course of scirrhus, there are often prominent exceptions. In the case of old and lean persons, the tumor, especially if seated in the breast, may share the natural atrophy, become actually less in size, cease its progress, and remain unchanged for several years. In other, more exceptional cases, the tumor may grow very rapidly, and may terminate the life of the patient in a few months.

The lancinating pain described as characteristic of scirrhus is sometimes absent, the disease running its entire course without any inconvenience except that caused by its size, its ulceration, and the general decay of the system.

Encephaloma.

A long list of names has been given to this form of cancer. It has been known as the medullary cancer, the cerebriform cancer, the cephaloma, the soft cancer, fungus hæmatodes, rose cancer, etc. All these terms express, in some degree, the consistency of the tumor, namely, that it is a soft tumor instead of a hard growth like the scirrhus. Of all tumors this is the most malignant, having the greatest range of location, most rapid growth, most rapid multiplication, and the shortest duration. The encephaloma may grow as a primary tumor in the intermuscular spaces, the testicle, the mammary gland, and the eye, or as an infiltration in the lungs, liver, uterus, lymphatic glands, or digestive canal. In the latter instance it may form a dense, solid mass in the larger organs or as small, thin patches in the mucous membrane of the intestines. It occurs at an earlier age than the other forms of cancer, being almost the only one which is found before the age of puberty. When it does occur at, or previous to, this period, it is usually seated in the eye, the testicle, or the osseous system, in this respect resembling sarcoma. A marked difference between the encephaloma and the scirrhus is shown in the location chosen by each for its habitat. While the scirrhus is found, by preference, in the mamma, the encephaloma is most frequently found in the testicle, the uterus, the lymphatic glands, the liver, and the bones. Indeed, it may attack any part of the body. To the touch, the tumor presents a peculiar soft feel, giving way under pressure, and returning to its shape again, as if filled with fluid. It varies in volume from the smallest kernel to a tumor of the size of an adult's head. Its softness and pliability allow it to fit or accommodate itself to the adjacent parts, being variously shaped according to the form or resistance of the tissue in which it is found. If not distorted, it is usually of an oval or spheroidal form. As it grows, it branches out in lobes which extend and easily insinuate themselves into spaces between the muscles, bones,

and tendons. Sometimes one of these branches will dip down between two bones and form an attachment on the other side. In this way, by their growth, they often completely encircle an important artery, vein, or nerve. Thus I have seen a tumor which completely encircled the head of the scapula, although the main body of the tumor occupied the pectoral region.

Upon section, a variety of tissue is often presented. One part may be white or light gray, composed of a soft substance resembling fœtal brain, while another may be firm, tough, and more of a fibrous character. When pressed or scraped, it yields an abundant, soft, jelly-like substance, slightly viscid, and generally diffusible in water and coagulable by heat. Bloodvessels are very abundant and of a large size. In many instances they seem to form the frame-work of the tumor, the cancerous material filling the interspaces. The walls of the vessels are brittle, easily torn, and seem to be defective in muscular power. Any injury to them is liable to result in an effusion of blood into the tissues if the skin is not broken, or to produce alarming hæmorrhage if ulceration has occurred. To the great vascularity of the tumor may be attributed the phenomenally rapid growth as compared with scirrhus. Of all the forms of carcinoma, the encephaloma is the most rapid in its growth. But a few months may elapse from the appearance of the growth until it has attained a very large size. A tumor may grow from the size of a pea to that of an adult human head in the short space of four weeks. Sometimes a large tumor of this character will contain one or more serous cysts which increase its size and add to the difficulty of diagnosis.

Symptoms.—The early symptoms of encephaloma do not differ essentially from those of scirrhus, but as the nodule enlarges it does not present the peculiar hard, firm feel of scirrhus, but is soft and yielding. Once started, it seldom remains stationary, never decreases in size, but continues steadily and rapidly to increase. Although it grows rapidly, it does not show a tendency to infiltrate the integument. The integument becomes thin and inflamed, not so much as a result of cancerous disease as of the increasing pressure of the tumor or of the formation of an abscess in the tumor itself. According to the growth of the tumor, this may occur within a few months or not until a year has elapsed from the date of its appearance. As the skin is not infiltrated, the edges of the ulcer are thin, undermined, and irregular. The rapid growth of the tumor and the formation of cancerous material below results in protrusion of the cancerous mass from the opening, which extends over the integument on every side. This exuberant growth consists of soft and friable granulations, which give forth a profuse sanious discharge of peculiarly irritating and offensive odor. At the same time it is very tender, easily injured, and prone to inflammation and ulceration. Copious hæmorrhages often

take place as a result of some slight irritation, and these rapidly undermine the strength and hasten the final result of the disease. As soon as ulceration takes place, many times before, the lymphatic glands become cancerous, and the history of the primary growth is repeated. The more rapid the growth, the earlier this unfortunate event usually occurs. The encephaloma is particularly liable to invade the lymphatics, while scirrhus, as a primary growth, is rarely found in lymphatic tissue. The encephaloma not only attacks the lymphatic gland early as a secondary deposit, but is quite often found in it as a primary disease.

Upon the advent of ulceration, the first real pain in the tumor is noticed. Often there is no pain from first to last, only a feeling of unrest and anxiety. As the disease advances and the whole system becomes invaded, this anxious expression becomes seated in the face, the general health fails, and the patient dies from exhaustion, the result of repeated hæmorrhages, or from visceral deposits.

Epithelioma.

This division of tumors was formerly classed with scirrhus, because of its firm, hard feel and its sharp, cutting pain; but later investigation has shown it to possess peculiarities which entitle it to be classed as a separate form of cancer. It is usually found directly under or in the skin or mucous membrane, and shows a decided preference for the junction of the mucous and cutaneous membranes. Its favorite locations are the lower lip, tongue, prepuce, scrotum, anus, labia, uterus, mucous membrane of the mouth, and alæ of the nose. It is not altogether confined to these localities, for in rare instances it is found in different portions of the body, as the bones, muscles, lungs, liver, and lymphatic glands. In the progress of the disease from its primary seat it may invade and destroy muscles, aponeuroses, and bones. As a secondary disease it may be found in any local tissue, or even in the lungs, liver, and intestines. The male sex is much more liable to this form of cancer than the female, almost four-fifths of the tumors, excluding those of the sexual organs, being found among men. The liability of the sexual organs is almost equal in the two sexes. A few cases of epithelioma have been reported as occurring before adult life, but they are exceedingly rare. It is more liable to occur after the meridian of life than before. It is more common after sixty years of age than any of the other forms of cancer. As in sarcoma, it occurs earliest in the sexual organs, and latest in the head and face.

Epithelioma, more than any other form of cancer, seems to follow some external injury or previous morbid conditions. The injury which seems most effective is some long-continued irritation rather than a severe injury. Thus, epithelioma of the lip occurs most frequently in the male, attacking the side of the lip upon which the pipe

is held. Epithelioma of the tongue may follow the constant irritation of a jagged tooth. The irritation of the scar of an old burn, or of the sensitive tissue of an ulcer, may be followed by epithelioma. Reliable authorities have reported cases in which ulcerated bunions of many years' standing, old perinæal fistulæ, old cases of necrosis of the palate, have terminated in epithelioma. The irritation of retained discharges, and the strain put upon the prepuce in phimosis, may be operative causes in producing epithelioma of the penis, and, without doubt, the irritation of soot is a powerful agent in the production of scrotal epithelioma. Of the morbid conditions which precede epithelioma, and the irritation of which is followed by cancer, none are so frequently noticed as warts. By this is meant, not the common wart of childhood or the venereal wart, but a sort of incrustation which is frequently formed on the faces of old people. The papillæ under these warts are often enlarged and sensitive, and the constant irritation of a pipe, fine dust, or repeated removals is sufficient to cause undue morbid action and the formation of new growths. The new growth may present itself as a slight elevation above the integument or mucous membrane, having but little thickness, being uniformly diffused among all the tissues of the skin; or as a prominent outgrowth, if it be seated chiefly in the papillæ. Whatever its earlier character, its progress toward a fatal termination is as certain as that of a scirrhus or encephaloma. The rate of progress is, fortunately, much less, and the prospect of relief or retardation of the growth correspondingly good. Ulceration, especially of those near the integument, occurs so early that the physician rarely sees the growth until a condition of ulceration has existed for some time. Occasionally the ulcer is the first abnormality noticed, the thickening and induration seeming to follow rather than precede. The progress of the ulceration is usually accompanied by severe pain, burning, darting, neuralgic in character. The lymphatics which bear a direct anatomical relation with the tumor become irritated as the disease progresses, but general lymphatic involvement is rare.

Symptoms.—The symptoms vary somewhat according to the location of the tumor. Cancer of the lip may be noticed first as a slight swelling or unusual firmness of the skin near the muco-cutaneous junction. The induration continues, but the breadth and width are much greater than the depth. The enlargement begins to be noticeable, the lip projects, and a slightly raised border shows the diseased tissue to be oval or irregular in outline. The surface becomes rough, as if the little papillæ were enlarged, a little moisture exudes, a scurfy scab forms upon it. As the induration extends, the scab increases in size. Under this scab disintegration takes place until, upon the removal of the scab, a shallow ulcer is discovered. The scab may form again and again after removal, but the ulceration goes on under, and

even beyond, the edges of the crust. If the tumor is quite deep-seated, it may follow a course similar to that of the scirrhus, the integument being infiltrated and becoming thinner and thinner over the growth until, eventually, a little crack or fissure of the integument results. This gradually extends until a perfect ulcer is formed. Having once formed, the progress of these different ulcers is about the same. The edges become thick, nodulated, elevated, and everted. The base is firm, hard, roughly granulated, and discharges a thin, ichorous fluid, having a strong, offensive odor. As ulceration advances, and frequently when the primary disease is small, the submaxillary gland begins to harden and enlarge. Slowly but surely the induration and ulceration extends—the muscle, the mucous membrane, the periosteum and bone are invaded and destroyed. The health of the patient becomes undermined by the continual discharge, the pain prevents rest, the destruction of the jaw interferes with mastication, the patient gradually declines, and eventually dies.

Colloma.

This tumor is so called because it consists, in large part, of a clear, viscid, gelatine-like substance. It differs much from the other forms of cancer, and by many investigators has been denied a place in the cancer group, and has been dignified by a separate designation. Although destitute of many of the physical peculiarities of the other forms of carcinoma, in its clinical history are found all the distinctive features of the cancer family.

The colloid tumor is made up of two substances, a tough, white, fibrous tissue or stroma, and a soft, jelly-like, or nearly liquid substance—the colloid material. The fibrous material is so organized that the tumor is divided into little compartments or sacs, varying in size from one which is microscopical to another which is an inch, or more, in diameter. The colloid material fills these spaces, sometimes surrounding the cells without affecting them, and sometimes distending them with this mucus-like accumulation. This colloid matter is an unorganizable product of varied consistency, resembling somewhat the vitreous humor of the eye. Ordinarily it is translucent and of a faint yellowish hue, but it may be colorless or of a pinkish-gray or even of a dark reddish hue. It has little adherence to the walls of the alveoli, and is easily pressed out. Under the microscope it appears to be structureless, with here and there nucleated cells imbedded in its substance.

Colloid appears as a primary growth in the stomach, uterus, omentum, rectum, and ovary, rarely in other portions of the body. In its early history it takes the form of the organ infected, being simply an infiltration of the part. As it grows, it extends beyond the original dimensions of the affected organ, and forms a large and prominent

tumor. The size attained, especially in colloid tumor of the omentum, is sometimes enormous. Some cases have been recorded in which tumors weighing from twenty to twenty-five pounds have been formed in the abdominal cavity. In one of these cases several quarts of free colloid matter were found in the peritoneal cavity. Although the original tumor is an infiltration, and takes the shape of the organ involved, as it grows it develops irregularly, and the surface of the tumor becomes rough and nodular, sometimes distinctly lobular.

The cases of colloid occurring in external parts are so rare that it is difficult to give any symptoms which could be considered common to this particular growth. It has, however, a clinical history very similar to that of medullary cancers, except that it is less rapid in its growth. Like them, it is liable to affect internal structure; to infiltrate natural tissues; to extend to the lymphatics and lungs, and to recur after removal.

Melanosis.

The melanotic cancer, sometimes called the black cancer, is apparently an encephaloid cancer which has been changed in appearance by the deposition of a black pigment in the elements composing the growth. This substance is of a sooty black or dark brown, varying in consistency from a thick liquid to a firm cartilage-like substance, and fills up the interspaces between the fibrous bands. The history of the tumor, so far as the age at which it may occur, the liability of sex and the general progress of the tumor is concerned, differs little from that of encephaloma. The location of the tumor is suggestive of its tendency to partake of the character of the tissue in which it is found.

The tumor is found most frequently in the eye or skin, nine-tenths of all the cases reported being found in one of these localities. In both of these structures pigment matter is normally deposited.

A noted peculiarity of melanosis of the integument is its pronounced tendency to form in or under a pigmentary mole. This need not seem strange, for the mole is an abnormality at best, and, from its raised position, liable to injury. It has, from its beginning, a tendency to excessive pigmentary deposit, and when it takes on malignant growth this tendency is simply increased. The symptoms are those of encephaloma, except that the progress is usually slower and the tendency to multiple formations somewhat increased. In melanosis of the skin it is not uncommon to find the skin far remote from the primary disease filled with little nodular masses.

Diagnosis.—The diagnosis of the different forms of carcinoma, when located in some external part, is usually a matter of no great difficulty.

The *scirrhus* is generally found in the breast. It is a solitary tumor,

and rarely appears before the forty-fifth year of age. In feel it is firm, hard, dense, resembling cartilage. It grows slowly, and never attains large size. From its start it is accompanied by sharp, shooting, lancinating pains, which are distinctly localized. It early contracts adhesions to the integument and deeper tissues. If in the breast, the nipple is retracted. The superficial veins are but slightly enlarged. Ulceration occurs early, and the ulcer has an abrupt, steep edge, and a firm hard base. The lymphatics are invaded at, or soon after, the beginning of ulceration. The diagnostic symptoms of scirrhus are clear-cut and cannot be mistaken.

The *encephaloma* may occur at any age and in almost any portion of the body. It is soft, lobulated, usually solitary. It grows rapidly, and often acquires a very large size. Pain is absent or slight until the advent of ulceration, when it becomes severe, but does not assume the lancinating character of the scirrhus. The subcutaneous veins are always enlarged. Ulceration is early, and the ulcer is foul, with thin edges, and is often covered with a fungous, friable mass. The lymphatics are early involved. The diagnostic features are markedly in contrast with scirrhus, but are very similar to those of sarcoma of the soft tissues. As tabulated, they show a very close resemblance.

Sarcoma.	Encephaloma.
Age.—May occur at any period of life, but is most common between the ages of twenty and forty.	*Age.*—May occur at any period of life.
Feel.—Is soft, lobulated, and fluctuating. May be firm, hard, and tense.	*Feel.*—Is soft, lobulated.
Growth.—The tumor may remain quiet for years, but when fully aroused grows very rapidly.	*Growth.*—Grows rapidly, and often attains a large size in a short period of time.
Pain.—Pain slight or absent until ulceration takes place, when it becomes severe.	*Pain.*—Pain absent or slight until ulceration takes place.
Veins.—Superficial veins are usually but little enlarged.	*Veins.*—Superficial veins are noticeably enlarged.
Ulceration.—There is no tendency to ulcerate until late in the disease. The ulcer is foul, with thin livid edges, but little tendency to hæmorrhage.	*Ulceration.*—Ulceration early. The ulcer foul, with thin livid edges, and ofttimes a protruding fungous mass, very liable to hæmorrhage.
Lymphatics.—The lymphatic glands are not involved until the disease has made marked progress.	*Lymphatics.*—The lymphatic glands are early involved.
Location.—Occurs in the lymphatic glands, bone, skin, eye, testes, and mammæ.	*Location.*—The lymphatic glands are involved, bone, skin, eye, testes, and mammæ.
Microscopic.—Under the microscope is shown to consist of connective-tissue cells in disordered masses.	*Microscopic.*—Consists of epithelial cells in alveoli or depressions, surrounded by fibrous stroma.

The distinction is to be found in the less marked enlargement of the veins, the later advent of ulceration, and less frequent involvement of the contiguous lymphatic glands in cases of sarcoma. All these distinctions are, however, relative and, therefore, difficult to make.

In case of disease of the testes in which sarcoma is accompanied by an early involvement of the glands of the groin, and in which the encephaloma does not ulcerate until late, on account of the firmness of the tissue, the differential diagnosis may be impossible.

The *epithelioma* is known by its ulceration at the junction of the skin and mucous membrane or upon either of these tissues; by its commencement as a fissure or ulcer; by its firm base, slow growth, and later involvement of the lymphatics. The only disease with which it is liable to be confounded is the rodent ulcer or lupus. In both of these diseases there is progressive ulceration, but there is a difference in the appearance, rate of progress, and in the tissue forming the base and walls of these two ulcers. The surface of the lupus has a bright, reddish color, and is comparatively dry, its border slightly elevated, but not undermined. The discharge is slight, and not unusually offensive. The base and border is tough and hard, but the induration does not extend for more than a line or two, and does not increase in extent as the ulcer enlarges. These peculiarities are in marked contrast to the rough, foul ulcer of the epithelioma, with its everted edge and surrounding induration, the area of which increases with the progress of the ulceration. The lupus does not infect the lymphatic glands, nor do similar tumors appear in other portions of the body.

The *colloid* cancer is rare, and its characteristics are not pronounced. It is tardy in its growth, of uniform consistency, free from pain, and often attains an immense bulk. It is usually found in the peritoneal cavity; when superficial, it may be confounded with a fibrous or cartilaginous tumor or sarcoma. It is distinguished from fibroma by its more rapid growth, its large size, and its constitutional tendency; from chondroma by its elasticity and less firm feel, as well as by its more rapid progress; from sarcoma by its more uniform growth and comparatively slow progress.

The *melanotic* cancer can only be distinguished by the peculiarity of its color and its frequent origin from pigmentary moles. From the facts given in the diagnosis this may be deduced: a tumor appearing late in life, which grows rapidly, is attended with pain, infiltration of the surrounding tissues, and adhesions to the integument and tissues beneath, shows a marked tendency to ulceration and to infection of the lymphatic glands, and decay of the vital forces, is a cancer or malignant tumor.

Prognosis.—The prognosis in carcinoma is exceedingly unfavorable, the natural progress in every case being toward the destruction

of life. As has been shown by the natural history of the different varieties of carcinoma, the prognosis, as to course and duration of the disease, varies much in the different forms and in the different parts of the system affected. Scirrhous cancer is one of the most regular in its course, its average duration, when uninterrupted by operation, being about three years. Great variations, even in the duration of the growth, are sometimes noticed. Thus, cases are occasionally recorded in which death occurs within six months from the first appearance of the growth, and still others in which many years may elapse. These latter cases are most commonly carcinoma of the breast in aged and withered women. In such instances even the advent of ulceration does not, as in the case of ordinary scirrhus, denote the early termination of the disease, for such patients may live many years after ulceration has commenced.

The encephaloma is more rapid in its course, the average duration of life being less than two years, even in parts whose formations are not essential to life. In epithelioma greater differences in the progress of disease exist than in any of the forms of cancer, and an average of the general duration of the disease is difficult to make. In twenty-five cases affecting a variety of regions, the average duration was two and one-fourth years, but this included several in which the course was very rapid and others in which the disease had existed long beyond the average time. In certain localities the prognosis is more definite. Carcinoma of the tongue, the interior of the mouth, the œsophagus, and the penis are very rapid in progress, being usually fatal in from twelve to eighteen months. Carcinoma of the lip, the face, and the rectum are slower and more amenable to treatment.

Treatment.—*Remedial.*—The treatment of cancer has always been extremely unsatisfactory. Various remedies have from time to time been heralded as cures, but after thorough trial have in every instance been discarded. The latest of these is the Chian turpentine. According to Professor Clay: "The turpentine acts upon the periphery of the growth with great vigor, causing the speedy disappearance of the cancerous infiltration, and thereby arresting the further development of the tumor. It produces equally efficient results on the whole mass, seemingly destroying its vitality, but more slowly. It appears to dissolve all the cancer cells, leaving the vessels to become subsequently atrophied, and the former structure to gradually gain a comparatively normal condition." Long and careful trial by other and competent surgeons has demonstrated that this remedy differs little, so far as its curative properties are concerned, from the many that have preceded it. It is not only worthless for purposes of cure, but is not even of value in arresting the disease.

Occasionally, cures of cancer by the administration of homœopathic remedies have been recorded, but the cases are so few, and the possi-

bilities of error in diagnosis so many, that the value of these remedies in the treatment of this disease cannot but be called into question. There are many tumors, the result of acute or chronic inflammatory action, which resemble very closely some of the forms of cancer. Many of these are amenable to the properly selected remedy, and it is, I believe, cases of this character that have been cured by the remedy recorded. That no remedy has been discovered which is absolutely specific to the disease there can be no reason to doubt, but that remedies are of no value in the treatment of the disease cannot so positively be asserted. Whatever the cause of the disease, there must be a certain condition of the part which permits its appearance, for the same causes do not produce the same results at all times, not even in the same individual. If then this condition is present at one time and absent at others, it must be amenable to treatment, and it is upon the possibility of overcoming this condition that our hope in the success of our remedies must be founded. Whatever doubts may arise as to the value of remedies in overcoming the disease when once aroused, there can be none as to service rendered by remedies in retarding the development of the disease and in relieving many of the accompanying symptoms. Among the remedies which are recommended as curative or palliative, Arsenicum album, Carbolic or Phenic acid, Apis, Conium, Thuja, Hydrastia, Phytolacca, and Silicea.

Arsenicum seems to be of most service when the cancer is of the epithelial type, and is situated upon the face. It is further indicated by rapidly progressing ulceration; thin, bloody, offensive discharge; sharp burning pains, and extreme sensitiveness to cold air.

Conium.—The best results with conium have been obtained in scirrhous induration of the mammary glands. Special indications are: firm, hard tumor in the breast; breast sensitive before menses; dull, aching pains come on at night, and are better from warmth and motion.

Carbolic or **Phenic acid** has been largely used both hypodermically and by the mouth. It is believed to act by destroying the disease germs. It has a very favorable action on many ugly ulcerations having a cancerous appearance, and has relieved the pain of cancer. I have never seen a case of cancer cured by it, but it has apparently retarded or prevented its return after removal.

Thuja is of most service in tumors which have their origin in warty excrescences or moles. Recently a number of cases of apparently cancerous ulcerations of the lip have been reported as cured by large doses of the tincture of this remedy.

Phytolacca is of value in cancer of the breast, lessening induration, and relieving pain and tension. It may be applied externally and administered by the mouth.

Apis mel. is indicated in cancer of the breast in which the induration has followed an old case of mastitis, and in which the pain is of a burning, stinging character. The characteristic urinary symptoms of the drug are the best indications for its use.

Hydrastia.—The value of this remedy is more in the good effects produced upon the organs of digestion than in its special action upon the disease itself. As an external application it diminishes pain, retards ulceration, and lessens discharge.

Silicea has been used with most service in scirrhous indurations of glands and in bony outgrowths resembling sarcoma.

Besides these, cases of cure have been recorded after the administration of Belladonna, Calcarea, Chamomilla, Causticum, Carbo animalis,

Hepar sulph., Lycopodium, Lachesis, Mercurius, Nux vom., Phosphorus, Phosphoric acid, Sepia, and Zincum.

While remedies are of value in relieving many of the attendant symptoms of cancer, and are often curative in ulcerations and indurations resembling cancer, at the present day surgery offers the only possibility of a radical cure. If the disease, as modern research seems to indicate, is local in its origin, the thorough and complete removal of the primary tumor at an early day is the rational treatment. This view is now quite generally adopted by the most prominent surgeons and physicians, and it is believed that if the tumor be removed before it has extended locally or before the general system has become infected, the disease can be cured. In certain forms of cancer in which involvement of the lymphatics does not occur until late in the progress of the disease, the possibility of cure following an operation is always greater than in those in which lymphatic involvement is early noticed. Thus, sarcoma of the breast and central sarcoma of the bones, if removed early and thoroughly, may never return. Even if the tumor does return, succeeding operations may effect a cure. It is not uncommon to perform several operations before the tendency to return disappears. In the noted case, reported by Gross, after removing twenty-two tumors by twenty-three distinct operations, the patient was well for the eleven years she remained under his observation. In the carcinomatous cancers the possibility of a cure following an operation is always less on account of the rapid dissemination of the cancerous material, which makes it almost impossible to determine the nature of the growth before the disease has extended some distance from its original seat. Notwithstanding this tendency of the tumor, an operation offers some hope of cure.

Epitheliomas of the lower lip are quite amenable to treatment, the thorough removal of the tumor before the submaxillary gland becomes involved being, in many instances, followed by cure. Even in the more rapid and malignant scirrhous and encephaloid tumor, thorough removal gives a percentage of cures sufficiently large to encourage the belief that early and radical measures will succeed in materially reducing the mortality of the disease.

The removal of the disease, if it does not succeed in effecting a cure, is still a great benefit to the patient. A careful study of statistics shows that the average duration of life is increased twelve months in cases operated upon over those in which the disease proceeds unmolested by surgical measures. The increase in life in some cases is several years, a fact in itself sufficient to justify the advocacy of this measure. Even if this hope cannot be entertained, an operation is often justifiable on the ground that it will avert the suffering attendant upon the regular progress of the disease. The relief which follows an operation is sometimes remarkable. Freed of the local pain and offensive dis-

charge, the patient will become cheerful, sleep, eat, and even gain in flesh.

In those cases in which an operation is not advisable, much relief from pain and offensive odor may be obtained by the use of certain applications. The best of these is hydrate of Cocaine. Painting the ulcerated surface with a two- to four-grain solution affords instant relief. This is particularly true of the different forms of epithelioma of the mouth and throat. In other instances a cloth wet in a solution of four grains of citric acid to three hundred and fifty grains of water, or one part of sulphate of atropia to one thousand parts of water, will do much to mitigate the sufferings of the patient. When the discharge is profuse and offensive, the ulcer should be washed frequently with a strong solution of carbolic acid. If this proves objectionable, permanganate of potassa, Listerine, or some of the chlorides may be employed. Hyposulphite of soda may be used when other disinfectants fail. The surface of the ulcer is washed with a saturated solution added to an equal quantity of water, and lint steeped in the solution is laid upon it. The distressing night-sweats of the later stages of the disease may be controlled or improved by the use of aromatic sulphuric acid or aromatic vinegar. At this time also the use of morphine to allay pain and to secure sleep is permissible. In the early stages it is nearly always harmful, and should be administered with great caution, if at all. It is best given by hypodermic injection.

SCURVY.

BY J. G. GILCHRIST, M.D.

Scurvy, according to some authorities, is a term derived from the Saxon *scarbock*, signifying ulcer of the mouth; others maintain that it originates from *scarb*, a Sclavonic word, meaning "disease." The Latin synonym *scorbutus* seems to have a similar etymology, the knowledge of the disease having originally, it is thought, come from the northern nations of Europe. Thus we find that the Latin races assimilate their name of the disease to the Latin word, the French calling it *scorbut*, the Spanish *escorbuto*, and the Italian *scorbuto*. The Germans, on the other hand, retain the Saxon derivation, calling the disease *scharbock*. Among the many terms employed by the earlier writers on medicine we meet the terms *porphyra nautica*, *porphyra des Alpes*, *scorbut de terre*, and many others. Among English-speaking people the words scurvy and scorbutis alone are used, and they are used interchangeably, the preference being decidedly in favor of the plain Saxon scurvy.

However denominated, the disease is an acquired acute or subacute affection, wholly due to deficiencies in diet as to quality, often occurring on shipboard, and yet sufficiently so on land to make its study

interesting to all classes of practitioners. Whilst it is very rarely seen to-day in a fully developed form, it is still far from uncommon, of a mild type, particularly in the West or in new settlements. It is characterized by a perverted nutrition, particularly extensive fatty metamorphosis of various tissues and parts; consequent upon this there is lassitude, increasing to extreme physical prostration, fungus-like swellings of the gums, hæmorrhagic extravasations into the subcutaneous cellular tissue, or passive hæmorrhages from the nose, bowels, or vagina; an intractable form of ulcer, both on mucous and cutaneous surfaces, is exceedingly common. In light cases the morbid action will be largely confined to the gums, but in severe cases the symptoms are of the most alarming character. A peculiar feature in scurvy is that even the most severe cases speedily improve when proper diet is furnished; the rapidity of the change from an apparently hopeless condition to one of good health is sometimes fairly marvellous.

There is an interest attaching to the history of scurvy which is not found in many forms of disease; a brief summary of the leading features may not be without value at this time. Long before voyages of any duration were undertaken, scurvy, under various names, was well-known in the world. The great wars of antiquity, during which immense bodies of men were quartered upon sparsely settled communities in which the land was poorly cultivated and the highest ranks in society lived upon food which presented little variety, the additional hardship accompanying war, when the field laborers left their fields to follow their lords to battle, rarely failed to bring scurvy into one or the other, if not both, of the contending peoples. The sufferings of the inhabitants of besieged cities, when the provisions commenced to give out, are described as something awful, multitudes perishing from scurvy, and the remainder too feeble to man the walls. It was not only in connection with a state of war, however, that scurvy appeared. In mountainous countries, where tillage of the soil was imperfectly carried on, the winter season always brought scurvy to the mountaineers. In communities where bread and meat formed the staples of diet the disease was of very frequent occurrence. In modern times, as late as 1846, the failure of the potato crop in Ireland caused the appearance of scurvy among the lower class of the Irish. In Wales, to this day, cases of scurvy occur very frequently in the mountains, particularly in the winter and spring.

Whilst the disease was so widely prevalent for many ages, it is singular that so little was known of its causation; books without number were written, it is true; some ascribed the disease to cold and damp; others to overwork, mental or physical, or to mental anxiety; others to insufficient food as to quantity; others to insufficiency as to quality. It was not until 1567, when Wierus attributed the disease to dietetic errors, that any rational conception of its ætiology prevailed.

Since then a great number of books have been written on the subject, all recognizing the fact that lack of fresh esculents in the food is the chief cause; but some animated controversy on minor matters formed the burden of most of these productions. The most important of these works, it would appear, is that of Dr. Lind, of the English navy, written in 1753, in which not only a correct statement of its ætiology and semeiology was first given, but a rational mode of treatment was recommended. It was this gentleman, called the "father of nautical medicine," who called the attention of the government to lime juice as a remedy and a prophylactic for scurvy. The admiralty, we are told, with characteristic British conservatism, allowed forty years to pass before the principle advocated was put into practice.

Surgeon-General Wales, United States Navy, gives the following account of scurvy in London: "Although the districts bordering on the North and Baltic seas were more particularly affected by these evils, yet the largest cities then (sixteenth century) presented a squalid aspect in striking contrast with the present spacious avenues, gardens, and imposing structures everywhere seen. Voltaire states that, about the year 1500, industry had not yet changed those huts of wood and plaster, of which Paris was composed, into sumptuous palaces. London was still worse built, the Strand being composed of mud walls and thatched houses. These wretched hovels swarmed with people until after the great fire of 1666, when the houses were less crowded, one person occupying as much space as two in the old city. Yet, with this amelioration, the deaths from scurvy between the years 1671 and 1686 were 9451. From the period from 1686 to 1701 there were 1569 deaths, and only 226 between 1701 and 1776. This remarkable decrease took place *pari passu* with hygienic improvements, both in the dwellings and food of the people." (*Encyclopædia of Surgery*, vol. i., p. 279.)

As an evidence of the slow growth of hygienic science, it may be noted that while the naval services of the world have long shown a wonderful mitigation in the ravages of what was once truly esteemed the scourge of the ocean, the land services of the most enlightened nations, as late as 1854, suffered enormously. On the authority of the *Medical and Surgical History of the British Army*, 1858, Dr. Thomas Buzzard (Reynolds's *System of Medicine*, i., 447) gives the following account of the prevalence of scurvy in the Crimea, among the allied troops, from 1854 to 1856. In the British contingent the total number of cases admitted to hospital in the two winters was 2096, but, as our author states, "the returns convey but a faint conception of the disastrous part which it acted among the troops, for although it comparatively rarely presented itself in well-defined forms, and as an independent affection, yet the prevalence of scorbutic taint was widespread, and in a vast proportion of cases evident indications

of it existed as a complication of other diseases, especially fever and affections of the bowels." In the French army the totals reached the enormous figure of 23,000. The Sardinian army suffered to a similar extent. The Turks reported upwards of 20,000 cases. The mortality is stated, partly estimated, however, to have been as high as 8.4 per cent. Dr. Wales (*loc. cit.*), quoting from the British returns, says that the disease commenced in the English army in October, 1854, gradually increasing until, in February, 1855, the admissions were 641. It then declined, until in August there were but three admissions. The next winter it went through the same course, always declining as the season for fresh vegetables appeared. The imperfect returns from the Sardinian and Turkish armies render it impossible to arrive at definite conclusions, but it is estimated that the latter sent about 1000 a month to the hospitals with scurvy, and the former nearly as large a number. Thus we find that out of a joint force of nearly 70,000 men, upwards of 60,000 were more or less victims of scurvy, with a mortality of nearly 7000. In still later times, our own civil war did not furnish, according to the returns, a case of distinct scurvy in either army; on both sides, however, there were occasional scorbutic complications in the diseases incident to camp life.

From the foregoing sketch of the history of scurvy as it appears on land, we find a gradual amelioration as the arts of peace prevail and the agricultural interests of a country are not crippled by drawing all able-bodied laborers into the army. It will serve the purpose, also, of calling attention to a fact more generally recognized, that the disease is not by any means a nautical one, or incident to sea life; this will be found to bear an important relation to the question of ætiology to be considered later. There is no doubt that the attention of the laity, at least, has been more frequently attracted by the occurrence of the disease on shipboard, probably from the fact that the condition was not recognized as being scorbutic when prevailing in armies in the field, or in times of famine. A singular fact should be presented, as going to show, perhaps, a greater spirit of liberality in the nautical profession, notwithstanding the contrary is popularly believed—and that very recent times, as the Crimean war, have witnessed horrible suffering from scurvy in armies, whilst the disease is almost unknown in modern navies, in fact has been a mere tradition for a hundred years or more. The first account of the disease on shipboard is in 1431, when a Venetian merchantman suffered terribly on a voyage to Norway. Next we read of the sufferings of Vasco de Gama's people, on a voyage to India, in 1491. Jacques Cartier (1598) is reported as suffering most severely in his voyage to Stadacona in December, 1535. In the quaint orthography of the time he says: "By the middle of February of 110 persons there were not ten whole. Some did lose all their strength and could not stand on

their feete; then did their legges swel, their sinnowes shrinke as black as a cole. Others also had all their skins spotted with spots of blood of a purple color; then did it ascend up to their ankels, knees, thighes, shoulders, armes, and neckes; their mouths became stinking, their gummes so rotten that all the flesh did fall off, even to the rootes of the teeth, which did almost all fall out." (Wales, *ibid.*) In the mercantile marine of all countries, there are occasional examples of scurvy, compared to the records of former times very trifling in numbers; in England, the Dreadnought hospital ship receives an average of 90 cases a year. In this country, according to the Marine hospital reports, admittances average about 40 a year. In the navies of the civilized world the disease is practically unknown; the word does not occur in the various reports of our own navy which I have examined. It is only where the cupidity of owners keeps their crews on insufficient food, or disaster, as wreck or fire, enforces a suspension of proper nutrition, that scurvy can exist. Hence the moral of this historical résumé is not hard to find, viz., the disease may be banished from the earth if proper hygienic precautions are maintained.

Ætiology.—A striking peculiarity of the scurvy is that there is a single definite cause, one which is at once apparent and unmistakable. It differs in this important particular from almost every other disease. This cause is a deprivation from esculent vegetables; it is a disease of mal-nutrition, pure and simple; not a lack in quantity, but in quality. There is no doubt that a deprivation from other species of food will likewise induce disease, but in scurvy the cause is always found in a lack of vegetables. The question has been extensively argued, whether the use, for a long time, of salted meat, or the influence of cold, wet, fatigue, or extreme mental disturbance, are not as much factors in the disease as want of vegetables. The experience and teaching of generations answers in the negative, but it may be well to offer some proof of the assertion. Dr. Hammond, late Surgeon-General U. S. A., in his *Essays on Military Surgery and Medicine* (p. 192), refers to many cases of scurvy as occurring among our troops in the West, where fresh meat was furnished four days in the week, and game of the men's procuring *ad libitum*. Dr. Christison, in the *Edin. Month. Journ.*, July, 1847, gives a minute account of scurvy as it appeared among the laborers on the Scotch railroads during the potato famine of 1846. He says that the food was abundant, so far as bread, salt pork, butter, tea, coffee, cheese, and sugar were concerned, but "potatoes were, of course, out of the question. Fresh vegetables were never thought of, and were, indeed, in most places, inaccessible." Some military statistics are fortunately available, proving beyond a shadow of doubt that the kind of food supplied can never cause scurvy, but the failure to include vegetables will surely do so. Whether the meat is salt or fresh, or fishes, fresh and salt, the result is the same if vegetables are not supplied. The

following is one example of the many to be cited. Dr. Buzzard (*loc. cit.*), on this subject says: "In 1836 above one hundred cases of scurvy occurred in the 75th regiment whilst quartered in Caffreland, at a time when the men had no harassing duties and were abundantly supplied with rations of good fresh meat, without having had an ounce of salt provisions. They had no vegetables. The Hottentot troops doing duty with them were served with the same rations, but sought out for themselves pumpkins, melons, some indigenous wild fruits, and esculent roots. They entirely escaped an attack, as also did the 27th and 72d European regiments, encamped at a distance of eighteen miles, fed with the same rations, but supplied also, in addition, with vegetables."

Monotony of diet, regardless of its quality or quantity, has sometimes been urged as a cause of scurvy. It is notorious, however, that in Ireland, where "stirabout," milk and potatoes form the daily and life-long food of a large majority of the people, scurvy never appears unless the potatoes fail. In Switzerland, in the Tyrol, and other primitive communities, the same uniformity in diet prevails, and yet scurvy is rarely seen, excepting in times of famine or agricultural distress. Unquestionably, the continuous use of one kind of fare, even when nutritious, often, perhaps always, induces some disturbance of nutrition, or even some active morbid condition; but it is not scurvy that is thus caused, unless the lack of vegetables is prominent.

Cold and wet are also cited as possible causes, as well as unusual fatigue and mental depression. There is little doubt that these agencies exercise a very important influence in the establishment of scurvy, at least in facilitating its outbreak and in intensifying it; but there is abundant testimony to show that, unless the want of vegetables be added to the list, scurvy will not occur, although other diseases may do so. Bodily weakness is a very important element in causation, the chief factor being present; at least, the disease is far more severe in such cases. Individuals in good health and of robust habit, if deprived of vegetables, will suffer from scurvy as well as their weaker brethren, but they will resist its attack longer, will suffer less, and will recover more promptly and perfectly. There may be some individuals, owing to an idiosyncrasy not understood, who never have scurvy even when all the conditions are fulfilled, just as there are others who can thrive on a purely vegetable diet. These, however, are to be esteemed exceptions to the general rule.

Age and sex have no ætiological value. The conditions of scurvy being given, the result is to be readily prognosticated, with the occasional exceptions mentioned above. Dr. Buzzard (*loc. cit.*) sums up all these questions as follows: "The relation which such alleged cause(s) . . . . . bears to scurvy seems to us simply that which obtains

generally in modifications of health. The fact that these conditions are certainly not essential to its production, must exclude them from the category of true causes. That they are frequent concomitants, and hasten, as well as intensify, the symptoms of the disorder, is just what is seen in many other diseased conditions which, depending upon a special cause, are yet capable of being injuriously influenced by circumstances known to affect the assimilation of food and the consequent nutrition of the animal economy."

The account of the ætiology of scurvy would be incomplete were one important and practical feature omitted, viz., the extent to which scorbutus enters into the ordinary ailments of the poor in our cities and settlers in new districts in the far West. Various acute diseases, particularly some of the continued fevers, are characterized by an early loss of appetite, or even a repugnance to food. The appetite is variously tempted, or, on the ground that some "support" must be given, beef tea, mutton broth, or some of the especially prepared beef extracts are given, with varying success. In prolonged cases it is not uncommon to observe the gums recede from the teeth, become swollen, spongy and bleeding, and the strength daily growing less, a condition of things which indicates scorbutus, incomplete though it be. So far as these symptoms go, scurvy is common; few of us have failed to see such examples. Hence, even in the daily walks of private practice scurvy is a living issue, even though the more severe forms of the disease are very rarely met with.

Semeiology.—An uncomplicated case of scurvy, one in which the symptoms are fully developed, cannot be mistaken for anything else; it is as unique in its semeiology as in its ætiology. Quite frequently, however, cases are met which lack in one or more of the symptoms generally deemed characteristic; but rarely is there lacking some notable symptomatic difference from affections which, to some extent, resemble scurvy. The first symptom, usually, is a feeling of lassitude, perhaps with wandering pains in the loins and extremities, rheumatoid in character, and usually supposed by the patient to be rheumatic. These pains are quite generally experienced later in the case, but are frequently preliminary to more pronounced symptoms. The lassitude increases until voluntary effort is shunned and the recumbent posture is preferred to others. The breathing is somewhat embarrassed, and the heart becomes irritable, so that any exertion brings on shortness of breath. The appetite may remain good, although constipation is quite common. The urine is somewhat diminished, varying greatly in different cases; in some there is considerable albumin, without any structural kidney-lesion; the urea is often diminished; in color the urine is dark, as if bloody or stained with bile-pigment, yet examination shows neither. After standing for some time, it is strongly ammoniacal, but no unpleasant odor is observed when first voided. Wales

(*loc. cit.*) says: "The conclusions that would seem to be authorized by the statements of the various authorities are that the quantity of urine passed is decreased, as well as that of the urea, while the amounts of the albuminoid and mineral matters are increased." My own study of these analyses goes to show diminished oxidation, which would argue a constructive process, which, I think, we will find to be the case.

Sometime after these prodromal symptoms are developed, the period greatly varying in different cases, objective signs are observed. The first in order, usually, is a change in the complexion and color of the skin, the individual becoming pale, sallow, or greenish, depending upon the natural degree of fairness of the complexion. The mind becomes apathetic, the individual is non-communicative, often gloomy or depressed, and is weak and purposeless in body and mind. In some cases there is fever; in others none at all; the sleep is usually profound but unrefreshing; some authorities, I fear with poetical fancies, assert that dreams are vivid, and seem to run upon scenes in which fruit and vegetables form an important feature. The gums, in nearly all cases, become sore, swollen and spongy; there is bleeding on slight provocation; mastication becomes gradually more and more painful and difficult, until it is suspended, and liquid nourishment only can be taken. In extreme cases the swelling of the gums increases to a frightful extent, protruding between the lips, concealing and loosening the teeth; the odor is horribly offensive, and the sufferer becomes an object of disgust to himself and all near him. Ecchymotic spots now appear on various parts of the body, originally about the roots of the hair, particularly about the thighs and legs. These spots or maculæ coalesce, forming large patches, so closely resembling bruises that they may be reasonably suspected to be traumatic. Later in the case, as they appear particularly on parts which have been subjected to pressure or straining, they are found to be essentially bruises, as there is an extravasation of blood into the connective cellular tissue. The face becomes swollen and bloated, and doughy swellings occur in various parts of the body, particularly in the flexures of the joints. The popliteal space and the hollow of the elbow joint are oftener affected. The swelling is hard, but somewhat doughy, pitting on strong pressure, and while not particularly painful on handling, yet, when the swelling is large the tension of the integument is painful, so much so that full extension of the limb is resisted, the parts being carried flexed. Similar swellings occur about the jaw, adding much to the difficulty in mastication, and, occasionally, under the integument on the front of the leg.

The eyes are peculiarly affected in severe cases, and it is somewhat remarkable that while the objective symptoms are apparently of the most formidable character, yet recovery from the disease leaves no

appreciable trace in them. The integument about the orbits is puffed out enormously, of a dark color, ecchymotic; the eyes are red, the ocular conjunctiva being tumid and brilliantly red, the swelling amounting to a chemosis, the cornea appearing sunk into a circular well. As to sight, hemaralopia, sometimes nyctalopia, is a common occurrence. In daylight sight is good, probably perfect, but at night, when without the range of the candle, there is absolute blindness, the patient requiring to be led in moving about. On examination with the ophthalmoscope, there are no symptoms of any trouble at the fundus, a fact which Mr. Soelberg Wells considers very important. He says: "It ought to be carefully distinguished from that which depends upon retinitis pigmentosa, in which the ophthalmoscopic appearances are most marked, which is not amenable to treatment, and generally leads, sooner or later, to almost if not complete blindness."

Dysentery and diarrhœa occur so frequently in connection with scurvy that they may be considered as concomitants. Apart from the additional weakness and prostration induced thereby, they seem to have no special significance.

The lesions of scurvy are not by any means confined to normal tissue; in fact, cicatricial or adventitious structures are oftener among the first to become affected. In the *Report of the Grinnell Exploring Expedition*, Dr. E. K. Kane refers to the occurrence of refracture among those of his men who had perfectly united fractures of long standing. The callus seemed to be destroyed; either by absorption or softening the bones would fall asunder again. This is not the first, or even the latest, observation of this phenomenon; early writers speak of it, and later observers have authenticated it. In some cases the same retrogressive change has occurred in wounds; old wounds have become disunited, and have even become the starting point of extensive ulceration.

The skin, as might be expected from these facts, and from its appearance, is intolerant of injury; small wounds heal with difficulty, and are prone to produce ulcerations which are intractable at all times, but may cause the most extensive destruction. The typical scorbutic ulcer is irregular in outline, its edges are hard, thick, shining and rounded, and the base is fungous-looking and bleeds readily. The discharge is very profuse, dark and thin, smelling, as a naval surgeon puts it, "atrociously." Such ulcers extend rapidly, sometimes exposing the bones, causing thereby caries and necrosis, and sometimes opening large bloodvessels. The physical exhaustion attending all cases is greatly increased when ulceration occurs, death frequently ensuing from it.

Effusion frequently occurs into the pleura and lungs, so that there is at first an appearance of pneumonia, then of gangrene of the lungs from the horrible fœtor of the expectoration. There is some pain on coughing, slight fever, and the expectoration is viscid, dark, and

sanious, at first sight strongly resembling the sputa of pneumonia. Auscultation and percussion, however, do not give the characteristic signs of pneumonia; there is some dulness on percussion, and mucous râles are frequent. Perhaps without other symptoms of scorbutus the case might be mistaken for one of pneumonia, but as other symptoms are pronounced when this stage is reached, there need be no difficulty in making a diagnosis. As is the case with most of the visceral changes in scurvy, they are alarmingly grave in appearance, and yet recovery is so prompt, under proper conditions, that it borders closely upon the marvellous.

The prostration and breathlessness are extreme in the last stages, so that all voluntary effort is suspended. Joined to these distressing symptoms there is a tendency to fainting on rising from the recumbent posture. Many cases die in this way: starting up in bed on the approach of the physician, and falling back in a fainting fit from which they do not recover. In military and naval hospitals this fact is well understood, so that patients brought in are carried in the most careful manner, cots being used to hoist them up the sides of hospital ships.

Mr. Buzzard (*loc. cit.*), in this connection, uses the following very graphic language: "His skin harsh, dry, dirty-looking, and discolored with bruise-marks, bloated and puffed up in parts by swellings, his whole manner apathetic and helpless, the condition appears to a novice more irremediable than is seen in almost any other disorder. And yet it is remarkable that these cases, where the external manifestations of the disease are so strongly marked, are frequently just those which yield most rapidly and surely to treatment. The change wrought in a few hours by the administration of lemon-juice or vegetables, coupled with general care, is the most extraordinary thing in therapeutics."

Pathology.—There are few diseases with such marked and striking symptomatic characters of which the pathology is so obscure. The appearances are such that there would seem little difficulty in discovering the pathology, particularly when the ætiology is so well understood and so obvious. The disease following abstention from vegetables, it would seem that analysis of the food would show at once the particular substances which are so essential to vital harmony, and explain why such dire consequences attend their being withheld. Experience has shown quite the contrary. For instance, lime-juice is everywhere recognized as the great anti-scorbutic, both prophylactic and curative, while many other substances are more or less useful; it is *par excellence* the king of that class of remedies. Upon analysis it is found that the only ingredients not found in many or all animal substances are citric acid and malic acid and potash. One or all of these elements must be that which the body needs in perfect nutrition. Experiments have been made with them, separately and combined, with results either decidedly negative or pronouncedly different from what

would be expected. The conclusion is inevitable that there must be an undiscoverable element in the lime-juice, or else the anti-scorbutic property lies in the union of the three, or of *all* the ingredients, in a natural manner. We know that the most carefully prepared imitations of natural "mineral waters" are not to be compared, therapeutically, with the waters as found in their proper wells and fountains. Chemically they are the same; therapeutically they are widely different. In fact, in many ways the laboratories of nature and of the chemist give widely different results. This is not, therefore, peculiar to lime-juice; it is the same in purely animal substances. Thus we find that chemically there is no difference between the poison of the cobra and the parotid secretion of man; we have ample testimony that there is an immense difference experimentally. We know from examination that the most prominent pathological appearances in scurvy are an unnatural fluidity of the blood, a tendency to disorganization and fatty metamorphosis in the tissues generally. We also know that lime-juice corrects this condition when present, and prevents it when anticipated, and we can only recognize the fact, without the ability to detect just what the element is, the want or the loss of which is productive of so much mischief. Citric acid of commerce has been used to a considerable extent as a substitute for lime-juice; the results have not been satisfactory; in fact, in the majority of instances no beneficial effect has been observed.

The literature of scurvy is notably full of analyses of the blood, as well as of other fluids of the body, it being somewhat remarkable that the results of different observers' analyses are widely different. One finds a diminution in the corpuscular elements, another finds them unchanged, a third finds fibrine increased, and a fourth finds it diminished. Here we are taught that potash is in excess, there that it is diminished. This one maintains that the chlorides and mineral salts are generally lessened in quantity; that one states that they are increased. The only point upon which there is apparent agreement is that the blood is of increased fluidity and coagulates imperfectly. The occurrence of the petechiæ is supposed to prove the fluidity, but many good authorities think they are the result of lesions of the capillaries rather than exudative. Again, the fibrinous organization so characteristic of scurvy would seem to argue a constructive rather than a disintegrating force, which would make it appear as though the process were allied somewhat to inflammation, the blood being in a state of past perfection. Under all these circumstances we are not yet prepared to construct a pathology from a study of the blood.

The pathological anatomy is somewhat characteristic. The fact that such changes as are observed *post mortem* occur in all cases, fatal and non-fatal alike, may be taken as an additional evidence of the singular character of this disease; here are tissue changes of the most severe

character, changes which would be considered essentially mortal under any other circumstances, and yet resolution is as prompt as in the case of external parts. The body is often emaciated, although not always, as frequently there is sufficient food as to quantity. Decomposition, however, is rapid in either case. There are two prominent features in the anatomy: extensive effusion and fatty degeneration. The condition of the gums, as well as the puffiness of the mucous membranes generally, is found to be largely due to a fatty change and a proliferation of epithelium. Indeed, the viscera quite generally are more or less infiltrated with fat globules. The effusion may be serous, fibrinous, or hæmorrhagic, in the order named, representing a rising scale of intensity in the disease. The pleura, pericardium, lungs, arachnoidean spaces, the joints, and peritoneum are found more or less filled with the effusion; often it is stained, reddened from the blood, and of a very offensive odor. In cases of greater gravity the effusion is sero-fibrinous, or organized bands and bundles of fibrine, quite firm, intimately adherent to parts with which they are in relation, red or dark colored, and with the characteristic odor. Blood is often found, collected in cavities, fluid, and ill smelling; if coagulated, the clot is weak "cottony," and easily broken up. Collections of fluid-blood are found quite frequently in the lungs, the rupture of the cyst causing hæmoptysis and suffocation if they are large. The surface of the lungs, heart, brain, stomach, intestines, bladder, and the viscera generally are found marked by ecchymotic spots, similar to those seen on the surface of the body; they are found, as in the case of the cuticular spots, to be due to extravasation of blood. Muscular tissue generally is found softened and friable, due to the infiltration of fat and serum. The fibrous deposits have been called "scorbutic formations," as something distinctive; although of a high degree of organization, capillaries forming in them, there is nothing in their structure which would stamp them as scorbutic if taken apart from other indices and some knowledge of the history of the case.

Diagnosis.—A case of scurvy fully developed, or which occurs under circumstances which would lead the observer to anticipate such an occurrence, need never be mistaken for anything else. As it occurs in civil practice, fully developed cases are extremely rare, but slight cases are more common than many would suppose. A failure to recognize it is usually due to the fact that it occurs in connection with other affections. The chief complaints of patients, being in the earlier stages of the affection, is of weakness, or of the rheumatoid pains in the back or extremities. No attention may be paid to the color of the skin or to the state of the gums. The peculiar dirty pallor of the face and the spongy gums should be considered pathognomonic. Some examination into the diet and other habits of life will then be found to give evidence of the existence of the conditions of scurvy. Anæmia

is the only condition for which scurvy could, or should, be mistaken, but the characteristic symptoms, petechiæ, ecchymosis, spongy gums, and so on, soon appear, and the case is clear.

When the bruise spots on the skin appear, there may be some confusion between scurvy and purpura hæmorrhagica, unless an important point of difference is noted, viz.: that the spots of scurvy appear as secondary upon a longer or shorter period of ill-health or weakness, and with the characteristic "dirty pallor" of the face. The purpura patches appear suddenly and without any antecedent ill health.

The gums are usually affected in scurvy, and yet, there are exceptional cases in which the signs are not readily observed. Such cases usually present other ample evidence of the existence of scurvy, and no mistake need occur. While the advanced stages of scorbutus show the swollen and spongy gums, in early stages there is a period in which they recede from the teeth, that portion which embraces the root being thick and shining. All things being considered, therefore, the diagnosis of scurvy may be considered simple if care is taken to get a full history of suspicious cases.

Prognosis.—As already stated in several places, the prognosis is nearly always good. In fact, should the lungs, heart, or brain escape serious lesion, no matter how severe the symptoms may be, we may confidently expect a cure when the patient can be put in a proper condition. Comfortable surroundings and vegetable diet will bring about a cure in the most wonderful manner, even when the condition seems absolutely hopeless. The loss of blood is poorly borne, so that hæmorrhages from the outlets may be considered dangerous and ominous symptoms.

Treatment.—Notwithstanding the fact that our text-books generally give a long list of remedies as indicated in scurvy, I am of the opinion that they are mentioned on purely theoretical grounds. There is no fact better established in medicine than that of the prompt cure of scurvy by a correction of diet and the administration of lime-juice. If these remedies are not available there is no promise of a cure from any remedy in the Materia Medica. Of course, concomitant ailments, diarrhœa, or febrile affections, of which scurvy forms a merely accidental accompaniment, may call for special therapeutic consideration, but the scurvy having disappeared, the treatment of the remaining conditions is to be on "general principles."

In military and naval expeditions, ample provision against scurvy is now provided, and its occurrence can only be due to a lack of proper food—which it is impossible to cure. In civil practice such a contingency will rarely occur; proper food can be obtained in most instances if its necessity becomes apparent. Among the poor, the charitable associations will supply their wants; among the rich it is not difficult, in settled communities, to supply the essential elements. Among the

sick, who have been ignorantly fed on beef-tea, and like animal material, change of diet may be secured by any reasonably ingenious housekeeper.

In new countries, however, or in times of famine, vegetables may be absolutely non-procurable. In such emergencies lime-juice, pure, or in the form of sour lemonade, must be given. An ounce of lemon-juice should be supplied daily; this is the navy ration, founded on generations of experience. Whilst all vegetable material is useful, there are some forms which are pre-eminently anti-scorbutic. These are oranges, lemons, limes, lettuce, cabbage, potatoes, onions, mustard, cress, and grapes.

When possible, scurvy patients must be made warm and dry in their clothing and habitations, kept in a recumbent posture, and, in short, made as comfortable as circumstances will possibly allow. They may receive some benefit from such remedies as *Arsenicum* and *Mercurius*, but the improvement is so prompt under lime-juice and proper regimen that there is little, if anything, left for remedies to do. The cases which do not do well are those in which some serious lesion of the heart, lungs, or brain exists, lesions which are not amenable to remedies and are necessarily mortal. Should *Mercurius* be given, great care must be had to use it in attenuation, experience being unanimous that mercury in any appreciable form is productive of the most disastrous consequences.

Sequelæ, if any, are to be treated according to the existing indications. There are rarely any to attract attention; should there be, it would be an impossibility to predict the form, hence equally impossible to lay down directions for treatment.

PURPURA.

BY J. G. GILCHRIST, M.D.

Purpura or *porphyra* is from "*purpureus*" (purple), on account of the purple color of the spots in the integument constituting the disease. It is a condition in which blood is non-traumatically extravasated into the tissues of the skin, either through spontaneous capillary rupture, or through some equivalent lesion of the vessels, or from an alteration in the blood itself, which enables it to pass through the walls of the vessels. As connected with other diseases, such as typhus fever, measles, scurvy, and others, it is common as a symptom or concomitant; as a distinct affection, unconnected with other morbid conditions, it is not so frequently observed. The fact that there is an actual extravasation is readily shown by making pressure on the spots with the finger; as the blood is extravasated into the tissues, the color does not disappear, as would be the case were the blood still within the vessels. The

peculiarity of the occurrence, as it is seen disassociated from other morbid states, is that there is no pain, fever, nor any antecedent or accompanying illness. In fact, the purpura is a disease in itself.

Writers differ very widely in classifying the many supposed varieties of the disease. The differences, I take it, are very largely due to the persistence of an old idea that the disease is to be classed among the skin affections. Admitting this, an arrangement which would put each modification of the extravasation, from connection with other disorders, into a separate list, would be proper and logical. There is little question now that purpura simplex is a distinct morbid affection, and as such presents little variation in different cases. The only proper classification, therefore, would be with reference to the gravity of the process. Thus, we have *purpura simplex*, in which the extravasation occurs into the tissue of the integument, and *purpura hæmorrhagica*, in which blood flows from free surfaces, chiefly the mucous outlet, on slight provocation, sometimes spontaneously. Some writers add a third variety, the *purpura senilis*, which, however, does not differ from the others, save that it occurs in elderly people and the spots or maculæ may attain quite large dimensions. These varieties or modifications require separate mention, particularly as to semeiology, the presumption being that the pathology will be found quite similar, if not identical; in other words, the differences are in degree.

Symptoms.—The *purpura simplex*, the typical form of the disease, consists in the appearance of purple or reddish spots on different parts of the body, coming on without any premonition, appearing suddenly, and running their course without any pain or irritation, local or general. The chest and lower extremities seem to be the chosen seat oftener, but they may appear on any part of the surface. They are sometimes exceedingly minute, and are called *stigmata* (from *stigma* "a mark") when they are found in patches and not distributed over a great extent of surface. Again, the spots are larger, about the size of a pea, not in great numbers, and frequently widely separated. They are then called "*petechiæ*," and oftener appear in the course of fevers, being recognized as the expression of great prostration. In other cases they appear as larger patches, like a bruise from the stroke of a whip, in wheals, older writers calling such patches *vibices*, from *vibix* "a mark of a blow." Finally, the patches may be large, irregular, bruise-like, and are then known as *ecchymoses* or *suggillations*, the former term referring more particularly to traumatic extravasations, at least conventionally and by popular usage; the latter would be the preferable term.

Whether as stigmata, petechiæ, vibices, or suggillations, the spots appear suddenly, are painless, and not noticeable in any way subjectively. The integument in most cases is not raised, although when the extravasation is large the skin may be thickened, so that there is

considerable elevation of the spot; also, when it occurs under the epidermis it may be raised in the form of a "blood-blister" or *pemphigus*. When first occurring, the color is usually red, quite bright, unless the blood is venous, when it has the characteristic bluish color. After a time the color becomes darker, more bluish, and, as it fades away, undergoes many changes of color, such as occur in a bruise, becoming greenish-yellow on the borders. At first the boundaries are very distinctly marked, but later the discoloration shades off into the healthy color of the part. The eruption is of indefinite duration, often disappearing at one place while fresh ones appear at others. A fact already mentioned must be borne in mind as distinguishing the disease from skin affections, viz., the spots are unaffected by pressure.

Purpura hæmorrhagica, so far as the skin symptoms are concerned, presents the same appearance as the simple form, although cases occur quite frequently in which skin symptoms are entirely wanting. The chief difference consists in a hæmorrhage from free surfaces, such as the nose, gums, rectum, or vagina, and into loose connective tissue, as under the ocular conjunctiva. In some instances hæmorrhages occur from the mucous lining of the stomach, from the intestines, from the bronchia or bronchioles, or from the urinary passages; hence, hæmoptysis, hæmatemesis, hæmaturia, or bloody stools, are to be considered in the semeiology of purpura hæmorrhagica. These occurrences may lead to dangerous or fatal errors in diagnosis, as they may be mistaken for phthisis, gastric ulcer, intestinal ulcer, acute nephritis, or as hæmatophilia. The peculiar characters of purpura, generally, are unchanged in this severe form of the disease, and will render an accurate diagnosis quite easy. There is absence of any premonition, and no antecedent illness, in most cases; the attack is usually in adult life and eminently acute in character. Where there are initiatory symptoms they are quite trifling, some lassitude, or malaise. In any of the other affections above mentioned there is either a marked chronicity or a congenital disposition. Furthermore, there is obvious impairment of health for an indefinite period before the occurrence of hæmorrhage. There are cases, however, in which purpura is ushered in by more or less fever, and some indefinite pains in the back or limbs.

Upon the occurrence of hæmorrhage there are symptoms depending upon the amount of blood lost and the previous state of the patient's health. Thus, when the hæmorrhage is considerable or the patient is already anæmic, there will be the usual signs of concealed hæmorrhage; weakness, quick small pulse, and more or less faintishness on sitting up or standing. In extreme cases there would be ringing in the ears, dimness of vision, great restlessness, and thirst. The region affected would modify the symptoms greatly; thus, a hæmorrhage from the lungs would be followed by more serious symptoms than one from the intestines or nose. Under all circumstances, however, the

occurrence of purpura hæmorrhagica is a serious matter; it is not only immediately threatening to life, if the hæmorrhage is profuse or prolonged, but recovery is slow, and future attacks are to be anticipated. Perhaps the condition is not as serious as hæmatophilia, in one sense, and yet they are quite similar, with this important difference: the hæmorrhagic diathesis is congenital, the patients are always delicate and weakly, and while they are often carried to the very verge of the grave, they as often recover their former health. In purpura hæmorrhagica the attack comes on suddenly, in one unaccustomed to sanguineous losses, and safety depends upon arresting the flow of blood and guarding against a recurrence. Perhaps a better idea may be obtained from a report of a case of each disease.

Reynolds (*Syst. of Med.*, i., p. 462), quoting from Graves's *Clinical Medicine* (vol. ii., p. 362), gives the following case of purpura, somewhat modified by the tardy and imperfect appearance of the eruption: "There was an eruption of red spots, somewhat resembling that of measles, but without the crescentic outline usually seen in this disease, and more nearly resembling that of typhus. The patients were strong and healthy previous to their attacks. There was but slight febrile excitement, and this only at the onset; the pulse was slow (in one case 70, in the other 50, in the minute), but it was peculiarly hard and thrilling, almost dicrotous. There was no headache, delirium, or loss of sleep. Bleeding took place from the intestines and urinary organs, from the gums, the nares, stomach, and other mucous surfaces; it gradually became more profuse, resisting all treatment. The tongue was dry and brown in both cases. The exanthems appeared on the skin on the seventh day of illness in one case, and after seventeen days in another. The spots never became petechial, and disappeared in about five days. Both cases proved fatal in about four weeks. In one case the eruption was ushered in by a tingling sensation resembling the sting of nettles, and was diffused over the trunk and extremities; in the other there was no such tingling, and it was limited to the limbs." One of the men was thirty-nine, the other thirty-four years of age; neither had received any injury or had suffered from previous illness, and one was rather a "hard drinker," while the other was abstemious.

Mr. Moore (Holmes's *Syst. of Surg.*, i., p. 721), gives a very full account, which is well worthy of quoting entire, of a case of hæmatophila, which shows the marked difference from *purpura hæmorrhagica:*

"*Heinrich, M.*, forty-four years of age, the son of a man-servant, still living, is a strongly-built man, five feet nine inches in height. The hair of his head and beard is black, his eyes are of a clear blue color. He was delicate in his early childhood, and as he grew up he suffered much from rheumatic affections of the joints; his feet especially

remain weak from this cause, and they still prevent his walking quickly. From the first year of his life he has been subject to hæmorrhages, both spontaneous and traumatic. Those which were spontaneous issued from the nose and the gums in his earlier years, but more lately from the urethra and rectum. The attacks of bleeding are always preceded by great restlessness, by pulsating and throbbing of all the arteries, and by a feeling as if they would burst. He states that he is warned of the approach of the bleedings some weeks or a fortnight before by the continual odor of fresh blood in his nostrils. At the expiration of the period of warning, slight hæmorrhage from some part of the body begins, and usually continues a fortnight or three weeks. At first, he is able to continue up and about; but after a week he is compelled to take to his bed, and from that time the bleeding increases in severity and continues, whether he wakes or sleeps, until at last the blood is quite clear and appears like lymph.

"In a state of prostration and unconsciousness, he then lies as one dead for several days. When the flow has ceased, he slowly returns to life and consciousness; but many weeks pass before he loses his paleness and the feeling of languor and exhaustion. Gradually, however, as appetite returns, he begins to make blood again, and after a few months he once more blooms like a rose. He is bright and clever, and has a good deal of mechanical ingenuity. The sexual passion was never inordinate in him, as is reported to have been the case in one of Wachsmuth's patients. When three years of age, he fell and bit his tongue; the wound bled for eight days, and the enormous hæmorrhage could not be stopped without surgical help. Up to his seventh year he bled frequently and severely from his nostrils; after that age the blood issued from the gums. The gum would become congested and swollen, and at some one spot upon it drops of blood would appear; after a time smart hæmorrhage would come on, and continue for a fortnight or three weeks until he lost consciousness. In his nineteenth year he cut his thumb, and the wound went on bleeding for three weeks. As he was without surgical assistance, and all domestic remedies proved useless, he had a bandage applied round the arm near the wrist. The bleeding stopped, indeed, but such swelling of the hand and arm came on that he was obliged to have the ligature removed. The hæmorrhage then recurred and continued until he was perfectly exhausted. In another week the wound had cicatrized. Later he had more frequent hæmorrhages from the urinary passages; once he passed a pailful of pure blood from the bowels; at other times it came in large quantities from the lungs. And so he passed through life, with a severe hæmorrhage about once in two years. Three of his maternal relatives were 'bleeders,' and all had raven-black hair."

I have seen but one case of this singular malady in an adult, although in infants it has occurred in my practice three times, the

subjects perishing from hæmorrhage from the navel after separation of the cord. It is not so common in this country and England as it is in France and Germany, and very little is known of its ætiology or pathology.

Of the so-called purpura erythematosa, or even the senile form, nothing need be said, as the purpuric condition is always the same, even when it occurs as an accompaniment of other morbid action.

Ætiology.—From the paucity of symptoms apart from the eruptions, and from the fact that no previous state of ill-health is necessary, it is very difficult to understand the conditions of causation. Occurring at all ages, perhaps with greater frequency in childhood and old age; not restricted by climate; apparently independent of personal habits or occupation; largely indifferent to diet and character of associated morbid conditions, it would seem almost impossible to satisfactorily account for its appearance. That it is often met with in complicated forms, in connection with small-pox, scarlet fever, measles, and rheumatism, might have some significance were it not that it not only occurs in exanthematous fevers, but that cirrhosis of the liver, amyloid degenerations of the viscera, ague, Bright's disease, syphilis, jaundice, and suppurative ostitis furnish nearly as frequent complications. Two conditions would naturally seem essential, viz., a change in the blood, and (or) a change in the capillaries. Blood changes might be of a character to facilitate its exudation through the unbroken vessels, an unnatural fluidity. The vessels may be softened or weakened until unable to resist tension otherwise not extreme; tension may be greatly increased; or, finally, all of these factors may exist simultaneously. There seems, however, to be little room for doubt that there is an actual rupture of the capillaries, an extravasation occurring, and not a transudation. Blood changes may, and probably do, exist, which are directly responsible for the deterioration of the capillaries,—a defective nutrition. Examination of the blood in numerous instances shows a relative deficiency of solids, with corresponding increase in the fluids; this would, of course, give greater fluidity. The opinion is quite general that there is a deficiency in the salts of potash; but analysis of living blood is always difficult, and it will be long before this point is settled. Experiments have shown, however, that purpura often occurs when patients have been under the influence of iodide of potassium. There seems to have been a marked unanimity in the observations of many different observers that injections of ammonia generally result in purpura. It seems impossible to escape the conviction that there is an indistinguishable change in the blood as an initial lesion, resulting in degeneration of the bloodvessels, not sufficiently to affect the large vessels materially, but enough to cause the peripheral vessels to become inadequate to resist any unusual tension. The appearance of blood-corpuscles in the extravasation, white as well as red, must be

conclusive evidence that there is rupture of the vessels, and not a mere transudation of the fluid portions. No constant change in the proportion of fibrine has yet been established; indeed, a standard of proportion is not yet established. Probably, the exact ætiology cannot, for a long time to come, be stated any more definitely than I have given it.

Pathological Anatomy.—Dissection has as yet failed to show any pathognomonic alterations, either in viscera, tissues, or blood-vessels. In some, the liver was found variously affected, chiefly atrophic changes; in others, the "blood glands," particularly the spleen, were enlarged, in some cases atrophied; amyloid changes were observed in the viscera in a few instances; in a few instances the capillaries were found waxy, friable, and impervious; so also with the muscle fibres occasionally. Spots of extravasation are found on many, perhaps all, of the tissues of the body, with greater frequency on the integument. The blood is usually found fluid now, and as ordinarily found in *post-mortem* examinations. In some cases, extravasations of fluid blood occur in the spaces of the body, as the pelvis of the kidney, the bladder, the stomach, muscular interspaces and the arachnoidean spaces. These appearances are largely those of hæmorrhage, with nothing upon which to base a reason for its occurrence; they are pathognomonic so far as the occurrence of purpura is concerned, but throw no light on the causation. No doubt, continued investigation will bring with it increased knowledge, but at present the inconstant and meagre organic and visceral changes occasionally encountered are of little significance, more particularly as the same abnormalities frequently exist in other cases in which there is nothing like purpura existing at any time.

Diagnosis.—Purpura, pure and simple, uncomplicated or unconnected with other forms of morbid action, can hardly be mistaken for anything. Scurvy, ecchymosis from traumatism, or the bites of insects, such as fleas or mosquitoes, might be esteemed sufficiently similar to lead into error, but a moment's consideration of them would point to ready differentiation. Thus in *scurvy* there is more than cutaneous extravasation. There is the dirty pallor of the skin, the swollen gums, the adynamia, and the general cachectic appearance. In *traumatic ecchymosis* there is a history of traumatism, besides the limitation of the extravasation to the locality sustaining the injury. The *bites of insects* also has a history of the occurrence, and the spots themselves are usually somewhat elevated and marked with the puncture made by the sting.

Prognosis.—As to preservation of life, the prognosis in purpura simplex is nearly always good; many subsequent attacks may, however, usually be predicted. The occurrence of *purpura hæmorrhagica* is always a serious matter; even though few cases terminate fatally on a

first attack, pulmonary and cerebral apoplexy are always to be feared as possibilities.

Treatment.—In cases in which hæmorrhage is severe, approaching hæmatophilia, astringents or styptics may be necessary. These indications are purely surgical, and do not call for extended notice in a work on general medicine. Where possible, hot water, gallic acid, or some non-escharotic astringent is to be preferred. These failing, or the case being alarming, more energetic measures must be adopted; agents like persulphate of iron, dry or in solution, *cupric sulphate*, the potential cautery, or the like, must be employed. It is useless to think of ligature, as the bleeding could only be controlled by securing the chief artery of the part, and, in addition to the ordinary gravity of such an operation, there would be dangerous bleeding from the wound made, hæmorrhage equally as severe and dangerous as that which it was sought to cure. Pressure on the bleeding point, elevation of the part, when it occurs in an extremity, must be employed concurrently with other measures.

Those who have not experimented with remedies for hæmorrhages can have no conception of the surprisingly satisfactory results often obtained; both in promptitude and permanency the effects are often marvellous. While many remedies may be more or less useful, those which should be borne in mind are few in number, and with very clear-cut indications. *Arnica*, *Carbo veg.*, *Belladonna*, *Phosphorus*, and *Crocus sat.* are oftener called for.

Arnica is to be preferred when there is trickling of blood from the capillaries; red and copious, but not forced out in jets, as from an artery. On wiping off the surface, with a sponge or cloth, it is again instantly covered with drops of blood.

Carbo veg. is a typical remedy in epistaxis when the blood flows in a dark stream or in large dark drops, very profuse, and soon inducing yawning and desire to be fanned.

Belladonna is the remedy when the blood pours out in large quantities, as from the rectum or vagina, hot, and bright red.

Phosphorus is very useful in cases in which the hæmorrhage is excessive, not so formidable in appearance, but continuous; more particularly is it useful when there is thirst, with vomiting of the water almost as soon as it is swallowed.

Crocus sat. is indicated when the blood is dark, "black as tar," stringy, or loosely clotted.

Ipecacuanha resembles *Belladonna*, somewhat, in that the blood is bright red, and the amount startling, and comes in gushes. There is, however, as a distinguishing feature, nausea and vomiting; *continuous nausea*.

China.—After succeeding in controlling the hæmorrhage, for the prostration and debility which ensues, *China* has long enjoyed a well-earned reputation. When *Carbo veg.* has been used for the hæmorrhage, however, I have always continued it for the debility ensuing; in fact, I have long called this remedy the "homœopathic tonic."

Purpura simplex will rarely require any treatment unless it appears on the face. *Bryonia*, *Lachesis*, *Hamamelis*, *Phosphorus*, or *Sulphuric acid* will be needed according to symptoms.

On general therapeutic principles *Secale* and *Ustilago maidis* would seem to be valuable remedies in hæmorrhages from muscular organs,

particularly the uterus; perhaps the good effects would be due to a contraction of the organ, thus controlling the bleeding by compression. I have no practical experience with these remedies, and thus speak of them more suggestively than with positive recommendation.

CHLOROSIS.

BY JULIA HOLMES SMITH, M.D.

Synonyms.—Spanæmia, Chloro-anæmia, Cachexia virginum, Green sickness, Nervous phthisis (Morton).

History.—This malady of maidenhood has been known from the very earliest times. Hippocrates described its symptoms and gave this mysterious ailment, which changes the rosy hue of youth to the greenish-yellow of the autumn leaves, its present name. Ancient writers held different theories concerning chlorosis. Some described it as the result of unsatisfied sexual desire, hence called it *icterus amantium*, *febris amatoria*, and as a cure-all for this love-sickness prescribed marriage. Others, noticing the intimate relation of chlorosis with irregularities of the menstrual function, found in the genital organs of the female the cause of the disease, and so used the terms *pallor virginum*, *morbus virgineus*, to express this train of symptoms. Sydenham described the "green sickness," and Hoffman, in the middle of the 18th century, made the first careful analysis and description of chlorosis in his treatise on *De morbus virginum*. Later, the French authors Andral, Becquerel, Rodier, and Gavarret, studied this disease most carefully, analyzing the blood of chlorotic patients, formulating theories concerning the cause of the malady, and suggesting therapeutic measures. German pathologists, Rokitanski, Virchow, and many others, are not behind their French compeers. To Virchow we are indebted for the discovery that there is a decided abnormal narrowness of the aorta and its branches in patients who have died with chlorosis. "Hypoplasia of the vascular apparatus" is Virchow's technical term for this condition. The same author has found by repeated post-mortem examinations that a morbid condition of the genitalia in chlorotic women is by no means constant, thus deducing by inference the theory that the chlorosis is not dependent upon imperfection in the development of the sexual organs, but symptomatic of a deep-seated systemic change.

Chlorosis is a disease of the feminine part of the human race wherever found; climate or color, wealth or poverty are in no wise specially responsible for its begetting, and but for the fact that physicians have been careless in reporting their cases, confounding anæmia with chlorosis, and mingling with the narrative of a true chlorosis details of complications of malarial or tubercular origin, material would be had for

a comprehensive résumé of the history of this disease; under the circumstances, the vast quantity of material at our disposal is of little value.

Definition.—The most careful pathologists avoid an arbitrary definition of chlorosis. Whether the disease is due to faulty development of the arterial system, with a resultant loss of tone in the whole body from insufficient blood supply, or whether this same loss of tone results from impairment of nerve function, hence imperfect development of the blood, or whether these two factors coexist and jointly give rise to the peculiar train of symptoms embraced under the term "chlorosis," are as yet unsettled points. It seems to me that chlorosis is a disease of the ganglionic or sympathetic nervous system, disordering the control of this system over the functions of organic life, and expressing itself by producing alterations in the character of the blood, diminishing its hæmoglobin, causing disturbances of the digestive, respiratory, and sexual apparatus, and giving rise to abnormalities in the emotional nature of the patient. Becquerel and Rodier practically sustain this view.

Trousseau has given an admirable picture of progressive chlorosis which may with propriety be quoted here. He accepts the theory of the nervous origin of this malady, and sketches briefly, but forcibly, the results of the abnormal nervous action.

First Epoch.—The action of the visceral apparatus becomes slow, almost null. Assimilation is as if suspended. The heart and stomach show their erethism and weakness by their abnormal sensations and movements. The poverty and liquidity of the blood cannot yet be accused of producing this state of languor and nervous accidents, for they precede anæmia and produce it. This is the first period, during which the blood changes may last long before the chlorosis is revealed to the observer by the complexion.

Second Epoch.—The hydræmia which results from the preceding period becomes in time a cause, and produces upon the entire system the effects of impoverishment of the blood.

Third Epoch.—Excessive erethism of the circulatory system produces a remittent or continued nervous fever which consumes the system, and then we may say that the organism consists solely of a horribly exasperated nervous system; the entire existence is but a sensation of suffering, anxiety, and general distress. The person or its survivor, a useless nervous system, may be extinguished by exhaustion or colliquative discharges and phlegmasia of the principal organs, such as those seen in persons who starve to death or succumb to various kinds of nervous fever.

Ætiology.—The causes of chlorosis are predisposing, or constitutional, and exciting, and there are instances in which the chlorosis is congenital. This last would seem to be due to the imperfect develop-

ment *in utero* of the vascular apparatus. Virchow, with other German pathologists, claims to have found an abnormal narrowness of the aorta and its branches in the bodies of persons who have died of chlorosis, and the starting point of this defective development, according to the theory advanced by Virchow, would be at the very moment of conception. This condition of the bloodvessels will be considered more fully when treating of the pathological anatomy.

Concerning the predisposing causes of chlorosis, sex must be pre-eminent, although cases are on record where men have had all the symptoms which go to make up this disease. Even the arterial hypoplasia has been found in the post-mortem examinations held on males. Immermann, however, considers chlorosis in males extremely rare, rejecting many of the cases claimed by Fouguier and other French authors. It is quite possible that many cases of so-called chlorosis are really instances of progressive anæmia. The conditions surrounding the evolution of sexual activity in the female are fraught with more danger to the whole organism than is the advent of puberty in the male. Says Valentine: "the total volume of the blood bears a smaller average proportion to the body weight in women than in men." Quantitative analysis of the blood in the two sexes has shown that the proportion of red corpuscles is normally decidedly smaller in women than in men, and also that the blood of women contains a larger proportion of water; surely this will to a degree suggest the reason why sex is so important a factor in the ætiology of chlorosis, a disease whose marked characteristic is a pathological oligocythæmia.

Age, next to sex, comes naturally in the sequence of causes. The period of puberty, when sexual development is being accomplished, is the time when girls are most liable to chlorosis.

It is an accepted axiom that the total volume of the blood in relation to the body weight is at its greatest during the prime of life, and that in childhood and youth it is somewhat more watery and contains less solid matter, whether in solution or suspension, than the blood of middle age. Hence the frequency of "rudimentary" forms of disease in childhood and early youth. This accounts for the fact that chlorosis is most frequently met with in girls between the ages of fourteen and twenty-four. Special demands for blood are made by the sexual apparatus as the girl approaches womanhood, and usually in the training to which the child is subjected no cognizance is taken of this serious drain. Mental precocity is encouraged, while physical education and development are neglected; there is persistent training of certain small muscles, as in practicing the piano, but the great need of the economy for a wise distribution of the blood-supply is unheeded. Says Trousseau: "The genital apparatus has a powerful and quite special influence upon the digestion and hæmatosis of woman. At the epoch of puberty, if the life of this apparatus remains concentrated in itself and

does not extend its influence over the functions of individual preservation, the latter fall into a condition of languor and inertia; digestion is impaired, the heart and vessels are attacked by a violent erethism, functions most closely related to intelligence and will are alternately torpid and irritable; in a word, chlorosis is present." The question naturally arises why, at puberty, does the life of the sexual apparatus ever become concentrated upon itself? We answer, because it is denied proper nourishment. Starvation of the general economy produces a whole train of nervous symptoms indicative of decay of nerve force. The starvation of the female reproductive organism at the time when special demand is made results in degeneration of nervous energy, which in turn affects the digestive apparatus, thus producing an imperfect blood supply, and the "vicious circle" is complete.

Although chlorosis is most common at puberty or between the ages of fourteen and twenty-four, the disease may appear, and in fact is quite frequent, during the entire period of sexual life; Trousseau even reports two undoubted cases which occurred after the menopause. He also quotes M. Monet, who concludes from the frequency of abnormal *bruits* in the necks of children that eight children in every ten are chlorotic.

Ludlam gives to the lymphatic constitution an important place in the ætiology of chlorosis. Recognizing the important part which the lymphatics play in hæmatogenesis, the failure of normal action on their part results in the diminution of red corpuscles, and we might, with justice, expect a chlorotic diathesis in a lymphatic girl with a scrofulous heritage.

The exciting causes of chlorosis are such influences and environment as create morbid introspection. Great grief, either from bereavement or disappointment in a chosen career; anxiety, home-sickness, or disappointed love may each create a chlorotic condition, eventually resulting in the complete loss of health. Chlorosis sometimes depends upon loss of sleep and excessive mental labor. It is often found in young girls who are in a notional, moody state of mind, the result of a little learning—that "dangerous thing"—just enough of so-called "culture" to make domestic drudgery detestable, and to make the self-tormentor sigh for some sympathizing soul who could understand her needs. Chlorosis is also sometimes developed during pregnancy, though it may not appear until after parturition. The reported cases of this kind have been of the acute febrile type, and by some authors are classed as pernicious anæmia; it would be of interest to know whether there had been a previous history of chlorosis in them. Long-continued malarial complications often tend to a chlorotic condition, but in these cases a differential diagnosis between chlorosis and pernicious anæmia is extremely difficult.

Pathology.—Chlorosis, according to the preceding definition, has its inception in the sympathetic nervous system, and in the progress

of the disease changes begin here. Life is motion; disease, abortive motion; death, cessation of motion. The vaso-motor system presides over the circulation of the blood through an occult influence whose very method is unknown, and by means of the constant interchange of elements between venous and arterial blood the healthy equilibrium between waste and repair is maintained. Nature hides with envious care from prying eyes those processes of "vital chemistry" which result in the healthful growth of the ultimate elements of the human body. No less zealously does she seem to guard her secret when some foe has entered her citadel and, mingling in the manipulations of her laboratory, causes disease. Growth ceases, disintegration begins, and not until results show themselves externally does the victim say, "I am sick." The chlorotic patient may have been born with hypoplasia of the greater arterial trunks; there may be through childhood a stunted condition of the heart and pelvic organs, but closely hidden in the cavities of the body such abnormality is not suspected until the evolution of sexual activity makes fresh demand upon vital force; then it is that the whole sequence of woes is entered upon.

Van Helmont spoke of the uterus as a stranger in the female economy dependent on the latter only for nutrition, "*perigrini hospitis instar a corpore non nisi animaliter dependens.*" But stranger though it be, its demands for nourishment must be met, and to this end nervous and vital force must be in reserve for the time of need.

The examinations of Virchow, Rokitansky, and others have not by any means proved that this defect in the calibre of the bloodvessels is an inevitable factor in chlorosis. On the contrary, the absence of this hypoplasia has not been uncommon in chlorotic subjects who have died of acute diseases. One may assume, however, from the reports of the researches of these authors, that all cases dying of complications due to *chlorosis per se* do have this stunted condition of the arterial system, and hence cure for them was not to be hoped for, since, in the progress of the malady, there has been fatty degeneration of the lining of the artery, and in some cases breaking down of the entire arterial wall. The researches of the German pathologists show great variety in the condition of the heart; in some cases it is found normal, in others hypertrophied; in still others stunted in size. The same lack of uniformity is noticed in the size and condition of the uterus and ovaries. This latter fact seems to me to exclude these organs from any important place in the ætiology of chlorosis, except in so far as they appear as sufferers from deficient nourishment—a clear case of starvation.

At the very threshold of the investigation into the pathology of chlorosis, the student recognizes the presence of an element in the process of degeneration which as yet is hidden from the pathological histologist. The first step in the direction of morbid action is hidden

from recognition, and it is only in the later stages that the disease is readily noticed. The solar plexus soonest shows its loss of tone by the irregular action of the stomach, and the imperfect assimilation of the food which is taken. Then the blood changes its character and ceases to be rich and red, a condition which, for a long time, was considered identical with oligocythæmia. Since 1860, French, English, and German histologists have made frequent and careful examination of the chlorotic blood, and found a diminished quantity of iron, of red corpuscles, a decided diminution in the size of the corpuscles, and a smaller quantity of hæmoglobin in each; for a knowledge of this last fact the profession is indebted to Duncan.* No further changes in the blood occur, its other constituents remaining as in health; and to make an exact diagnosis of chlorosis the more difficult, there are on record many cases in which the blood has shown no abnormality. After the blood becomes degenerate, there is but one step to the softening of muscular tissue and consequent reduction of strength. In post-mortem examinations the muscular tissue is found pale and flabby, but there is not necessarily a decrease in adipose. A person who was fat when attacked with chlorosis often retains this fatness, since the very inertia of the vital forces which prevents growth makes the processes of retrograde metamorphosis and absorption equally slow. The changes in lungs, liver, and kidneys are those due to malnutrition.

Prof. Meigs called chlorosis an "endangial disorder," and asserted that the changes in the composition of the blood are due to alterations by disease of the lining of the bloodvessels. Back of this lies the pertinent question of causation of the disease giving rise to these "alterations," and on this important point he is silent. We know that the blood is in a condition irresponsive to the demands made upon it, and the difficulty seems to lie in the imperfect formation, renewal, or evolution of the red corpuscles. This points to a derangement of the powers of development of the cytogenic organs, viz., the lymph glands, the spleen, and the marrow of the bones; but beyond this, until the dissecting table and the microscope yield much more evidence than we now possess, we are largely left to the mercy of mere speculations. As before stated, we incline to the belief that the primary cause of the disorder lurks in the ganglionic system; but we cannot formulate its exact nature, because no lesion has been discovered after death, either in that system or the cytogenic, uncomplicated with other disorders. It may be that the cytogenic system merely shares the general organic derangement, and that we have no more reason to isolate the condition of the red corpuscles than that of the accompanying indigestion. Immermann claims that the results of embryology and morbid anatomy combine to indicate that the existing hypoplasia of the

* J. Duncan, Sitzungs Berichte der Acad. der Wissenschaften. Wien, 1867.

arterial system is congenital, and that "the intensity of the impulse to the proliferation of the red corpuscle implanted in the system at the moment of conception, and which continues to regulate the plastic power of the cytogenic apparatus," is feeble. This hypoplasia of the walls is most marked in the ascending aorta. The walls of the arteries are often the seat of fatty degeneration, dull yellow spots and striæ being common upon the intima, but the degeneration very rarely extends to the middle coat. In post-mortem examinations the heart is sometimes found normal, sometimes stunted, occasionally hypertrophied, and in rare cases it shows fatty degeneration. As before stated, there is no change discoverable in the blood glands, the spleen, or the marrow.

The course of chlorosis is usually subacute or chronic, continuing for months and even years. Aitken (*Science and Practice of Medicine*) quotes several cases of an acute febrile type reported by Lebert. These occurred during parturition, and in some cases seemed to have been developed during pregnancy. In these there had been no hæmorrhage during labor or subsequently, and the lochia were scanty. They do not report a history of previous chlorosis, and previous labors had been normal. Some authors are disposed to consider these cases as cases of pernicious anæmia. In all cases of chlorosis there is a decided tendency to relapse, years sometimes intervening between the successive attacks.

Symptomatology.—As we incline to the theory that chlorosis is a functional derangement of the sympathetic nervous system, it follows that we regard the symptoms as a general manifestation of disordered functions of organic life; and in a grave case, especially during the early stages, symptoms referable to one or more of the great organic systems, notably of the alimentary and vascular, usually predominate.

The stomach and bowels are first deranged; there is abnormal or entire loss of appetite, foul breath, morbid craving for indigestible substances, as pencils, chalk, etc., and it is noteworthy that substances known to be very difficult of digestion are often, in the chlorotic patient, easily digested, owing to a peculiar capriciousness in the alimentary canal. Flying pains are felt in the bowels; there is flatulence, and the fæces become unnatural in character and color. Soon the patient grows listless, fond of solitude, inactive, irritable. Society becomes disagreeable; the face is pale, as are also the lips and gums. The least exertion, such as going up stairs, causes vertigo, with palpitation; bad dreams make night hideous, and doubts and fears make up the round of the day. By and by the greenish-yellow hue spreads over the body, the sclerotica becomes transparent, the muscles soft and flabby; a persistent leucorrhœa takes the place of the menstrual discharge; a slight hacking cough sets in, and, unless relief is obtained speedily, the bowels, liver, kidneys, and skin may each be so gravely

affected as to cause danger to the patient. Very few really die of chlorosis, but the "vicious circle" which makes up this disease once complete, there is little vitality left to resist any acute malady.

If the patient incline to adipose, there will in all probability be no special diminution in fat, although the muscles are flabby; emaciation exists very seldom; in fact, according to many authors, it is found only when anæmia complicates and predominates. In the later stages there may be slight œdema of the eyelids, face, and ankles, and cases are reported where there was general anasarca and effusion into the serous cavities. I am of the opinion that in genuine chlorosis, uncomplicated with anæmia, there is no tendency to dropsy.

Suppression of the catamenia may be a symptom in one case, while menorrhagia is the rule in another. These opposite conditions seem due to temperamental differences. The fat, lymphatic subject will in all probability complain of suppression; the dark-skinned, lean woman of too frequent flow. The girl who is of a nervous, excitable nature, fond of reading and of music, will incline to excessive flow if she be chlorotic. Virchow concludes that this difference is due to the difference in structure of the sexual apparatus in different individuals, the amenorrhœa being due to retarded or imperfect development of the uterus and ovaries, excessive menstruation to the hyperplasia of these organs. Immermann makes note of these variations, and adds yet another cause for excessive or premature menstruation in the chlorotic patient, which is a certain inherent condition of an hereditary order, viz., "the nature of the germinal area in the embryo out of which the generative organs are developed, and the nature and intensity of evolutionary impulse communicated to it at the moment of conception."

The heart symptoms of chlorosis vary in different individuals. In some there is actual increase in the volume of the heart, and with this condition of pseudo-hypertrophy there is liable to be pain in the eyeballs and slight amaurosis. Sometimes the pulse is slow, feeble, soft; sometimes quick and irregular, but always easily accelerated. There is an intense systolic cardiac murmur, and the venous hum is usually plainly heard in the neck; there is often imperfect syncope, vertigo, *tinnitus aurium* (especially of the right ear), sparks and black spots dance before the eyes, and there is more or less hyperæsthesia of the surface.

The chlorotic patient suffers from neuralgia, fleeting pains, referred especially to the viscera, painful spots, and the usual train of nervous symptoms referable to spinal irritation. In intense cases, where nervous symptoms predominate, chorea or convulsions may ensue.

The mental symptoms of chlorosis are usually characterized by depression, sulks, desire for solitude, display of tears and temper, making life a burden to patient and friends; and again, there will be a cor-

responding condition of excitement. But the inclination to resist depressing emotions seems weakened, and thus forms a peculiar psychical element. Though apparently incapable of exertion, yet, when an agreeable demand is made, the patient responds cheerfully and endures unusual exertion without marked fatigue, thus conveying to her companions the impression that she is not so sick or weak as she claims to be. It is this same element of inconstancy which operates when food difficult of digestion is easily digested if it be of the kind for which she has craved, and when the disorder is relieved without medicine if an agreeable change is made in surroundings.

The urine is pale, of low specific gravity, and diminished in urea and uric acid.

Mild cases of chlorosis are at times found in which languor and palpitation are the only notable symptoms present.

Complications.—Chlorosis is a factor in the causation of many maladies the results of which, if not fatal to life, are many times hindrances to usefulness and productive of great discomfort.

The papilloma, which are the most common amongst the new formations within the larynx, are by Oertel referred to "anomalies of constitution and of blood composition" due to chlorosis during the years of bodily development.

Gastrodynia, unattended by muscular spasm or by flatulent distension, is caused by a chlorotic condition of the system, and often it is quite impossible to decide whether the branches of the pneumogastric or filaments from the cœliac axis are involved.

Hyperæmia of the pia mater occurs sometimes during the progress of chlorosis. Consciousness is rarely lost, but the congestion is sufficiently marked to give to the conjunctiva a blood-shot appearance. The headache is severe, and photophobia is present. Huguenin describes a singular form of chronic congestion not unfrequently met with. It occurs in girls at puberty, and its symptoms are constant moderate headache in the forehead, increased by any excitement or fatigue; sleeplessness, impairment of the thinking faculty, and of the memory for recent events. The superficial vessels of the head are congested, the menstrual flow interrupted; there is constipation, the pulse is small, and although the patient looks well, she has very little muscular strength. When the neurotic condition which causes the irregular distribution of blood is removed, the congestion disappears. In other words, the cure of the chlorosis removes the hyperæmia.

Again, in cases of ulceration of the stomach chlorosis has been considered a causative agent, especially in some cases of perforation.

This fatal accident was probably due to a lack of vitality in the tissues resulting from a chlorotic state of the blood by which is hindered "a projective thickening of the edges and base of the ulcer," a process essential to the prevention of perforation.

In considering the subject of hæmorrhage of the stomach, Leube thinks it at least necessary to inquire "whether such congestive hæmorrhage may not be due to a morbid deficiency of resisting power on the part of the vessels, and, above all, whether in cases of vicarious menstruation an important part in the causation of the hæmorrhage may not be played by chlorosis, which itself induces a fatty metamorphosis of the walls of the vessels, and which, as Virchow has recently specially insisted, produces vascular pressure by the hypoplasia of the vessels which attends this affection—both of which conditions evidently favor a rupture of the gastric vessels."*

Diagnosis.—The diagnosis of chlorosis is not without difficulty. Chlorosis may be confounded with hysteria, anæmia, cardiac disease, tubercular peritonitis, and even with phthisis. The differentiation can only be made by careful watchfulness on the part of the physician. The most frequent mistake is in confounding anæmia with chlorosis, and these two ailments have so many symptoms in common that the most acute observers have been deceived, especially as in some cases the characteristic condition of the blood is wanting in the chlorotic patient.

In an article in Ziemssen's *Cyclopædia*, one of the points mentioned in the differential diagnosis between these two conditions is that iron will cure in the one case and not in the other. The statement, as a diagnostic symptom, is certainly remarkable for its oddity, as if the patient were made only for the purpose of affording to the physician a chance for experimentation.

It seems to me that the differentiation can best be made by the history of the case. In anæmia the trouble seems to be, first, with the blood; impoverishment of the blood due to wasting disease or malnutrition or hæmorrhage. In the other case the nervous symptoms are the first to appear, giving rise to affections of the stomach as a consequence. Physical examination will establish the differentiation from organic heart disease and tuberculosis, but as the latter may possibly follow in the wake of chlorosis, great care should be taken to watch the progress of the case and to abort the first symptoms of disease in lung tissue.

From hysteria the differentiation may be made by the color of the sclerotica: in chlorosis it is transparent; in hysteria the expression is more dull and humid. Also by the color of the buccal cavity, which in chlorosis is paler than in hysteria. The train of nervous symptoms is the same in both diseases.

Prognosis.—The prognosis depends upon the constitutional vigor of the patient. In those who enter upon life with a fairly robust frame we may anticipate a favorable issue, even though the symptoms may

* Diseases of Stomach and Intestines, Leube, Ziemssen's Cyclopædia, vol. vii., p. 275.

be very severe. But if complicated with tuberculous diathesis or hæmorrhagic tendency, the prognosis must necessarily be guarded. A highly susceptible nervous system, an inherent weakness of the digestive apparatus, a scrofulous heritage, all these tend to render the prognosis unfavorable. Such subjects are liable to succumb by organic degeneration of some vital organ. Patients rarely ever die of chlorosis, but, on the other hand, are liable to relapse, even after having made what appears to be a complete recovery.

Therapeutics.—Ferrum.—One triumph of the homœopathic law is evinced by the successful use of iron in cases of chlorosis. The fact that the blood has lost its color and is deficient in iron, naturally suggests the use of Ferrum, but great discrimination must be used both as to method of administration and in considering the characteristics of the case for which it is exhibited. Trousseau, fifty years ago, recommended iron in chlorosis, but prescribed it in massive doses, and quite indiscriminately. He found that although there was apparent improvement in nearly all cases, yet many of these afterwards died of phthisis, evidently hastened to a fatal termination by the use of the metal. The distinguished therapeutist then began to diminish his doses, and during the latter years of his life was confessedly afraid of giving iron in any quantity in any case in which he had reason to suspect constitutional tendency to phthisis. Ferrum, however, is valuable when homœopathic to a case of chlorosis. Dr. Ludlam commends *Citrate of Iron and Strychnia* in cases of chlorosis characterized by pale lips and gums, general anæmic appearance, cold hands and feet, waxy complexion, suppressed menstruation, with hysteria.

Ferrocyanuret of potassium is valuable in chlorosis when the heart is affected; the blood seems watery, and there is a tendency to dropsy. The patient looks "puffy," and the flesh is not firm; the heart beats irregularly and feebly; there is dyspnœa on the slightest exertion, the bowels are constipated, and the kidneys are inactive (Hale).

Nux vomica.—Is especially valuable for patients of dark complexion and dark hair; the so-called bilious-chlorotic. The symptoms which suggest its use are hypochondriasis, disgust with life, and distrust of friends; vertigo, frightful dreams, pain in the back and loins, neuralgia, cramps in the calves of the legs, hyperæsthesia of the skin, especially of the scalp, so that the touch of a brush is positively painful. The patient complains of palpitation in the stomach, often declaring "she has two hearts beating." The eructations are bitter, and in the morning there is a bad taste in the mouth. The menstrual flow is very profuse; she is subject to attacks of colic, and has a persistent bad-smelling, acrid leucorrhœa.

Ignatia.—When nervous complications appear, the patient starts at the slightest noise, and is unable to fix her mind upon anything.

Silicea.—When the glandular system seems disordered, and there are abscesses in different parts of the body.

Pulsatilla.—When the patient is irregular in menstruation, and has pain in the small of the back; pale face, puffy eyelids, white tongue; sleepy in the morning, scanty menstruation one month, and leucorrhœa in its place the next. Some difficulty of breathing, and vertigo.

China.—When the chlorosis is of malarial origin and its characteristic features are marked by the malarial symptoms. The mouth and tongue are slimy, and the breath fetid. Restless nights and bad dreams; great indisposition to mental action.

Sulphur.—Pale, bloated face; blue veins around the eyes, and a shaded line around the mouth. Mouth and tongue slimy, abdomen distended. Acrid leucorrhœa, vertigo, morbid craving for sweet things, a sense of goneness at the pit of the stomach with throbbing, as of a heart, in the abdomen; sensitiveness to cold, ill humor, sadness, obstinacy.

Sepia is suited to chlorosis in pale, delicate, nervous women, who have irregular menstruation. There is dyspnœa, pain in the back, watery leucorrhœa, weakness of memory, inability to think continuously on any subject; a sense of hopeless discouragement makes life unendurable.

Calcarea carb.—This remedy, acting "through the ganglionic nervous system

upon the lymphatic glandular digestive and generative systems," is especially valuable in the treatment of chlorosis. The indications for its exhibition are: irritability, disinclination for every kind of work, weakness of intellect and memory. Vertigo, especially out of doors. Sleepiness in the daytime, and a feeling of heaviness all over. Cold feet and hands, with clammy perspiration; nervous cough, flatulence, and craving for chalk. Too early and profuse menstruation, milky leucorrhœa; itching and soreness of the vulva.

Consult also Gelsemium, Platina, Zincum, Arsenicum, and others.

In addition to the exhibition of remedies, the physician should insist upon a hygienic method of life. Exercise in the open air is essential. Walks, drives, tennis, croquet, all these, in moderation, are valuable to a chlorotic patient. Horseback riding should be recommended, if there are no pelvic derangements which render it undesirable. Cheerful companions and agreeable surroundings are essential. This later fact is fully recognized in the so-called "Hygienic Institutions," where the patient is rarely left to her own devices for amusement or occupation, and accounts for the real success often obtained by them in the treatment of chlorosis.

The use of water, hot or cold, either for full baths or sitz baths, is desirable. Massage is invaluable, and the application of electricity should be of use. Food must be taken at regular intervals, and should consist of those articles which are most nourishing, as mutton, beef, game, and soups. Everything which tends to increase the red corpuscles in the blood is to be desired. The compound syrup of hypophosphites (Fellows), taken with the meals, is quite a valuable adjunct.

Change of air and scenery, especially as had on a sea voyage, will prove a most valuable auxiliary in the treatment of chlorosis.

RICKETS.*

BY J. G. GILCHRIST, M.D.

Definition.—Rickets is a disease of childhood leading to, and characterized by, a softening and consequent distortion of the bones, with irregular development of their growing portion, chiefly an enlargement of the extremities of the long bones, with increased porosity or cancellation. Associated with this change of the bone-tissue there is some extensive visceral degeneration, chiefly an amyloid condition of the liver and spleen.

Synonyms.—Rickets, in modern medical literature, is often called rachitis, but in older works various terms are used, many of them based upon the fact that the affection is essentially a disease of the English poor. Thus it has been called "morbus puerilis Anglorum,"

* Refer also to article "Rachitis," vol. ii., p. 872.

"atrophinæ infantum Anglicum," "Englische Krankheit," and many others.

Ætiology.—The study of the causation of rickets has always occupied the attention of medical writers and teachers, and many and varied are the theories advanced. The chief fact in the semeiology being practically a malnutrition, volumes have been written in the endeavor to reconcile this fact with the numberless existing theories of causation; the resulting differences and confusion are not lessened by the tone of dogmatism which is assumed by their authors. One writer asserts the absence of lactic acid in the food as a cause beyond the range of argument; another as positively maintains that an excess of this acid is causative; another esteems the nature of the affection to be strumous; another tuberculous; and still another, scorbutic. One argues that rachitis is of syphilitic origin, another that it is carcinomatous; all, however, announce their theories as established facts. The difficulty seems to arise from a want of care in distinguishing between predisposing and exciting causes.

Among the *predisposing* causes, it is probable that almost any profound impairment of health on the part of either parent will predispose the offspring to rickets. As the disease occurs largely in Europe, where it has been more thoroughly studied clinically, it is safe to assume that poverty has much to do with establishing the predisposition; comparatively few children of the well-to-do suffer, and when they do, the fathers and mothers, one or both, are adynamic. It has been observed that where there are a number of children in one family, it is the younger who are rachitic; this leads to the inference that the increasing cost of family maintenance not being compensated by an increase of income, the food is correspondingly insufficient, and the younger members, who are rapidly growing, suffer most from the insufficient supply of their greater need. At the same time, the cares of maternity, the rapid succession of pregnancies, so common among the English poor, and the increasing innutrition from scanty and insufficient food, must have a cumulative effect which tends to establish rickets in the children. Furthermore, the habits of intemperance, quite too common among the laboring classes, and the results of immoralities, which seem to be associated with such habits, must unfit the parents for the procreation of healthy offspring. When cases of rickets are observed among the higher classes, it is not uncommon to find similar bodily states from other causes, such as syphilis, recent or remote, and the disturbances of nutrition growing out of indolence and artificial habits of life; hence, in the beginning, the child has an enfeebled life-force, and may easily succumb to assaults upon its health. Notwithstanding Parrot and Vogel assert that syphilis is at the bottom of rachitis, I am of the opinion that it may only be considered a cause in the same sense in which any other equally profound dyscrasia may

be a causative factor. Indeed, Parrot, in common with the majority of writers on this subject, is impatient of contradiction, and in a clinical lecture, as reported in *Le Progrès Medical*, No. 31, uses the following language: "Minute and continued observation has taught me that, in the external and clinical manifestations, as well as in those conditions which an autopsy alone reveals to us, hereditary syphilis often follows a well-determined course, and undergoes a regular series of transformations which are in a constant direct relation with the age of the subject; and that there exists a parallelism between the succession of these periods and the different ages of infantile life, so that the age of the child attacked being given, we are able, without seeing it, to describe the eruptions which it may have, with almost a degree of certainty; or seeing a portion of the diseased integuments, we can tell, in the same degree, what is the age of the child. If death follows, in either case it is easy to predict the lesions which the autopsy will reveal; and, inversely, we can reconstruct the clinical phenomena from an investigation of the cadaver. I do not know any other disease in regard to which a similar statement can be made. With this certainty and this regularity in the morbid process, there is no part of the organic system which carries an impress more constant, profound, or characteristic than the bones. We find engraved there, with an almost mathematical regularity, the dates of the evil, or better, the forms which it assumes, either at the onset or by means of the series of transformations which are habitual to it. Among these pathological modalities, the last, chronologically, is *rachitis*. Now, my aim is to demonstrate to you that *rachitis recognizes one source only, viz.: hereditary syphilis*."—(*U. S. Med. Invest.*, Oct., 1880.) There is no room for debate or argument here: the opinions are expressed with a positiveness which hardly admits a denial. Without questioning the ability of the authority quoted to do all he affirms, I am free to confess that I know of none in this country able to perform such diagnostic feats. Many cases of rickets may undoubtedly be ascribed to hereditary syphilis, but that there are other dyscrasiæ equally powerful in other cases, an abundance of clinical testimony will attest. The doctrine of syphilitic origin is not new, and, with the necessary qualification, it may safely be accepted.

Adolph Baginsky, of Berlin, according to the *Medical Press and Circular*, 1882, summarizes his views, which I condense, as follows: Rickets cannot be considered a disease of the bones, as there are changes in some of the viscera of as much, or greater, gravity and significance. The existing mal-assimilation results prominently in a loss of lime salts, which are largely eliminated through the intestines. The fact that the loss of lime in the bones is sufficient to account for the changes observed in the system was proved by experiments on animals, who were deprived of lime in their food; the bones soon became rach-

itic; by adding lactic acid the alterations were remarkably increased. "Rickets is, therefore, a dyscrasia originated by an alteration in the general nutrition which may be caused by various noxious influences working upon the infantile organism."

The *exciting* causes can readily be inferred from the foregoing. Prominent among them is insufficiency in quality or in quantity of the food. In many cases the history shows that the infant has seemed precocious, teeth developing rapidly, with other superficial signs of unusual bodily vigor. This tempts the mother or nurse to feed it carelessly, offering it food from the table which is utterly unsuited to the needs of the child. Thus there is established the indigestion which is the first step in laying the foundation of the disease. Where children are nursed by a "wet-nurse" there is always danger of immediate infection from the prolonged lactation which the nurse is compelled to keep up, and the resulting deterioration in the quality of the milk renders it unfit for proper nutrition.

Among the poor, children are often nursed long after the milk has lost all nutritive property, in the mere hope that by this means another pregnancy may be averted, or at least delayed. Added to this there is often a vitiated atmosphere, from the crowded population of the neighborhood, and the house itself is likely to be damp and unwholesome; not seldom an utter disregard to cleanliness exists, and an abundance of other causes are not wanting to seriously impair the health of even robust infants. Sir William Jenner (*Med. Times and Gaz.*, May, 1860) says: "For the first two or three days after birth their tender stomachs are deranged by brown sugar and butter, castor-oil and dill-water, gruel and starch-water; as soon as the mother's milk flows they are, when awake, kept constantly at the breast, and well for them if they are not again and again castor-oiled and dill-watered, and even treated with mercurials,—for the poor have learned the omnipotent virtues of gray powder. After the first month, bread and water, sweetened with brown sugar, is given several times a day, and during the night the child is, when not too soundly asleep, constantly at the breast. As soon as the little ill-used creature can sit erect on its mother's arm, it has at parents' meal-time 'a little of what we have,'—meat, potatoes, red herring, fried liver, bacon, pork, and even cheese and beer daily, and cakes, raw fruits, and trash of the most unwholesome quality, as special treats, or as provocatives to eat, when its stomach rejects its ordinary diet. Then, instead of being weaned when from ten to twelve months old, the child is kept at the breast when the milk is worse than useless, to the injury of its mother's health, and to the damage of its after-brothers and sisters, in the hopes that thus keeping it at the breast may retard the next pregnancy. The children are sacrificed that the passions of the parents may not be restrained." After some additional graphic pictures of life among the lower classes, our author

states: "Without doubt, rickets is the most common, the most important, and, in its effects, the most fatal of diseases which exclusively affect children."

The above unquestionably is a truthful account of the disease and its ætiology so far as it applies to England, but is only partially true as regards the United States. Here rickets is an uncommon disease, and even in large cities the mortality records rarely show more than one or two deaths in a year from that cause. There are, very probably, a number of imperfectly developed cases, as "pigeon-breast" is often seen, but even in these cases, so far as my experience goes, the victims are children of English parents. We are then forced to conclude that the exciting causes are not climatic, but consist of the manner of nursing and rearing children which is peculiar to certain countries.

Symptomatology.—The symptoms of rickets must be studied as presented in at least three stages of development. The prodromal stage differs little from that of many other diseases. In the stage of development we find evident symptoms of affections of the bones. Lastly, there is the stage of distortion of the bones, in which the disease appears fully established.

The disease, as already stated, is essentially confined to the age of infancy, although there are instances of its first appearance occurring as late as puberty, or even later. These latter, however, may be justly viewed with suspicion, the diagnosis being based upon distortion of the bones, and may possibly have been cases of osteo-malacia, which, so far as bone-symptoms are concerned, bears a very close resemblance to rickets.

The usual period at which the prodromal symptoms make their appearance is from birth to the sixth year, some cases being congenitally rachitic. From a study of 346 cases of rickets, M. Guèrin found the greater number had commencement between the 2d and 3d year. His table (Reynolds's *System of Practice*, I., p. 475) is as follows:

Before birth,	3 cases.
In the 1st year,	98 "
In the 2d year,	176 "
In the 3d year,	35 "
In the 4th year,	19 "
In the 5th year,	10 "
In the 6th year,	5 "
	346

This prodromal stage is of varying duration, usually approximating six months, there being very few cases in which the symptoms are so unmistakably diagnostic that there is certainty in the diagnosis. There are three symptoms which, when occurring together or in sequence, are considered pathognomonic. They are profuse perspira-

tion of the head, tendency to kick the bed-clothes off at night, and "general tenderness" of the body. The usual symptoms in this stage are those of "impaired health," particularly innutrition. The abdomen is swollen, quite hard; the bowels are irregular, but generally loose; the stools are dark in color, or sometimes pale, but at all times very offensive, the prevailing odor being putrid; the appetite is variable, but oftener much diminished; the child is dull and languid, drowsy, but does not sleep much; the face becomes pale, sometimes puffy; the muscles are weak and flabby; the veins unusually large; the fontanelle shows no disposition to close; the hair is thin; the eyes lustreless; and the pulse quick and irritable. Various exaggerations of these symptoms may occur, as diarrhœa or dysentery, great emaciation, polyuria, and severe or prominent gastric derangement, but the symptoms so far are characteristic of many infantile diseases, and nothing peculiarly rachitic has yet appeared. Shortly, however, and occasionally even from the beginning, there is a profuse perspiration of the head, more particularly when sleeping; independently of the temperature the sweat will stand in large drops on the head, face, and neck, soaking the pillow. The extremities and abdomen are usually hot and dry, while the head is wet; the veins of the head are large and prominent, and the carotids are often seen beating strongly.

This heat of the extremities leads to another characteristic symptom, viz., an effort on the part of the little sufferer to keep cool by kicking off the bedclothes at night, lying naked, and, if possible, outside of the coverings. This is regardless of the weather. Associated with this symptom, it will be observed that the child is restless, boring the head in the pillow, and on waking is seen to rub the back of the head; it cries when the head is moved or handled in washing. Upon examining the head, it will be found almost destitute of hair on the occiput, and the bones are felt to be very thin when pressure is made upon them, yielding almost like pasteboard. This is usually the first symptom of bone implication.

Last among the characteristic prodromal symptoms is the general painfulness of the body; the least motion or touch is painful, so much so that the child will often cry if a hand is extended toward him. It will lie at full length without making any attempt to move its limbs or to change its position, and will endure considerable pain from long continuance in one position rather than be moved.

As the case progresses to other stages, in which the characteristic rachitic symptoms are prominent, this painfulness may somewhat abate. There is then, usually, considerable emaciation; the muscles are weak and flabby, and when sitting in a chair or on the mother's arm "it falls into a heap;" the back is curved outwards, the head falls backwards, and is sunk between the shoulders; the child has an aged, preoccupied look, and the head assumes a "square" appearance. Sir

W. Jenner, to whose masterly description I am chiefly indebted for this *résumé*, sums up the description in the following case: "A. V., aged three and a half years, a male. His present ailment commenced about four months since, shortly after 'a severe cold on his chest,' with the following symptoms: Heat of skin, especially at night; thirst; loss of appetite; profuse sweating about the head; extreme tenderness of the whole body, so that he could not be touched without crying from the pain it caused him; relaxed bowels, the stools being, to use the mother's own words, 'stinking,' a 'rotteney' smell; a desire to lie exposed at night—again, to use the mother's words, 'even in that bitter cold weather he would never lie covered over; in the previous winter he liked to lie warm;' although he had long run alone, he was soon 'taken off his legs.'

"*Present State.*—Rather thin; muscles very flabby; evident tenderness of head, trunk, and extremities. The muscles seem to partake of the tenderness, and the abdominal muscles are as tender as those of the thighs. Sits in his chair, unwilling to move, from morning to night. Cries if his brothers or sisters approach him. Feverish at night; throws his clothes off; sweats over the head profusely; the perspiration is limited to the head; appetite very small; bowels act once a day, but stools very offensive. Intellect decidedly less acute than that of his brothers and sisters at the same age. Head large, square. He cut all his teeth long before his illness commenced. Spine curved backwards from about the first dorsal vertebra to the sacrum, and forwards from the first to the last cervical vertebræ. Ribs very soft, so that there is great recession of each rib where it joins the costal cartilage at each inspiration. Physical signs of trifling catarrh. Very little enlargement of the ends of the long bones. No enlargement of glands, liver, or spleen."

We have now reached a stage where the bones are manifestly affected, and the characteristic rickety condition is fully developed. As already stated, the bones of the skull are usually among the earliest to become softened. For various reasons, however, it is not until the joints are enlarged that the attention of the parents is directed to the skeleton. The wrists, knees, ankles, elbows, in short all the articular extremities are enlarged; the ribs are flattened, or, rather, the chest, so that the antero-posterior diameter of the chest is increased as the lateral diameter is diminished. This pushes out the sternum, upwards and forwards, constituting that prominence of the chest known as "pigeon-breast." The natural curvature of the long bones is exaggerated so that the femur is extravagantly bowed forward and outward; the tibia is bowed in the same direction; the bones of the upper extremity, likewise, are bent. If the child has walked before the bones commenced to soften, there is a change in the angle of the neck of the femur, the shaft being pushed upwards, and the neck directed more

or less downwards. The scapulæ and collar-bones are also bent, as is every bone in the body, to a degree dependent upon its function and the weight exerted upon it in walking, sitting, or lying. The spine presents examples of curvature, sometimes to a degree that might lead to a diagnosis of Pott's disease. The cervical spine is usually bent forwards, exaggerating the normal curve, so that the head is thrown backwards, the face looking upwards; the dorsal and lumbar spines are oftener curved in an exaggeration of the normal, there being more or less lateral curvature, depending for direction on circumstances; thus, when the child is mostly carried on the left arm the curvature is to the left, and *vice versa*. In some instances the whole column, from the atlas to the sacrum, is curved backwards. The softness of the bones, and the facility with which they are bent, varies very greatly; in some cases light pressure, or even the weight of the leg hanging over the chair, will produce considerable curvature; while in other cases it will require long-continued application of force to produce any noticeable change. Of course, this facility of bending will be proportionate to the development of the case and the intensity of the morbid action. In this country, I think, judging from the frequency with which we see cases of pigeon-breast, consolidated spinal curvatures without history of caries, and bowed-legs, there are quite a number of cases of rickets of a minor degree of development, perhaps unrecognized at the time, while the more severe forms are rare. The distortion of the long bones, together with the softness, operating to discourage or prevent walking, the deformity of the chest interfering with respiration and free action of the heart, and the pelvic distortion necessarily producing some irritation of the contained viscera, together with the general derangement of the functions of life, gives rise to many symptoms, and to peculiar danger to life from partly mechanical causes. If recovery is secured, there is more or less deformity remaining, which has the effect to more or less seriously imperil health or life, as, for instance, the danger attending childbirth when there is distortion of the pelvis. Sir W. Jenner thus describes the interference with respiration: "It is strange to see a little child sitting placidly on the bed, without moving, for hours together, its legs placed so as to escape pressure, its spine bowed, its head thrown backward, the chief weight of its body cast on its arms; and to know that, notwithstanding the apparent calm, the tiny thing is indeed fighting the battle of life; for it is striving with all the energy it has to keep in constant action every one of its muscles of inspiration; endeavoring so to supply the mechanical defects of its respiratory apparatus, due to the softening of the ribs. It wants no toys. It is the best of children if you only leave it alone; move it, and you inflict pain on its tender frame; show it the horse or the doll that was once its delight, and it turns away its head or stares vacantly; to notice would divert

its attention too much from the performance of those respiratory movements which are essential to its existence."

The condition of the bowels has already been noticed; the urine is loaded with the lime salts, and all the excreta show great waste and loss of the earthy constituents of the bones. It appears, from the observations of some pathologists, that the greater part of the loss in earthy constituents is by the bowels; the dejecta constantly show an increasing amount of inorganic elements during the development of the disease, while the urinary indications become negative when the disease is well advanced.

The viscera do not escape structural lesion, particularly the liver and spleen. They become enlarged, chiefly by albuminoid infiltration or degeneration, but in the case of the spleen there is no increase in white blood-corpuscles, nor any evidence of serious alteration in the blood. The lymphatics, particularly the mesenteric glands and those in the groin, are enlarged somewhat, not remarkably, and are very hard. The head is unusually large, the sutures prominent, the forehead seems prominent from the arrest of development in the bones of the face, and the under jaw seems longer or more prominent than usual. The development of the teeth is tardy, so much so that the premonitory symptoms may be, and have been, ascribed to "teething." In fact, Jenner deems this a most important symptom of rickets, and counsels a careful study of the case when the teeth are slow in appearing.

Many of our text-books speak of "precocity," intellectual, being characteristic in rickets. Jenner does not consider this to be true, and my experience fully agrees with his. The mistake has grown out of the fact that rickety children, being debarred from playing with those of their own age, and thus spending much of their time with adults, instinctively "pick up" expressions and actions which they are constantly observing, thus giving rise to the belief that they are "unusually bright." As Jenner says, speaking of the mother's estimate of the child: "she is apt to believe her child is very clever—quite a prodigy—when it is only a few degrees removed from an idiot."

This is the history and semeiology of a case of rachitis up to the stage of full development. The further history of the case must be studied with reference to the mode of termination, which is in death or recovery. In this country probably a large majority of the cases recover, always with more or less deformity, the functions of life being more or less imperfectly performed, depending upon the extent and location of the deformity. Extreme deformity of the chest will interfere proportionately with the action of the heart and lungs. Curvature of the spine, by the disarrangement of organs, may interfere with many vital functions, more particularly respiration and digestion; distortion of the pelvis will expose women to extreme peril in child-

birth, but may be of insignificant trouble to men. In all cases, however, except in the last, the organs and parts involved accommodate themselves more or less to the altered arrangement, and the discomfort and disability is much less than would seem possible.

The indications of improvement are obvious; the muscles become firmer, the bowels are more natural, the urine becomes normal, the sweating of the head and the tenderness of the body pass away, the appetite improves, and sleep is natural. In short, the child gets well, and its future history will depend upon the degree and kind of osseous deformity.

When death ensues, I am unable to learn that it is altogether, in a sense, due to the rickets; that the rachitic condition is responsible for such concomitant or secondary affections as may destroy life. Thus, there may be a bronchial catarrh which produces bronchiectasis; the diarrhœa may become choleraic or dysenteric; there may be hydrocephalus or hydropericarditis; or the mechanical interference with respiration may be sufficient to destroy life. In some instances the rachitic cachexia may be responsible for a fatal termination; but in the vast majority of cases death comes from some intercurrent malady, of course directly related to the rickets.

It would seem as though the semeiology of rickets were sufficiently unique to prevent all danger of a mistaken diagnosis, but as a matter of fact, even after the osseous conditions are marked, there is a very close resemblance to other diseases. To be sure, the occurrence of the disease in childhood should exclude some quite similar conditions, but the sources of error, nevertheless, are many. Some cardinal symptoms of rickets are radically different from any other disease; the chief of these, in the prodromal stage, have been given as sweating of the head, general bodily tenderness, and desire to remain uncovered at night. In the later stage the fact that the bone changes are *general*, affecting the whole skeleton, and not a single bone or group of bones, should be almost a certain symptom. Above all, the fact that the disease is one of infancy, constitutes a highly important consideration. Osteitis, scrofulosis, tuberculosis, carcinoma, and possibly osteo-malacia *might* be mistaken for rickets. The last is a disease appearing, for the most part, if not entirely, after puberty; it should be excluded, for notwithstanding some writers speak of it as "adult rachitis," it is a fatty degeneration of the bones, something vastly different, pathologically, from rickets. As to the other diseases mentioned, they will be found to resemble rickets only superficially, not at all in fact, after the bones become affected. It must be remembered, however, that tuberculosis has occurred in connection with rickets, so that, superadding these symptoms to the pathognomonic signs of rickets, such an occurrence should not confuse the diagnosis.

In this country, however, where there are unquestionably many

cases of rickets which never pass beyond the initiatory stage, there may occasionally arise a doubt as to the true condition. A conclusion may be reached by an inability to find positive symptoms pointing in some other direction. For instance, we have no enlargement of the spleen or liver, no local development of carcinoma, no history of syphilis, no trace of tubercles, and yet the general appearance might resemble any of these cachexiæ. On the other hand, we have sweating of the head, bodily tenderness, intolerance of covering at night, slow eruption of the teeth, and the age of the patient, to say nothing of an absence of any history of heredity as favoring a condition other than rachitis. In fact, even with a history of syphilis in the parents, one or both, the absence of any of the definite symptoms of that dyscrasia (unless rickets itself be a symptom), and the positive character of the few symptoms which are prominent, there should be little difficulty in reaching a conclusion.

Pathology.—The fact is prominent, whether viewed clinically or theoretically, that rickets represents a condition eminently "constitutional," general in character, and arising from causes operating entirely within the organism. It is not a disease of the bones, nor of any single anatomical system, but leads to, or culminates in, osseous disease. In the broadest sense it is a disease of mal-assimilation, a term objectionable chiefly on account of its indefiniteness, not indicating any particular lesion. For reasons not yet understood (and which, perhaps, owing to the nature of things, may never be fully comprehended), the blood which should convey inorganic elements to the bones abstracts it from them; the earthy salts are found in the blood, they are provided in the food, and yet they are not deposited where they belong; nay, more elements of this character as have found their way to the bones before the establishment of the disease, are taken out by the blood, and appear in the excreta in large quantities.

Upon examination of the viscera, *post-mortem*, we find nothing characteristic, no hypertrophy, no degeneration which is pathognomonic of rickets. The liver and spleen may be amyloid, it is true, but this is not uncommon in other affections. There may be lesions of the lungs, kidneys, heart, brain, or gastro-intestinal tract sufficient in kind and extent to account for death; yet these lesions represent intercurrent or collateral conditions, conditions for which the rickets must be considered responsible, and which at the same time are neither characteristic nor inseparable.

In the bones we find the first pathognomonic lesions; yet, extensive as they are in character, they cannot be considered the cause of death, or even as representing the sum total of the disease. The bone changes are simply the final results of the rachitic disease. The appearances met with here are of two kinds, *macroscopic* and *microscopic*.

Under the first head it will be observed that all the bones are softened; the flat bones are thickened, and the long bones distorted or bent. The bending of the long bones is due entirely to mechanical causes, such as bearing the weight of the body in sitting, standing, or lying; at the same time it must not be forgotten that muscular action may be an important element. The heads of the long bones are enormously enlarged, partly from the pressure brought to bear upon them, and partly from the same conditions causing swelling of the bones in general. The shafts of the bones are shorter than normal, partly from pressure, but largely from an arrest of growth or development. It will also be observed that the parts associated with the bones, muscles, vessels, and nerves, are likewise arrested in growth, if not positively atrophied. The enlargement of bone, in short, is confined to the spongy portions. The enormous extent of this enlargement is shown in a table given by Jenner, quoted by Atkin (Reynolds's *System of Practice*, I., p. 488.

Disease.	Age.	Height.	Length of Forearm.	Circum. of wrist.
Rickets, ...	4 yrs.	30 in.	$4\frac{1}{2}$ in.	$4\frac{3}{8}$ in.
"	3 yrs. 2 m.	30 in.	$4\frac{1}{2}$ in.	$4\frac{1}{2}$ in.
Tuberculosis, ...	3 yrs.	35 in.	5 in.	$3\frac{3}{8}$ in.

I condense the following from the same article, which is a compilation of the views of Kolliker, Rokitansky, Virchow, and Jenner:

The prevailing anatomical peculiarity of the bones may be stated as a sort of rarefaction, an enlargement of the cellular spaces, with multiplication of the lacuni and canaliculi. Joined to this porosity is an immaturity in development, a cartilaginous character, with deposits of calcareous matter here and there, enough to give the whole mass a gritty feeling on section, but not sufficient to give the density and hardness of bone. Kolliker, whose views are endorsed by both Virchow and Rokitansky, shows that "the abnormity of the ossification in rickets consists not in a process of softening of the old bone, but in the non-solidification of the fresh layers of bone as they form, and that we see the process of growth better in rickety than in normal bones, because in the rickety bones the view is not obscured by the deposit of calcareous granules. The old layers of bones are consumed by the normally progressive formation of medullary cavities; and the new layers remaining soft, the bone becomes brittle. There is also a certain irregularity in the growth of the bone, so that stages in the development of bone which, when the formation is normal, ought to set in late, set in at a very early period in rickets. In normal growth, for example, the pointed processes (in which shape the calcareous

salts shoot up into the cartilages) form, along the margin of calcification, such a completely straight line that it should almost be described as mathematically regular. In rickets, on the contrary, this is very irregular, and there is no proper and continuous line of demarcation. As Aitkin says: "The further the process advances, the more do we meet with isolated masses of lime scattered in the cartilage; in many instances to such a degree that the whole of the cartilage on section appears dotted with white points. The irregularity of the process is further shown in this, that whilst in the normal course of things the medullary spaces should begin to form only at a short distance behind the margin of calcification, they exceed these limits in rickets, and in many cases a series of connected cavities extend far beyond the border of calcification, which cavities are filled with a soft, slightly fibrous tissue, with vessels running up into them. Medullary spaces and vessels are therefore met with where normally and properly not a single medullary cell, and scarcely a single vessel, ought to have been found. Different histological conditions are thus found side by side, crowded into a small space; at one point, cartilage, at another calcification, at a third, bone or medullary tissue, and everything lying in the greatest confusion; in one place medullary tissue, above it asteroid tissue or bone, by its side calcified cartilage, and below it, perhaps, cartilage still retaining its normal condition."

This an accurate account of the morbid anatomy, sufficiently so for the present purpose at least, the only points in dispute relating to the character of the substances found in the spaces; some assert a semi-fluid oily mass, others a rose-colored, jelly-like matter, and others the "fibrous substance" described above. These differences are of minor importance, and are justly held to represent the observations made by different men on specimens of varying development. The conclusion must be reached by all that there are no heterologous elements in the sense which applies to carcinoma or other deep-seated dyscrasia; the picture represents a state of disordered development; in other words, markedly one of innutrition,—mal-assimilation. That visceral lesions of a pronounced character are not oftener met with is readily explained, the peculiar waste or misappropriation being of the inorganic elements of bone.

Prognosis.—Rachitis seems to have a peculiar significance in Europe, more particularly in England, as compared with the ordinary form of the disease seen in this country, it being much more fatal, and of much commoner occurrence. In the United States the disease is of a milder type, rarely threatening the life of the patient; it is chiefly of interest and moment as it interferes with the common functions of life, the particular deficiency being dependent upon the bones chiefly affected. Thus, when the deformity of the chest is marked, there is corresponding interference with respiration and, perhaps, the action of

the heart. When the pelvic bones of female children are distorted, child-bearing, later in life, will be accompanied by unusual peril, both to the mother and child. Curvatures of the spine may derange the function of the viscera implicated, or, when extreme, may even induce such lesions in the cord that innervation will be seriously disturbed. Extreme deformity of the lower extremities may interfere materially with locomotion, and prevent the pursuit of certain kinds of business. The bones of the upper extremities may be so distorted that the choice of an avocation may be much restricted thereby. Hence the question of pressing character in rachitis in this country is not as to the recovery of the patient, but as to the resulting disability, both of degree and kind.

Treatment has much to do with determining this, provided a case is seen during its active stage; when recovery has fairly commenced, it is questionable if much can be done to lessen the deformity. The question of prognosis, as the disease appears in this country, may be summarized as follows: As to life, good; as to deformity, depending upon the stage of the disease when treatment is commenced, and the portion of the skeleton chiefly affected. That is, extreme pelvic deformity is usually irremediable from the inaccessibility of the bones, with reference to the fitting and wearing proper apparatus.

Treatment.—The two prominent indications in the treatment of rickets are to improve the appetite and to correct the mal-assimilation. Inducing the child to eat by moral suasion, or otherwise, in spite of its repugnance to food, will do no good; on the contrary, it will do harm. To feed it crude lime in order to supply the want of lime in the bones will fail in its object, and will only add to the activity of the morbid process. The only rational method of meeting these indications is by the use of the proper medicine to correct the gastric abnormality, which will usually be found to meet the second indication as well. I think there is a disposition in the profession to be too strenuous in the matter of diet; that is, theories are formed as to the best kind of food, particularly with reference to the lime-salts contained, and all patients are required to use it, regardless of the distaste many may have for it. I am of the opinion that it is not the lack of lime in the food, but the inability to appropriate it, which is responsible for the condition of the bones. Adding more lime, either as food or medicine, in appreciable doses, can have no other than an injurious influence. Lime given on proper homœopathic indications, and in the form in which such remedies are usually given, will act very differently than when given in larger quantities and in a crude form. It is not at all necessary to argue this point; it is a fact well established, and perfectly familiar to all practitioners of homœopathy. The food, of course, should be selected with attention to its palatableness and nutritive qualities, each of which conditions is largely determined by

the patient. As a general rule, that which is disagreeable to the patient is hurtful; and, *per contra*, that which they crave, and from the eating of which they derive satisfaction, is beneficial. So true is this that it is not uncommon to find the most apparently innutritious substances eaten with avidity and benefit by those suffering from chronic maladies. Accordingly, when a rachitic child exhibits a craving desire for certain articles, perhaps not always properly foods, it must be a matter of great care that they are not injudiciously forbidden. On the contrary, an intelligent inquiry into this morbid desire may lead to very important therapeutic hints. It is manifest, therefore, that the treatment of rickets must be entirely medicinal, without attention to what is sometimes falsely called "physiological feeding," beyond what an observance of the natural appetite would suggest.

The remedies which are oftener indicated are few in number; in the very large majority of cases one, Calcarea carbonica, will cover the case perfectly. The remedies of first importance are: Calcarea carbonica, Asa fœtida, Natrum muriat., Baryta carb., Silicea. The more prominent indications are as follows:

Calcarea carb.—The semeiology of rickets and the pathogenesis of this remedy are so similar that it must, and does, take the first rank. According to Lilienthal (*Therap.*) the symptoms are: "Skull soft and thin, crackling noise like paper, when pressed; delayed closure, or reopening of the fontanelles; head totters, cannot hold the head up; sallow, earthy face, full of pimples; retarded dentition, with cold tremors and emaciation; condyles are swollen on forearms and lower limbs; flabby, shrunken, emaciated children." Add to this the well-known sweating of the head, and the desire to uncover at night, and we have an almost perfect picture of the disease. In fact, I feel positive that many cases of rickets are cured in a very early stage, unrecognized, by this remedy, in homœopathic practice.

Asa fœtida.—Painfulness of the bones; fine, stitching pains, either relieved by touching the parts, or transformed into other kinds of pain; dread of touch, from painfulness of the body; even the approach of a finger causes shrinking. The bones are swollen, soft, and distorted. The relation of this remedy to syphilis and mercurial disease adds to its value in this connection.

Natrum muriaticum.—The body is dry and parched; whilst emaciation is general and extreme, the thighs are particularly thin.

Baryta carb.—Imperfect development; dwarfish children, mentally as well as physically; glands indurated and swollen, do not suppurate, but have a tendency to calcareous concretions; abdomen hard and distended.

Silicea.—Here, as elsewhere in bone-affections, this remedy is of the greatest value; there are few cases of rickets which do not call for *Silicea* at some stage of the treatment. I have observed, however, that when it is given for some time, and this regardless of the potency, there will appear a distressing gnawing pain in the stomach which is relieved by eating. I have hitherto failed in relieving this by a simple discontinuance of the remedy; *Nux vom.* has oftener removed it than any other remedy, but not always. The appearance of this symptom must be the signal to abandon the remedy entirely. Its duration is uncertain, but rarely exceeds a fortnight. The symptoms calling for *Silicea* are similar to those of *Calcarea carbonica*, with the following exceptions: the body is much emaciated, but not soft and flabby; it is "scrawny," skin somewhat indurated, with tendency to boils.

Other remedies, such as *Fluoric acid*, *Belladonna*, *Phosphorus*, *Chamomilla*, *Pulsatilla*, *Rheum*, and others particularly useful in diseases of children, will be needed intercurrently, but the pathognomonic symptoms are more frequently met by one of the preceding.

When improvement commences, the first sign will usually be a return of appetite, then the diarrhœa will gradually disappear, the complexion will clear up, the muscles become firmer, the perspiration cease, the tenderness of the body diminish, and the sleep will be natural and quiet, without that desire to uncover which had previously existed. With the commencement of this change attention must be paid to the bones, and some attempt made to correct such deformity as already exists and to prevent any increase. During the active stage of the disease the patient can only rest or breathe in certain positions, and, notwithstanding the consequent bending of the bones, it is impossible to prevent it. When convalescence begins, the long bones, which are notably bent, may be gradually straightened by the application of the hands, and care must be taken to avoid such pressure or weight on them as will reproduce the deformity. This straightening process must be very gradual, and should cease when the bones have acquired some degree of solidity. As to the bones of the skull, pelvis, and chest, the most that can be done is to enjoin frequent change of position, and to avoid lying or sitting, for any length of time, in a posture which has a tendency to increase any existing deformity.

SCROFULOSIS.

BY J. G. GILCHRIST, M.D.

Scrofula, by which term is usually expressed the condition under consideration, is a term derived from *scrofa*, "a sow," because, as Dunglison (*Medical Dictionary*) says: "Swine were supposed to be subject to a similar complaint." The disease has been recognized in all ages, and is spoken of in ancient and modern books as *struma*, *tabes glandularis*, *adenitis scrofulosis*, *king's evil*, *the evil*, and many other vulgar localisms. As "king's evil" it has had a peculiar history, it being a popular belief, at one time, that the touch of a royal hand would cure the sufferer. While all nations of Europe, in the last century, had more or less belief in this superstition, in France and England it seemed to have taken the deepest root. In fact, in the English Book of Common Prayer there was formerly an office for the ceremony of the "touch," and as late as the time of Queen Anne scrofulous persons were brought to the sovereign to be healed. After the death of this monarch the tory and high-church parties doubted the royal claims of the Hanoverians, and the practice gradually fell into disuse. Louis XIV. of France was the last French monarch to "touch for the evil," the disorders succeeding his tragic death having robbed royalty of much of its ancient consequence. Notwithstanding the fact that even the earliest authors refer to scrofulosis as a common disease, there are few morbid conditions to-day which are so little

understood. Some of the reasons for this lack of knowledge will appear as we proceed in the discussion of the subject, but the chief difficulty seems to be insurmountable, as a perfect explanation can only be found when we are able to explain and understand *life* itself. What life really *is*, constitutes a question which is no nearer solution to-day than it was in the very morning of time; it is only the *manifestations* of life that are observed; its essence would seem, in the very nature of things, to be undiscoverable.

Scrofula is a disease which represents a diathesis of uncertain pathological character, so much so that it is exceedingly questionable if it long retains a place in the nosological list. Rickets, constitutional syphilis, anæmia, chlorosis, and leucocythæmia, as well as chronic adenitis and other forms of glandular and lymphatic morbid action, were formerly considered to be "scrofula." One by one they have been found something with certain and definite pathological characters, and so we may confidently expect that in time the term will become restricted to represent a distinct form of morbid action, with an anatomical basis. At present, an individual who is of delicate health, particularly with a proneness to chronic suppurative action, is said to be "scrofulous;" in other words, we do not know what is the matter. Mr. Frederick Treves (*Scrofula*, p. 40) gives the following somewhat lengthy definition, which I have adopted as the best yet made: "I would define scrofula as a tendency in the individual to inflammations of a peculiar type, the distinctive features of such inflammations being as follows: They are usually chronic, apt to be induced by very slight irritation, and to persist after the irritation that has induced them has disappeared. The exudations in these processes are remarkable for their cellular character and for the large size of some of these elements. Such exudations also show a remarkable tendency to resist absorption and to linger in the tissues, the affected area becoming rapidly non-vascular. Among the common products of these inflammations are giant-cells and, if a certain stage of the process be reached, tubercles. The tendency of the process is to degenerate, not to organize, and the degeneration usually takes the form of caseation. At the same time these inflammations have a tendency to extend locally and infect adjacent parts, and their products present certain peculiar properties when inoculated upon animals. Lastly, a great feature in all these processes is this: they tend to commence in and to most persistently involve lymphatic tissue; an implication of this tissue being a most conspicuous feature in every case of scrofulous disease."

Were I to add to this definition anything of my own, it would be to point out a pathognomonic feature in the inflammation which our author has not emphasized sufficiently. Thus, inflammation normally, particularly when traumatic, tends towards resolution; suppuration, gangrene, and ulceration may be justly considered accidental

terminations, to a considerable extent of mechanical origin. Any products which may remain after active inflammation has ceased, will normally be removed. Now, a failure to remove these products argues a vital insufficiency, and this it is which constitutes scrofula. Summing up the whole matter, scrofulosis is another name for tuberculosis, in the true sense of the word; not necessarily an incipient phthisis, although that may justly represent a legitimate termination of scrofula or tuberculosis.

Semeiology.—The symptoms commonly recognized as scrofulous are chiefly those of "delicacy of health," proneness to glandular enlargements, and purulent discharges; in the order of succession, as usually observed, the skin is affected earliest, with some form of eruption; next, the glands become involved; succeeding this there may be bone diseases and, finally, pulmonary tuberculosis. Esteeming the so-called disease to represent incipient tuberculosis, it is only necessary to give at this place the symptoms of general impairment or delicacy of health, referring for the later manifestations to the articles on tuberculosis, phthisis, rickets, hip-disease, caries of the spine, congenital syphilis, basilar meningitis (tubercular), and other diseases having a tubercular basis. Miller (*Principles of Surgery*, p. 55) gives what has come to be a classical description of the "strumous physiognomy," which I quote at length: "The complexion is fair, and frequently beautiful, as well as the features. The form, though delicate, is often graceful. The skin is thin, of fine texture, and subcutaneous blue veins are numerous, shining through the otherwise pearly-white integument. The pupils are usually spacious, and the eyeballs are not only large but prominent, the sclerotic showing a lustrous whiteness. The eyelashes are long and graceful, unless *ophthalmia tarsi* exist, as not unfrequently is the case; then the eyelashes are wanting, and their place is occupied by the swollen, red, unseemly margin of the lid.

"In the phlegmatic form the complexion is dark, the features disagreeable, the countenance and aspect altogether forbidding, the joints large, the general frame stunted in growth, or otherwise deformed from its fair proportions. The skin is thick and sallow; the eyes are dull, though usually both large and prominent; the general expression is heavy and listless, yet not unfrequently the intellectual powers are remarkably acute, as well as capable of much and sustained exertion. The upper lip is usually tumid, so are the *columnæ* and *alæ* of the nose, and the general character of the face is flabby; the belly inclines to protuberance; and the extremities of the fingers are flatly clubbed, instead of presenting the ordinary tapering form."

Scarcely sufficient stress is placed upon the thick and swollen upper lip, as this is one of the commonest and most characteristic features in the scrofulous individual; it is quite conclusive evidence of a pre-

disposition to scrofula, even with an absence of any of the other usual signs. The symptoms above given, however, indicate a predisposition to scrofulosis rather than its actual establishment, it not being an uncommon occurrence that sound health is finally attained under good regimen and treatment, so that all these ominous signs disappear.

The "scrofulous subject" was formerly classified as "torpid," represented by the phlegmatic form of Miller, and the "erethic." While cases are occasionally seen which can at once be placed in one or the other category, the greater number do not admit of such arbitrary classification, the characters being more or less mixed. My own experience inclines me to the opinion that the erethic characters predominate in most cases, and yet the classification is of so little value, not only clinically, but for almost every other purpose, that few, if any, now pay attention to it. As instancing a predisposition to scrofulosis it may be important to emphasize the fact that the individual is not always a blonde; when the disease becomes established, glandular affections having developed, the particular class to which an individual belongs is a matter of no moment.

In the majority of instances symptoms of scrofulosis appear in infancy, and usually the skin is first affected. There are various eruptions, chiefly on the head and about the nates and genitals, which some observers have thought to be pathognomonic of the disease. As a matter of fact it would seem there is little, if anything, in the eruption itself to distinguish it from a similar one in a non-strumous subject. That the individual is scrofulous is sufficient to stamp the exanthema as likewise strumous. Whilst all forms of skin diseases are observed, perhaps the various forms of eczema are most common. The eruption is tardy in development, runs a slow chronic course, is very intractable, and is prone to cause troublesome ulceration of the skin.

The mucous membranes become affected early in most instances, as is shown in the catarrhal affections of the nose and vagina, the secretions having little of the purulent character, and exhibiting a tendency to become inspissated, forming crusts or scabs. The ear, particularly the external meatus, is especially liable to take on a chronic inflammation, with more or less abundant discharge, rather watery in character, and causing excoriation of the skin in the neighborhood. The inflammation not seldom extends to the middle and internal ear (or, as probably oftener occurs, extends outwards from the internal ear), perforating the drum-head, placing the patient in imminent danger of meningeal complications; or it may affect the brain, or induce embolism of vessels, or thrombosis of the cavernous sinuses. In chronic cases, I am very certain that I have seen the inflammation commence external to the drum-head; in acute cases there is no doubt that the morbid action oftener commences in the middle ear. It is astonishing

with what rapidity the process runs its course in acute attacks; a sudden earache, and in the course of a few hours, or a single night, a profuse purulent discharge, showing the giving way of the drum-head. If the discharge ceases in a short time, and hearing is unimpaired, there will probably be no further trouble for the time. Should, however, the attacks be frequently repeated, or the discharge persist beyond a day or two, or become offensive, or hearing be notably impaired, the case must at once be sent to a competent aurist, or the most serious mischief may result. Much injury results from the neglect to employ the services of those skilled in these disorders, a habit which is far too common among general practitioners.

The glands, particularly those of the neck, are usually involved early, frequently constituting the first symptoms of an actual commencement of struma. The chief distinguishing feature of the strumous glandular swelling is that the increase in size is slow, painless, non-inflammatory, usually more than one gland is affected in the region, and suppuration of an unhealthy character is common. Even when suppuration has been fairly inaugurated the pain is but little, if any, increased, and the pus forms very slowly. When the gland is incised early, there is very little pus; quite often, unless treatment is conducted with a view to keeping it open, the incision heals before there is much progress made in producing pus. In fact, the whole process is eminently chronic and painless. Pus is thin, curdy, sometimes ill-smelling, irritating to near parts; there is little, if any, subsidence in the swelling, even when the discharge is free and abundant. At other times the pus is thick, copious, and bland, inodorous; again, there is a tendency to caseation, or to the formation of calcareous concretions. In short, the variations in pus from the normal standard are of all possible degrees.

The liver, spleen, kidneys, and other organs, are frequently attacked by some destructive process, the prevailing chronic type being preserved through all. Lastly, the bones, particularly those of the hip and knee joints, become affected, caries being the commoner form of the morbid action. The morbid action becoming operative in the lungs, which is apparently the common tendency, the patient soon succumbs. In all these active forms of the disease, if such it can be called, the tuberculous character is marked; whether it be spinal caries, hip-disease, caries of the knee, glandular swelling and suppuration, basilar meningitis, tabes mesenterica, various kidney affections, or pulmonary disease, tuberculosis will be found at the bottom of it. The natural history of scrofulosis, therefore, bears almost unmistakable evidence that it can only be considered as incipient tuberculosis.

One of the commoner results of affections of the skin and of the superficial glandular system is the formation of ulcers, usually of the

"weak" variety, yet at times phagedenic. The ulcer usually extends rapidly, for a time, both in depth and superficially; then it remains either stationary for an indefinite period or else partly closes, and then breaks down again. The ulcers are of large size, have ragged edges, dark areola, with the base rough and "worm-eaten," and undermining the margin. In other cases the base is smooth or covered with large, flabby granulations. The discharge is usually profuse, dark-colored, and foul-smelling; there is little if any pain, and no induration. The induration of syphilitic ulcers is at the base of carcinomatous ulcers in the margins, facts which should render a diagnosis quite easy, as there is no induration in the scrofulous sore.

Scars, whether from abscess of the glands or from ulcers, are always quite disfiguring; they are rough, knotted, or depressed, and either much whiter than the surrounding skin, or dark-brown or purplish. The new integument is thin, tender, and readily excoriated for a long time; scales form, which, if pulled off before completely exfoliated, leave small excoriations which often extend until the ulcer is reproduced. When cicatrization has become firm, the scar is always unsightly, being depressed and irregular, but does not seem to be painful or to give rise to any discomfort whatever. The peculiar character of the scar is familiar to all, and even to laymen the presence of such scars in the neck at once pronounces a scrofulous tendency.

These are the common characters of scrofulosis, the process having a tendency to become localized in one tissue or another, or in one organ or another. Such localization having occurred, the affection finds a place in the catalogue of diseases, "scrofula" being credited with the causation. It will remain impossible for a long time, perhaps always, for any diagnostician to foretell what form of morbid action will be developed when scrofulosis exists; this will necessitate the retention of the word, although with a common understanding that it simply means the prodromal stage of some distinct form of morbid action.

Ætiology.—The causes of this affection necessarily constitute a subject which calls for extensive study; yet even those who have written exhaustive treatises have failed in the endeavor to show a single class of causes directly responsible for the existence of scrofulosis. In general terms all cases arise as secondary upon some debilitating condition; but while one finds this condition in syphilis, another finds it in phthisis, another in carcinoma, and still another in some form of acute disease, as small-pox; and the conviction is soon reached by the student that the causes are almost as many and diverse as are cases of fully developed diseases. In the outset it is essential to divide scrofula into two forms, the *hereditary* or *congenital* and the *acquired*.

Heredity has unquestionably an immense influence in developing scrofulosis. Anything which prevents the nutrition or development

of offspring must be provocative of feeble children. Thus syphilis, phthisis, carcinoma, inebriety, or scrofulosis itself in one parent will probably entail an enfeebled constitution on the offspring; should both parents be affected, the presumption almost amounts to a certainty. Any attempt to fasten the responsibility upon a single morbid action must fail, as testimony is abundant that it is adynamia in general rather than any particular dyscrasia which is the prime cause. It might reasonably be supposed that inasmuch as tuberculosis is a basis of scrofula, the existence of tuberculous disease in one or both of the parents would insure the appearance of the disease in children. Even in this case, however, such statistics as are extant go to show that it is a predisposition to tuberculosis rather than any active morbific principle which is impressed on the child.

It is not only by virtue of being victims of disease that parents produce weak and scrofulously disposed offspring. There are other considerations, climatic, social, and moral.

Consanguineous marriages have long been held to be the cause of scrofula in children born of such marriages; yet investigation does not sustain this belief. The fact that the parents are in delicate health has more to do with the existence of scrofulosis in the children than has their relationship. Family predisposition would have much to do in determining the propriety of such marriages, for as Hartshorne (Reynolds's *Syst. of Med.*, i., 508) says: "At least it is true that such a taint is aggravated, and is more likely to be manifested in those who issue from parents of the same stock."

Climate has an unquestioned effect upon the production of tuberculosis, but whether it is an effect of climate alone, or of different habits of life enforced by the climate, is a question still undecided. We know that tubercular troubles are more common in northern than in southern lands, and among the upper classes of society. The confinement to the house necessitated by a cold climate, together with defective drainage and ventilation, is undoubtedly often a cause of scrofulosis. Sudden changes of climate, more particularly from a warmer to a colder, has a marked effect; thus, tuberculous diseases are very common among negroes who emigrate from southern to northern states. So also with animals in menageries; monkeys are notably predisposed to tuberculosis, and lions, and other animals, who, so far as known, rarely suffer from disease in a wild state, when held in captivity quite frequently die of phthisis or of some less acute form of tuberculous disease.

Dampness of locality, whether in the habitation or location generally, is universally recognized as causative of scrofulosis. Statistical reports are not wanting, in fact they exist in abundance, going to show that the nearer the sea-level the greater the prevalence of tuberculosis.

Poverty fulfills nearly all the ætiological conditions; thus, there is adynamia or its equivalent in the parents; damp and unwholesome tenements, insufficiency of food, and deficiency in clothing and artificial warmth, joined to the fatigue of manual labor and the temptations everywhere abounding to seek release from unpleasant home surroundings in dissipation of the most coarse and degrading character.

All these varied conditions of causation may be considered predisposing. Careful reading of even the brief account given must lead to the conviction that they are identical with the predisposing causes of phthisis and other forms of tuberculosis. It may be unnecessary to add anything bearing upon the relationship which scrofulosis sustains to tuberculosis; but inasmuch as the little work of Mr. Treves (*loc. cit.*) is among the latest and certainly the most original contributions, a quotation, (page 64) will not be amiss: "*phthisis* in the parents is an extremely common cause of scrofula in children. Lugol asserts that more than one-half of all scrofulous patients have had phthisical progenitors. Out of 141 cases of scrofula investigated by Balman, in 9 instances the father had died of phthisis, and in 11 the mother; while among the near or distant relations of these scrofulous patients 67 deaths from phthisis had occurred on the mother's side, and 89 on the father's side. I made a detailed investigation into the family history of 65 scrofulous patients—having especial reference to this matter of phthisis—with the following results: In 27 of these cases I could find no trace of phthisis among any members of the patients' family, either near or distant. In 13 instances the father had been phthisical, and in 6 instances the mother. In the remaining 19 cases both father and mother were free from phthisis, but in 9 of these instances deaths had occurred from phthisis among the mother's relations, and 10 among the father's relations." From these statistics Mr. Treves concludes that the occurrence of ill-health in the father is more liable to entail disease in the children than ill-health in the mother; cases are given to show that the paternal transmission results in more severe forms of disease than when coming through the mother. On the other hand, when one of the parents of a scrofulous child has also scrofulosis, the mother seems to be at fault oftener than the father. There are numerous instances of scrofulous parentage causing phthisis in the offspring; this fact is simply noted to confirm the statement of relationship.

So much for the question of heredity. We have next to inquire if scrofulosis may be acquired by those born without predisposition to tubercular affections. The answer must be carefully considered. We remember that the inheritance is rarely in a developed disease, but rather a predisposition to it, a state of "delicate health." Accepting this as a fact, children may pass through life and attain maturity

without visible impairment of health, perhaps from lack of opportunity or excitement, to the inauguration of tubercle, and yet their family history will show the essentials of that state. Some accidental occurrence, an acute fever, a severe injury, a reverse of fortune, or a change of climate may then light up what has hitherto been a concealed predisposition, and the case is spoken of as one of "acquired scrofula." In this sense the disease may certainly be acquired; in any other sense it is more than doubtful. The impairment of health succeeding any of these accidental occurrences may be of a character to impress future offspring with a predisposition to scrofula; but esteeming scrofula to be an early stage of tuberculosis, we cannot call spinal caries, acute adenitis, lymphangitis, pulmonary tuberculosis, hip disease, or "white swelling" scrofulous, inasmuch as they are fully developed diseases, and have a definite anatomical and pathological character which at once stamps them with an individuality of their own.

Using the term in this sense, the occurrence of acquired scrofulosis is noteworthy as being caused by what would seem very inadequate accidents. For instance, an ordinary "cold" develops glandular swellings which do not subside with accustomed promptness, but persist and become scrofulous; a misstep, which occurred hundreds of times before and produced no appreciable effect, now develops a destructive morbid action in a bone or in a group of bones; some wrench of the back causes caries of the spine, and so on through a long catalogue. The exciting causes are noteworthy, therefore, on account of their apparent inadequacy. We find an explanation, perhaps, in one of two obvious facts: there is peculiar intolerance of the body, generally arguing defective reparative power, and a peculiarly chronic character to the inflammation so easily lighted up.

The *exciting causes* of acquired scrofulosis are very numerous, including almost every form of acute disease, particularly eruptive fevers and all manner of accidents. Anything, in short, that has a tendency to make a draft on the reparative powers, the individual already being predisposed to scrofula, may be considered causative. There are cases, now and then, in whose history there is no trace of scrofulosis or of tuberculosis, and yet the condition will succeed some severe injury entailing a long confinement or a prolonged and exhausting illness. There is here the essential enfeeblement and loss of reparative power, and the occurrence of struma should not be considered anomalous.

Pathology.—The study of the pathology of scrofulosis really involves a study of tubercle, a subject almost inexhaustible, and yet very unsatisfactory, since the utmost lack of unanimity of opinion concerning their nature is found among those who have studied the subject.

From a study of the ætiology of scrofulosis it is apparent that chronic inflammation is the direct and most influential ætiological factor.

Chronic inflammation differs from the acute form in these important particulars: there is a marked modification of the four cardinal symptoms, pain, heat, swelling, and redness, not only in intensity, but in duration. In acute cases the symptoms appear almost simultaneously, run a rapid course, and terminate in resolution, suppuration, ulceration, or gangrene in a short time after the commencement of the process. In a chronic case, swelling usually appears first, and may be more marked than that which would accompany an acute inflammation of the same tissues. Redness is often wanting entirely, the parts even being rather whiter than usual or decolorized; pain is frequently insignificant, so also is heat. Now, these symptoms, it seems to me, mean this: While acute inflammation is characterized by increased vascular tension and a tendency to pseudo-organization, *i. e.*, increased cell-production, thereby notably increasing the vascularity of the part affected, the tendency of chronic inflammation is to render parts non-vascular, and liable to disorganization even while there is primarily a greatly exaggerated production. For instance, while all inflammation, whether acute or chronic, represents increased production with defective organization, the subsidence of an acute inflammation usually witnesses a more or less rapid disappearance of its products. Chronic inflammation, on the other hand, does not subside entirely for long periods, becoming slowly less and less acute, and its products not only remain, but by disintegration perpetuate and extend the mischief already wrought, perhaps by material contagion from organic particles carried in the circulation of the bloodvessels or lymphatics, or by embolism and an extension of the inflammatory action. There is, as all medical men know, such a thing as a profound morbid action without any anatomical features. For instance, a person may be syphilitic for an indefinite time without the occurrence of an anatomical symptom; or a tumor may be carcinomatous, and yet in an early stage its malignant characters are not demonstrable. In such patients the occurrence of inflammation will result in products which are unmistakably unlike the normal products of inflammation, from the impress stamped upon them by the predominate "unanatomical" morbid action. So in cases of syphilis we have gummous tumors, a modification of what in a non-syphilitic person would be an ordinary lymphatic exudate. As long as a case remains *scrofulous*, we have an absence of anatomical symptoms until inflammation is set up, then we have the imperfect organization of the exudate, the caseation and destruction of tissue.

When the scrofulous case develops into matured tubercular disease we have a definite pathological anatomy; what was before scrofulosis or immature tuberculosis, now becomes something more, depending upon location and upon the tissues implicated.

Esteeming the typical scrofulous gland to represent true scrofulosis,

let us enquire what its anatomy is. First, the gland is enlarged, firm and elastic; upon examination there is found to be a remarkable, as Cornil asserts "a prodigious," development of connective tissue. In a large majority of cases what are called tubercles are found, which on examination are seen to consist of a mass of cells of various kinds, containing one or more "giant-cells." These tubercles are neoplastic, often the result of inflammation, as Treves says, possibly embolic, or according to Birch-Hirschfeld, "tubercle may be regarded as a degenerated species of inflammatory neoplasm (granulation) determined by necrobiotic processes." This first stage I assume, therefore, to be a stage of tubercularization of the gland, the tubercles not existing as such from hereditary transmission, but produced by the peculiar morbid influence communicated by the inflammation, the result being a production of which the system is inadequate to dispose, either by elimination or organization.

Later, in what may be called a second stage, the gland becomes soft and doughy, sometimes, however, hard and incompressible; its contents will be found a cheesy, dry substance, more or less mixed with calcareous particles, and more or less fat. This caseation, as Hartshorne (Reynolds's *Syst. of Med.*, i., p. 504) puts it, "is but a modification of fatty degeneration, which may affect morbid products of different kinds, as, for example, cancer or other tumors. Yet, in far the greatest number of instances caseous metamorphosis results from the scrofulous constitution, predisposing all the organs of the body to *abnormal vulnerability under slight irritation*, and *deficient restorative power when diseased.*"

A third stage, or one which may be considered alternative with the last, is a stage of so-called suppuration. The gland softens, the integument gives way, and the contents are discharged. The cavity thus left is imperfectly filled up, and hence the depressed scar, additional evidence of low recuperative power. The "pus" furnished by this form of abscess may, in some instances, resemble normal pus as far as gross appearances are concerned, but upon examination with the microscope it will be found to be made up of *débris*, no proper pus corpuscles, but the degenerated and altered natural elements of the part. Should such a gland be opened artificially, before distinct pointing, the discharge will either be the caseous matter to which reference has already been made, more or less liquefied, or an albuminous substance not at all resembling pus.

It must not be understood, however, that caseation is only observed in scrofulosis; while many so state, there is good reason for holding a different opinion; it is a feature of scrofulosis quite constant and diagnostic, but occurs not unfrequently in connection with other dyscrasiæ.

Without assuming that the tubercle of phthisis is likewise of in-

flammatory origin, it may safely be asserted that there is no appreciable difference between that of scrofulosis and the long list of "scrofulous" diseases and phthisis; anatomically they are the same; it is unnecessary to enter upon the discussion of the germ theory as taught by Koch, and others, partly because the matter has already received attention in other portions of this work, and partly because the theory is still far from acceptation by the profession generally. The ground is well covered by Treves (*loc. cit.*) when he says:

"The following conclusions may be stated as to the relations between scrofula and tubercle:

"1. The manifestations of scrofula are commonly associated with the appearance of tubercle; or, if no fully formed tubercle be met with, a condition of tissue obtains that is recognized as being preliminary to tubercle. Anatomically, therefore, scrofula may be regarded as a tuberculous or tubercle-forming process.

"2. The form of tubercle met with in scrofulous diseases is usually of an elementary and often of an immature character. Whereas in diseases called tuberculous in a strict clinical sense, a more perfect form of tubercle is met with in the form of the gray granulation or 'adult' tubercle (Grancher).

"3. Scrofula, therefore, indicates a milder form or stage of tuberculosis, and the two processes are simply separated from one another by degree."

Prognosis.—Although the semeiology is quite clear, and the natural history of allied or similar conditions is well understood, it is surprisingly difficult to lay down any satisfactory rules for the prognosis of scrofulosis. During the early periods, when the *disposition* is marked, but no glandular or other developments have occurred, it is almost impossible to determine whether, or not, later and mature phenomena will appear. The case must be viewed as one of great danger, and an opinion is to be given guardedly. Should infancy be passed without active disease, especially should the dangers of dentition have been passed with safety, there is a strong probability, in the absence of any unusual occurrence, such as accident or acute disease, that glandular or other troubles will not appear until puberty approaches. Passing this period safely, the climacteric is to be encountered, after which time of life few cases only become actively scrofulous. In the case of women, each childbirth may be considered a period of danger.

Active disease having appeared, the prognosis depends upon the particular form assumed and the region chiefly affected. Thus, if otorrhœa occurs, hearing is endangered; if the process is active, and the middle or inner ear becomes involved, we may expect brain lesions. So with all the regions of the body, function or life is threatened according to circumstances. In all cases, however, one fact must be borne in mind, *i. e.*, that the process is eminently chronic, and that

changes must be produced slowly. The tendency of all scrofulous affections is to go on from bad to worse; sometimes there will be a sudden improvement in the condition, but it ceases as suddenly, and the morbid action is renewed with increased vigor. A gradual and systematic improvement, therefore, late symptoms disappearing first, and whatever discharges there may be assuming more and more of the normal, particularly if the general subjective symptoms improve *pari passu* with the local and objective, furnishes hope for an eventual cure.

Scrofulosis, fully developed, becomes localized; if the localization is visceral, the particular organ affected governs the prognosis. In short, the case then passes beyond the scrofulous form and becomes a disease having a "local habitation and a name;" the prognosis in this case belongs to the disease in question. We must not forget the influence of homœopathic therapeutics upon the prognosis, for it can be safely asserted, testimony being abundant, that the prognosis sustains an intimate relation to the treatment.

Treatment.—The treatment of scrofulosis must be considered under two heads, the stage of *dyscrasia* or that of predisposition, and the stage of *development* or of glandular affection. Under either head the treatment must be divided into *hygienic* and *medicinal*, with the addition of *operative* in glandular affections.

(*a*) The stage of *dyscrasia* is very often barren of definite symptoms, a general "delicacy" of health being the sum total of the condition. There may be coldness of the hands and feet, perhaps some unnatural moisture of the extremities; but sleep is good and refreshing, the appetite is fair, the bowels may be in a satisfactory condition, and nothing abnormal is discoverable in the urine. There are no sharp indications for any remedy, and there is far more solicitude for what *may* be than for what at present exists. Such a state of affairs usually commencing in infancy, treatment of some kind must commence with the birth of the child, and for a time must be directed to both mother and child.

Nursing will be the first question which suggests itself; shall the infant be nursed by the mother, by a wet-nurse, or shall it be artificially fed? This question cannot be answered on purely theoretical grounds; the proper answer can only be given after an intelligent study of the case in hand. If the mother has an abundance of milk, the infant thriving upon it, and no marked ill effect upon the mother being perceptible, common sense suggests that the child be nursed by the mother. Any or all of these conditions failing, other measures must be pursued. If a good wet-nurse can be had, and her milk agrees with the child, her employment is to be preferred to artificial feeding. Both of these methods failing, there is no resource but to make use of some of the numerous substitutes for mother's milk fur-

nished by modern science. There is no single article of food which can be arbitrarily prescribed; the sole consideration is the welfare of the child, and the particular food demanded can only be selected by experiment. A food which satisfies the child, which is properly digested, and does not provoke diarrhœa or other digestive trouble, is the food to be used in a given case. Each case, however, is practically a law unto itself.

Weaning should occur not long after the ninth month, more on account of the mother than for the sake of the child. The food at this time should not be solid, nor of a kind to require much effort of digestion; perhaps milk, properly diluted and sweetened, should form the staple article. As the teeth appear and the child becomes more robust, there must be a corresponding change in the food. The bowels and general condition must be carefully watched, and any indication of derangement is promptly to be met with the appropriate remedy. If the child fails to thrive, the food is to be changed; otherwise it must be continued.

Pure air is essential to the well-being of all, particularly of those in delicate health. Advantage should be taken of every fine day to take scrofulous children into the open air, using proper precautions to avoid taking cold, and at the same time not weighing them down under a load of clothing, nor obstructing their respiration by veils and other face coverings. Exposure to inclement weather must be avoided; this, although self-evident, requires mention, as there are still a few foolish parents who think that delicate children should be "hardened" by being taken out in boisterous weather. The best hours of the day for out-of-door exercise are the hours from one or two o'clock in the afternoon until three or four, or even five, in the summer; the length of time is to be determined by the character of the weather and the state of the child; if the child is chilly or becomes sleepy, it is time to go indoors.

Bathing is a necessity and a luxury, and capable of abuse. Cold bathing is a stimulus; warm bathing is depressing; a stimulus is always followed by corresponding reaction, and if too frequently applied, will sooner or later result in great exhaustion, which is proportionate to the preceding stimulation. Delicate children cannot endure frequent, perhaps daily, cold bathing, and many a mother has been painfully surprised to learn that the declining health of her child is caused by these daily ablutions. A full bath should not be given to a delicate child more than once or twice a week, save as is necessary to maintain cleanliness. In addition to the general debility caused by cold bathing, the undue stimulation of the skin causes an abnormal activity of the emunctories, and there is more waste than the enfeebled system can repair.

Clothing should always be sufficient to keep up the normal bodily

temperature. The feet must be protected from dampness by thick shoes and warm stockings; flannel should be worn next the body summer and winter; the outer clothing must bear relation to the day rather than the season; in short, the body must be kept dry and warm. The clothing must not be too heavy or too warm, so as to provoke undue perspiration; it must be selected by a careful exercise of common sense, without reference to fashion, custom, or season.

Dwellings, even when built "with all the modern improvements," are not always the most satisfactory from a sanitary point of view. Cellars should be dry and light, drainage and ventilation carefully looked to, leaks in water-pipes and gas-fixtures repaired. The rule should be to secure an indoor atmosphere as pure as the open air, barring a comfortable temperature. There is no standard of temperature; the comfort of the patient is the only criterion. In the dwellings of the poor—and it is among this class that the greater number of scrofulous persons are found—these conditions of domestic hygiene cannot at all times be secured; something, however, can usually be done, even in the most squalid tenements, to improve their sanitary condition. The matter of ventilation usually requires particular attention, and some improvised methods, as the indiscriminate opening of windows or doors, may be more hurtful than beneficial. The matter must receive intelligent study in each case, and no attempt should be made to formulate inflexible rules. Probably, other things being equal, the best ventilation of a room is secured by grate-fires, or fires in open stoves, providing the draft of the chimney is good.

Sleeping is an important consideration in connection with scrofulosis; awaking with a headache or coated tongue is often as much due to external as to internal causes. Poor ventilation, too much artificial heat in the room, or an unwholesome proximity to water-closets or bath-rooms, may each and all be at fault. Such agencies are readily detected, however, and indeed are part of the general domestic hygiene. The next question of importance is: *When and how much* shall the patient sleep? As a rule, the patient should sleep whenever he feels the need of sleep, regardless of time or custom, and a persistent effort should be made to have the scrofulous patient sleep alone. But the desire for sleep should be satisfied whenever it is felt.

Climate should receive intelligent attention. The most important condition to be secured is equability of temperature; sudden and extreme changes in temperature are very trying to delicate constitutions, and should be avoided as far as possible. Of course, attention to the warming and ventilating of houses, and an intelligent adaptation of the clothing to the weather, will, to some extent, effect a sort of compromise; yet, when it can be secured, a southern or subtropical latitude, free from malaria or excessive humidity, should be selected for a permanent residence.

In summing up these hygienic considerations, the whole matter is readily reduced to a truism, viz., in diet, exercise, clothing, habitation, climate, and habits, each person, sick or well, should be placed in a position where the conditions of health are conserved. This should be the rule of life of all, but it is particularly incumbent upon the scrofulous, for experience has shown that under favorable conditions many cases are curable, that the weak are made strong, and that the most pronounced strumous child may be reared to a strong, vigorous man or woman. Joined to these hygienic measures there must be a prompt treatment of any abnormality by properly selected remedies; nothing, no matter how trivial it may seem, must be neglected. What would be a trifling ailment in a strong person, is not unlikely to be the commencement of a dangerous illness in a scrofulous subject.

(*b*) The stage of *development* of glandular disease presents definite indications for treatment. This, as already stated, is what I esteem to be the end of scrofulosis, caries, rickets, etc., having passed over into distinct morbid processes. The object of treatment, when a case is seen in an undeveloped stage, is, necessarily, the prevention of the development of glandular enlargement; the successful employment of measures already considered will often secure this. As a matter of fact, it is not often that an opportunity is afforded for preventive treatment, cases usually coming to us with the glands already enlarged. It is a matter demanding considerable circumspection to determine how a given case is to be treated. It is well known that, while the whole body is predisposed to this tuberculariza tion, the process is localized in the gland or glands in which it first appears. Later the process may extend to other glands, as suppuration or caseous degeneration occurs, but to all intents and purposes the morbid action is now local. Keeping this fact in mind, it is evident that the object of treatment is twofold: first, to prevent suppuration or caseation; second, if this is impossible, or the case is seen too late, to secure a speedy and thorough evacuation of the gland, or what is now an abscess, in order to prevent the tubercular matter being carried to other parts.

To meet the first indication it becomes necessary to determine whether the case has not proceeded too far, in fact, whether caseation or suppuration has not already commenced. The presence of pus may be suspected when there has been a more or less active inflammation which apparently subsides without a reduction of the glandular swelling; in superficial glands fluctuation can usually be detected; in deep structures the fact is to be determined in accordance with the principles of surgical diagnosis. Suppuration, therefore, is usually readily determined. It is quite otherwise, very often, in the case of caseation.

I believe that in the majority of instances suppuration antedates caseation. When, therefore, there is a history of long duration of a glandular swelling, coming on with inflammation, the gland subse-

quently having become smaller, yet remaining notably enlarged, the swelling being firm but not painful, and there having been no discharge of pus, it is altogether probable that caseation has become established. So also, on the other hand, if we find a case in which there is a history of slow, painless, non-inflammatory glandular swelling, usually multiple, the glands being quite firm, with a tendency to an increase in the number of these enlargements, caseation may be considered as established.

If a case is seen at the beginning of the glandular enlargement, its fate practically depends upon the skill of the physician. If he is a master of his calling, he can generally prevent further development, if he so wishes; if he desires to promote a destruction of the gland, he has means to establish suppuration. Some will prefer the former, esteeming it a rational cure; others prefer the latter method, desiring to eliminate what is held to be a concrete infecting principle, which happy circumstances have localized and placed in their power. If there is the faintest symptom of suppuration, the latter course must be pursued; without indications of suppuration my opinion inclines to the former method.

To prevent suppuration, reliance must be placed entirely upon remedies, and the first in the list will be *Hepar sulphur.*, with *Mercurius vivus*, *Calcarea carbon.*, or *Baryta carbon.* as secondary resources. If there is a tendency to suppuration, *Hepar sulphur.* again comes to the front, and the question as to the employment of poultices comes up. Suppuration, if too extensive, may precipitate the very catastrophe which it is desired to avert, viz., the dispersion of the tubercular mass. For this reason, among others, it is not deemed best to use poultices. Sidney Ringer, Hartshorne, Treves, and other writers, have adopted *Hepar sulphur.* as a remedy of the first importance in promoting suppuration, and the former esteems it of particular value in the early stages for its efficiency in suppressing the tendency to it.

Fluctuation having occurred, and the evidences of the presence of pus being conclusive, the tumor must be evacuated. To allow the abscess to discharge spontaneously is to insure a large, ill-looking scar, a very unnecessary loss of tissue, and to expose the patient to the danger of dispersion of the tubercular matter. The only question is whether to open the gland by a free incision or by aspiration. The more acute the abscess, the stronger are the indications for free incision. In chronic cases, as psoas abscess (*q.v.*), aspiration had better be employed or some other method which equally prevents the admission of air. Under either circumstance, however, incision or aspiration, owing to the intolerance of the strumous individual there must be no rough handling or squeezing.

In cases of caseation *Hepar* may be given to promote suppuration, or a fine seton may be passed through the gland. When the glands

are superficial, freely movable, with no attachment to the skin or deep parts, enucleation has been practiced occasionally with very good results. The skin is incised, and the gland "peeled out;" if found attached, as often occurs, even though palpation failed to show such attachment, the attempt must not be made. The operation is a slight one when the indications exist, but it may be quite formidable, in its results at least, if violence is used.

Therapeutics.—In all stages of scrofulosis the so-called "antipsorics" stand at the head of the list. I shall here mention only those remedies which have proved in my hands more or less useful in the treatment of the diathesis in general, and in the stage of glandular tuberculization. For convenience of reference the remedies will be given in alphabetical order. Probably the remedies which will oftener be indicated might be arranged in the order of their value as follows: *Calcarea carb.*, *Sulphur*, *Silicea*, *Graphites*, *Hepar sulphur.*, *Iodum*, *Baryta carb.* (*or muriat.*), *Aurum met.*, *Conium*, *Mercurius.*

Arsenicum.—Goullon (*Scrofula*, p. 114), thinks this one of the most useful remedies. As he puts it: "*Arsenicum* does not act directly or specifically upon the morbid product, as an antiparasitic, as it were, but upon the healthy tissue, the vital energy of which it increases, and which it enables to resist the pathological element. Restoring general health, it becomes one of our surest remedies to counteract the development of neoplasmata." The waxy complexion, bodily restlessness, weakness, tendency to exhausting diarrhœas, and general aggravation from cold, are the more prominent indications.

Asa fœtida.—Glands hard, swollen, hot, and throbbing, with shooting, jerking pains; bloated, clumsy children, with phlegmatic temperament. I have found this remedy more useful in cases with a tendency to ulceration, fistulous formation with fine stinging pains, which are either relieved or transformed into other kinds of pain on touching the part. The discharge is always dark-colored, and has a putrid, cadaverous odor.

Aurum met.—Active scrofulous symptoms in those who have been of a ruddy complexion and sanguine, when they become depressed, with suicidal tendency; the bones of the head and face are painful, particularly at night and when lying on them.

Baryta.—The symptomatology, for clinical purposes, of the carbonate and muriate of baryta is quite similar, so that the drug is often given in one form or the other indiscriminately; the *muriate*, I think, is generally preferred, and is credited with a prompter action and one of longer duration. There is physical and mental debility, with atrophy and bloated abdomen. The glands are swollen, hard, indolent, and have a tendency to caseation or cretaceous degeneration, rather than suppuration. It seems to be for those of adult years what *Calcarea* is to children. The face is usually disfigured by eruptions of various kinds, but there is little painfulness, at most a soreness or stiffness of the part.

Belladonna.—This remedy is more useful in cases of an acute character in which the glands become inflamed, rapidly suppurate, and the lymphatics are seen to be inflamed by the red swollen streaks running to and from the gland. There is much pain and heat in the gland, and some considerable fever; the pus is thick and yellow, and much less in quantity than the degree of swelling and local disturbance would seem to promise.

Bromium.—This drug is esteemed, more particularly by the German writers, as of the first importance in scrofulosis, but I have not been able to verify their teaching. The symptoms for which it has been given are: swelling and induration of the glands; enlargement of the thyroid in children with light hair, blue eyes, and fair skin; pimples and pustules; boils on the arms and face; hard swelling of left parotid; suppuration of the left parotid; edges of opening are smooth, discharge watery and

excoriating, swelling remaining hard and unyielding; tonsillitis; swallowing of fluids more difficult than of solids.

Calcarea carb.—Mal-assimilation; tardy development of bony tissue; large head with open fontanelles; sweating about the head and neck when sleeping; feet and hands cold and damp, the perspiration not smelling badly, nor does it make the parts sore; bloated, protuberant abdomen; glandular swellings common, suppurating slowly, without pain, and discharging thin, inodorous pus, or yellow, bad-smelling and excoriating pus. The face is pale and puffy, the bowels easily deranged; takes cold on slight exposure. In fact, the remedy is the typical one for scrofulosis in children, whether the disease be latent or active. Even without marked symptoms as above, the flabby skin, and the want of firmness in the flesh, so often seen before the active development of scrofulous affections, will call for this remedy above nearly all others. It is also particularly useful when there are indolent glandular swellings, small "kernels" as they are called, with a tendency to caseation.

Calcarea phosphor.—This remedy resembles the last, but seems more suitable for those who have passed infancy and childhood, and are approaching or have entered upon puberty. There is emaciation, a dirty-white or brownish complexion, with difficult teething in childhood, and much fetid diarrhœa. The deeper glands are oftener affected, with a particular tendency to enlargement of an abscess of the mesenteric glands and to psoas abscess.

Conium.—Hard swelling of the glands, with stinging pain, or painless; the swollen glands soon contract adhesions to the skin and deeper parts, become incompressible, and often immovable. A common indication is a fugitive stinging or biting, here and there, and a "dread of solitude, with an aversion to company."

Graphites.—Eczematous eruptions, particularly about hairy parts, as the head; red, scurfy eruptions on the eyelids, with loss of the eyelashes. Glandular swellings, indolent, but soft, the suppuration being slowly established, the pus smelling like brine; pus is thin, yellow, and excoriating; the glands discharge through numerous fistulæ, and are very slow in healing. The formation of deep, sore fissures or cracks, in the flexures of the joints, particularly the fingers, is quite pathognomonic. I have seen them in the groins of children, extending quite through the skin, with little soreness or inflammation.

Hepar sulph.—The symptoms of the dyscrasia are very similar to those calling for *Graphites*, the glandular swellings run a more acute course, and suppuration is of a rather better character. The chief indication for this remedy, and one which no other remedy seems to fill as perfectly, is to promote suppuration when once it commences or seems irritable. In some cases in which I have used it for this purpose, I have been surprised to find that the action was curative, resolution occurring without suppuration; I am utterly unable to tell under what circumstances this action is secured; it has always been unexpected. When suppuration threatens in a painfully swollen gland, a few doses of *Hepar* frequently have the effect to dissipate the pain, and at the same time to wonderfully hasten the pointing of the abscess.

Iodum.—Dark, scrawny habit, extreme emaciation, yet with ravenous appetite; general glandular enlargement, the swellings not being large, but hard and firm. When suppuration occurs the pus is in large quantities, and quite laudable in appearance. While small lymphatic glands are liable to tumefaction, others, such as the mammæ, are prone to atrophy and disappear.

Kali bichr.—Affections chiefly of the skin and mucous membranes; in the latter case there is discharge of tough, stringy mucus, very adherent; in the former, a proneness to ulceration, the ulcers being circular, deep, small, not very painful, with tenacious discharge.

Kali hydriod.—Thickening of the tissues affected; glands which have become inflamed and suppurated seem to disappear entirely, leaving deep, depressed scars. There is little pain accompanying any of the processes; such as there is, occurs mostly at night.

Lycopodium.—Emaciation of the upper parts of the body; the lower part is swollen; violently itching, humid eruptions, with rhagades; much flatulence and constipation; glands swell and suppurate, the process being indolent, and the pus milky.

Mercurius.—Emaciation and dyscrasic appearance, with perspiration on slight exertion; painfulness of the bones and deep parts, particularly at night, after going to bed. Malaise and feeling of illness or prostration, almost indescribable. Swelling of

the glands, not painful, proceeding slowly to scanty, unhealthy suppuration. Next to *Hepar* it is the most important remedy to arrest suppuration.

Natrum carb.—Dry, rough, chapped skin, with rhagades; emaciation, especially of the thighs, slight swelling, with great induration of the glands.

Sarsaparilla.—"Great emaciation; skin shrivelled or lies in folds; herpetic circular ulcers, forming no crusts, red granulated bases, white borders; deep burning rhagades;" the neck is particularly emaciated.

Silicea.—The glandular and general symptoms very closely resemble those of Iodine. Thin, scrawny persons, dry skin. The tendency is to affections of the bones, with thin pus, dark in color. The glandular swellings are indolent, the enlargement not great; usually a number or a string of glands are simultaneously affected.

Sulphur.—This is a very important remedy in the dyscrasia of scrofulosis, both of young and old. I think it is rarely indicated when the disease becomes active. The face has an old "drawn" look; the hair is dry and unkempt; the fingers are disfigured with hangnails; the soles of the feet are so hot that they are kept uncovered at night; there is a dread of cold bathing on the part of the adult, and objection to bathing in the young. There is a tendency to many forms of chronic painless exanthema; the bowels are always out of order, either constipation or offensive diarrhœa existing; nocturnal enuresis is common. The prevailing characteristic is mental and bodily indolence.

Other remedies, of secondary importance, are: *Alnus rub.*, *Arsenicum iodat.*, *Asclepias tub.*, *Badiaga*, *Calcarea iodat.*, *Chimaphila*, *Cina*, *Cistus can.*, *Hecla lava*, *Hydrastis*, *Lithium carbon.*, *Lapis alb.*, *Oleum jec. as.*, *Petroleum*, *Phytolacca*, *Psorinum*, *Rhus tox.*, *Spongia*, *Theridium*.

As already remarked, a full list of remedies would include nearly the whole materia medica, particularly if the various eye, ear, throat, and bone affections which are related to scrofulosis are discussed under a single heading. Taking this wide view of scrofulosis, a large volume could not do the subject justice. What has been given in the way of therapeutics embraces nearly all that is essential to a successful treatment of purely scrofulous conditions.

CYANOSIS.

BY J. G. GILCHRIST.

It is very questionable if this condition should be considered a disease in itself, as it is usually, if not always, dependent upon some pathological lesion which is so predominant that cyanosis can only be considered a symptom. The term is used to designate a peculiar blueness of the skin, either permanent, transient, or remitting. It is sometimes spoken of as *morbus cæruleus*, and vulgarly as the "blue-disease." It is not uncommon in children in the first weeks of infancy, but is not fatal, the child generally recovering, or the affection becoming remittent, lasting indefinitely, or even through life.

Symptoms.—The most prominent objective symptom is a lividity or blueness of the skin, either general or confined to the extremities or face. In some cases the color is of a dark purplish tint, in others of a bluish lividity; in still others it occurs in patches like ecchymosis. The extremities are always cool, often feel damp or moist;

the ends of the fingers and toes are bulbous, the nails curving over them in a more or less talon-like form. The whole figure is more or less stunted; particularly there is, according to Vogel, a tardy development of the generative organs. When the patient is lying quietly the color of the skin is quite normal, at least it is not so marked, the tint deepening and becoming more pronounced when awake and in an erect posture, particularly when engaged in any physical exertion. There is frequent palpitation of the heart and dyspnœa, more marked when making some physical exertion; hence the patient is indisposed to take exercise. The temperature is always low, and exposure to cold is not well borne. The veins of the extremities are large and prominent, and the pulse is usually small and irregular. There is often a tendency to epistaxis, or even to hæmorrhages from mucous surfaces generally. Joined to these constant symptoms there are others indicating a general functional disturbance, the precise character of which can only be foretold by reference to the cause of the cyanosis.

Pathology.—Considering, for our present purpose, ætiology as related to the pathology, it is important to remember that the cyanosis observed in young infants, that which passes away after a few days or weeks, and does not again return, is something very different from that which appears later in life. In each case, however, the blueness of the surface is an indication of imperfect oxygenation of the blood, which may be due to admixture of the venous and arterial blood, as would occur when the foramen ovale remains open; this is a common cause in infancy. Again, there may be some impediment to respiration, or some obstacle to the entrance of blood into the pulmonary vessels, which *are* the commoner conditions in adult life. Thus, in the case of children, the closure of the foramen may be simply delayed, and a cure result when it is finally effected. In the case of adults, the cause, being of a pathological character, is likely to be permanent. On the other hand, there are very many instances of the foramen ovale remaining open during life, no serious trouble ensuing; this fact leads to the conclusion that the deficiency is not necessarily causative of cyanosis, and many writers have abandoned that theory and looked for a cause in the respiratory tract. We find, particularly in the case of adults, that tumors of various kinds in connection with the larynx or trachea, cicatricial contractions in the same regions, emphysema, carcinoma of the lungs, hepatization of the lungs, or stenosis of the pulmonary arteries, in short, anything that may offer a mechanical impediment to respiration or to the entrance of blood into the pulmonary vessels, is liable to produce cyanosis. In the case of infants the cause may often be found in atelectasis of the lungs, " which acts partly by causing general venous congestion, and partly perhaps by obstructing the flow of blood

through the pulmonary artery, so that the right cavities of the heart become distended, and there results an admixture of venous and arterial blood through the still unclosed foramen ovale" (Duncan, *Dis. of Children*, ii., p. 583). The cause and pathology may at once be stated as a failure in oxygenation, and the condition of cyanosis be properly considered simply a symptom of some definite pathological lesion.

Treatment.—The treatment of cyanosis must necessarily depend very largely on the cause; if this can be reached, surgically or otherwise, of course it must be removed; otherwise, or when the cause is obscure, reliance must be placed largely on remedies according to their indications, and on such attention to general hygiene as the nature of the case would suggest. Thus, the lowered bodily temperature and the want of resistance to cold would suggest attention to the clothing. The dyspnœa and palpitation of the heart ensuing from exercise would demand an avoidance of unnecessary physical exertion. In sleep a position should be assumed which interferes least with the action of the heart and with respiration. All such considerations must receive attention, depending upon the peculiar symptoms of the case, nothing but the most general instruction being possible in an abstract discussion of remedies. One of the following will be found most appropriate, Duncan (*ibid.*) having collected them from a large mass of clinical reports:

Aconite.—If at any time there should be much vascular excitement, heat or restlessness, this remedy may be needed.

Arnica.—In cases where there is hæmorrhage from the nose and mouth, and great strangling and suffocation. The case seems almost hopeless.

Arsenicum.—The symptoms are much aggravated from the least exercise. Much emaciation, cold sweat, great debility.

Calcarea carb.—This remedy may be indicated in leucophlegmatic children with large, open fontanelles; the head perspires very much.

Carbo veg.—The veins stand out very full, and are remarkably blue.

China.—In some collapsed stages, with waxy paleness and coldness of the skin.

Digitalis.—The child cannot be turned in bed or moved suddenly without nearly fainting and without an inclination to vomit; chilliness; coldness of the extremities; blue color of the skin, especially of the eyelids, lips, tongue, nails; unequal, irregular pulse.

Lachesis.—When the suffocating spells and increased blueness become worse after sleeping. Great tenderness of all the flesh; it is exceedingly difficult to handle the child at all; the least touch seems to hurt it and to leave a deeper blueness like a bruise. Suffocative attacks on touching the larynx or moving the chest; fainting and anxiety from the slightest motion of the child; purple color of the skin; coldness of the extremities.

Laurocerasus.—A little exercise produces gasping for breath and increased blueness. The ends of the fingers and toes are knobby and larger than any portion of these extremities; the child is better when lying still; slow, feeble, almost imperceptible breathing, with moaning; irregular beating of the heart, with slow pulse; soporose condition; amelioration in the open air.

Phosphorus.—In very tall and slim children, with much oppression of the espiration and swelling of the feet.

Secale cor.—In very thin, scrawny children, with shrivelled skin; especially when there are spasmodic twitchings, sudden cries, feverishness.

Sulphur.—This remedy will be found useful in many cases characterized by the real sulphur constitution.

Our author adds: "As in all these cases there is a flabbiness of muscular tissue, this system should be stimulated by food and remedies as much as possible. As remedies the *Kalis* stand first. *Kali sulphuricum* when the serous tissue is also feebly developed. *Kali muriaticum* where the nutrition is at fault, and *Kali phosphoricum* where the nervous as well as the muscular system is defective. Milk, as strong or old as it is possible for the child to digest should be chosen. The child should be kept as quiet as possible, allowing it, however, plenty of fresh air, and resorting to passive motion. Rubbing with oil would do good."

For cyanosis pure and simple, without reference to associated or causative conditions, *Digitalis* and *Lachesis*, in the experience of most practitioners, should take the first rank. As a matter of course, the selection of the similar remedy will be guided almost entirely by these associated states, so that nothing but meagre indications can be given in the present instance.

PROGRESSIVE PERNICIOUS ANÆMIA.

BY J. G. GILCHRIST, M.D.

Synonyms.—Pernicious anæmia, idiopathic anæmia, and progressive pernicious anæmia are terms used by different writers to designate the same condition. Not any of the terms, the most common amongst quite a number, are entirely unobjectionable; but in the present state of our knowledge of the subject it seems impossible to devise a term which fully covers the ground.

Definition.—Whatever term is employed, it is meant to express an extreme and progressive anæmia, without recognizable prodroma or pathological lesion, leading to a fatal termination in the large majority of cases. Some writers on the subject, notably Immerman (*Cyclop. of Ziemssen*), consider any extreme anæmia as coming under this head until some pathological lesion can be detected, when its name is changed to correspond to such lesion. This is not the general habit, however, nor should it be so, in the interests of medical science. Practitioners recognize a form of anæmia different in many essential particulars from the ordinary forms, and in which the course and termination are unique; it is becoming to *students* of medical science to endeavor to learn something of its ætiology rather than "abandon the subject in advance," as the majority of our writers have done. Let us first note the symptoms, and then look for their source and significance.

Symptoms.—The earlier symptoms of pernicious anæmia are somewhat insidious, and common to all forms of impoverishment of the blood. The countenance may be extremely pallid, or, as occurs occasionally, of a brownish or jaundiced hue, sometimes not unlike that of Addison's disease. There is not always emaciation; indeed, in some cases the body has been well supplied with fat, even up to the occurrence of death. There is great weakness in all cases, the patient complaining of fatigue more than debility; the voice is weak, respiration somewhat quickened and irregular, in advanced stages even panting. In nearly all cases, however, emaciation is quite rapid in the last stages, so that in the last fortnight, or so, of life the patient seems "to melt away before one's eyes." There is usually some fever, quite continuous, the temperature being slightly elevated, and the pulse notably quick and wiry. The skin is dry, the appetite is poor, there are many symptoms of indigestion, and œdema is a common concomitant, particularly in the latter stages. Other noteworthy symptoms are palpitation of the heart, a disposition to faint on slight provocation, murmurs at the base of the heart and in the large veins of the neck, and frequent spontaneous hæmorrhages. Hæmorrhage is oftener into the subcutaneous cellular tissue, forming spots or "petechiæ;" sometimes there is frequent epistaxis, as well as bleeding into the bladder or from the female genitalia. Extravasations into the retina are quite common, also; indeed, hæmorrhage may occur from almost any free surface, but is rarely active or profuse. Professor Quincke (Volkman's *Klinik*, 1876) says of retinal hæmorrhages: "Ophthalmoscopic examination is here of the utmost importance, especially in advanced cases, where mistakes in common cases are impossible on account of the frequent hæmorrhages and the absence of genuine retinitis. The grayish-red centre of the hæmorrhage is also characteristic, especially as in high-graded cachexia (carcinoma) retinal hæmorrhages are only exceptionally observed; on the other side it is important to know that the picture of Brightian retinitis may also appear in pernicious anæmia, and therefore cannot be considered pathognomonic for nephritis." (*N. A. Journ. Hom.*, xxv., p. 149.)

Upon examination of the blood it is found "unmistakably watery;" on submitting it to the microscope it is seen to be poor in corpuscular elements, both red and white being greatly diminished, but the proportion of one to the other is nearly normal. The red corpuscles are often altered in shape, and quite generally there is great difference in the shape of a number found in the same microscopic field. To the unaided eye the blood appears often "like weak coffee, or the washings of meat," coagulating imperfectly.

There are rarely evidences of visceral lesions; the urine is quite normal; there may be diarrhœa; the glands are not enlarged; and

the spleen is unchanged so far as tactile examination can determine. In women menstruation is quite commonly suppressed.

These are the chief characteristic symptoms of pernicious anæmia, and however much a hasty survey of them might lead one to suspect leucocythæmia, Hodgkin's disease, or chlorosis, a more careful study would show a radical difference; thus, there is no splenic enlargement, nor excess of leucocytes, as occurs in leucocythæmia; there is no glandular complication, as is the case in Hodgkin's disease; and the œdema and passive hæmorrhages distinguish it from chlorosis.

The waxy appearance of the surface might give rise to suspicion of carcinoma or of some other profound cachexia. There being no other evidence of such condition, however, either visceral or otherwise, it must necessarily be excluded. In fact, as already remarked, the anæmia is pronounced, its progression continuous and unremitting, yet, so far as objective indications are concerned, observable during life, there is nothing to account for it; the history of the case is often of little value in assigning a cause, if we are to believe all that is said by the standard writers; and the temptation is great, for an indolent man, to adopt Immerman's suggestion and call anæmia "pernicious" while we cannot charge it to observable lesions. But I think we can do better, perhaps, than the teaching of the day would lead one to infer.

So far as we have any knowledge of this form of anæmia, we must consider whether it represents a deficient formation of blood elements, an increased destruction, or a sort of union of the two. We know, judging from the meagre records accessible, that anæmia of this form rarely, if ever, arises spontaneously; it always succeeds some active illness, as the various forms of fever, or occurs in those who become debilitated from excessive lactation, frequent parturition, mental or physical exhaustion from overwork, or the innutrition of poverty. Under each and all of these circumstances there is blood loss as a prominent feature; the primary anæmia may fairly represent an increased destruction of elements; the continuance of the anæmia must represent a failure of supply, deficient production. But this only partly explains matters, as there is little atrophy of the body generally or of the blood-making organs. We find, on post-mortem dissection, that fatty degeneration of various organs is quite common, sufficiently so to lead Quincke (*loc. cit.*) to esteem it pathognomonic. This is, of course, equivalent to atrophy; by preserving the form and size of organs accessible to external examination the atrophic state is concealed.

In this country, at least, it would seem that the larger number of cases are seen in malarious districts, where intermittent fever is endemic, and *where quinine, arsenic, and iron are taken in large quantities by both sick and well.* To my mind this one fact is of the utmost value for purposes of ætiology; it would suggest that the cause of the disease

is "drug poisoning," precisely as Mitchell (*q. v.*) finds in leucocythæmia. I am confirmed in this opinion by the experience of our own practitioners, so far as it can be obtained. It seems that such cases as have come under homœopathic treatment have quite uniformly been long in the habit of taking large quantities of these antiperiodics, few, if any, occurring among those who have been long under homœopathic treatment. Accepting these statements as representing the facts, we need not have far to look for the *cause* of pernicious anæmia; knowing what we do of the action of the drugs mentioned, it is not difficult to connect their heroic use with the disease under consideration.

The *prognosis* is quite generally regarded as almost uniformly unfavorable. Nearly all writers, regardless of therapeutic convictions, consider a fatal issue as inevitable. Quincke (*l. c.*), however, is an exception, as he does not despair of effecting a cure, provided the patient can be taken into a hospital, and more attention given to nutrition than the poverty of most of the victims would render possible in their own homes.

Treatment.—A diligent search through our literature, both periodical and standard, has failed to furnish many examples of a cure of undoubted pernicious anæmia. This is explained when we consider that such cases are usually brought under observation very late in the progress of the disease, and thoroughly under the influence of the drugs which may be considered responsible. Cases have been cured, however, even when far advanced, a careful study of the symptoms as indicating a remedy giving opportunity for correcting the functional abnormality, which a study of its obscure pathology would not afford.

The remedies which seem to have done the best service, are *Calcarea*, either carbonate or phosphate, and *Phosphorus*. Lilienthal (*N. A. Journ. of Hom.*, xxv., p. 153) has given a careful résumé of the indications for these remedies, and his suggestions, while purely theoretical, have been found of exceeding value in actual practice. The knowledge we have of the power of *Calcarea* and of *Phosphorus*, its analogue, in correcting mal-assimilation, should give us great confidence in their use. The first indication of returning health is a recovery of the lost appetite, and a healthful appropriation or assimilation of the food. Likewise this is naturally the first indication in the treatment of the case. In some rare cases a desire for food has been recovered, but digestion remains imperfect; the disease still progresses and atrophy continues. Here *Iodine* has been useful, and would seem to be a remedy of much promise. As in all other cases, or, at least, the majority of morbid manifestations, the remedy must be selected with reference to the symptoms. However some may object to this method of therapeutics as being artificial and unscientific, certainly, with the paucity of patho-

logical knowledge in the present instance, it is fortunate that we have a method at hand which has stood the test of experience, and the want of which would leave us powerless. The more exact indications are given by Lilienthal and others as follows:

Calcarea carb.—Sudden blindness; black spots before the eyes; profuse bleeding of the nose, almost to faintness; pale face with blue rings around the eyes; yellowness of the face; bleeding from the gums, even at night; much mucus in the mouth, with a dry sensation; impure, bitter, sour, metallic taste in the mouth; ravenous hunger, or complete loss of appetite; nausea and vomiting, even black vomiting; frequent passage of stool, at first hard, then pasty, then liquid; diarrhœa; offensive, dark-brown urine, with a white sediment; much mucus passes with the urine; the urine becomes turbid after a short time, and deposits a whitish, flaky sediment; a fatty pellicle forms on the surface, and the urine smells fatty; severe palpitation, with excessive anguish, and restless oppression of the chest and pain in the back; she makes a loud sound, as if every breath would leave the body, with coldness of the body and cold sweat; excessive palpitation with irregular pulse; pulse rapid without feverishness; unusual weariness in the extremities; swelling of the feet; great loss of strength; attacks of faintness, with coldness and indistinct vision; severe pulsation of the vessels, especially in the chest, after dinner.

Calcarea phos.—Vertigo when getting up or rising from sitting; veil over the eyes; eyes misty; epistaxis; point of nose icy cold; pale face, sallow, yellowish, earthy; cold sweat on the face; body cold; foul taste and smell; tongue white, furred on the root, most in the morning; nausea and vomiturition; empty, sinking sensation at the epigastrium; watery looseness of the bowels, with urging after stool, day or night; urine with flocculent sediment; menorrhagia, blood either bright red or too dark; palpitation with anxiety, followed by trembling weakness, particularly of the calves; weariness and the greatest weakness.

Phosphorus.—Irritability and anxiety; blindness by day, everything having a gray color; bleeding from the nose; dirty color of the face; white tongue; slimy, cheesy taste; panting for something refreshing; nausea after a meal; constipation, followed by half-liquid stools; loose stools, mixed with lumps of white mucus; menses too early and scanty; discharge of blood from the uterus between the menstrual periods; "rush of blood to the heart," and violent palpitation of the heart with anxiety; in the night he thinks he hears the blood rush through his body; profuse bleeding of small wounds; hæmorrhage from various parts of the body; icy coldness and deadness of the hands and feet; hysteric weakness; she is unable to move a limb, with constant gnawing, gulping up, and torture and pressure in the chest; hectic fever and emaciation; general, sudden, excessive weakness.

Iodine.—Great emaciation, with ravenous hunger; skin dark, of "jaundiced" color. Particularly in those with coarse black hair and of spare habit.

Other remedies which might be useful are *China*, *Ferrum*, *Mercurius*, *Lycopodium*, and *Sulphur*. The indications are derived from the concomitant rather than the diagnostic symptoms.

HYDRÆMIA.

BY J. G. GILCHRIST, M.D.

Hydræmia is a term used to indicate an impoverished state of the blood in which there is a loss of albuminous and corpuscular elements or a relative excess of the serum. The result shows itself in various forms of dropsy, anasarca, ascites, œdema, or effusion into the meningeal spaces, the pericardium, or other cavities or spaces. It is impossible to treat the condition as a disease in itself, inasmuch as it is only

an accompaniment or an effect of morbid action which represents some regular pathological lesion.

At this time it is only necessary to observe that the question to be solved in a given case is whether the condition of the blood is due to a destruction of the solid and semi-solid elements, to a deficiency in their production, or to an exaggerated production of serum, which is only another kind of waste. These questions are to be answered by a consideration of the causative morbid action. Thus, various diseases of the heart, chronic or acute in character, abnormal conditions of respiration which would prevent oxygenation of the blood; impediments to venous circulation; various diseases of the liver, of the spleen, or of the kidneys, all may produce hydræmia, the symptom being similar in each case, but representing destruction, imperfect elaboration, or waste of some kind of the solid constituents of the blood. This list does not include a complete catalogue of the diseases which induce hydræmia, many diseases, acute and general in character, presenting the same symptom. Cholera Asiatica, some of the exanthematous fevers, and traumatism with excessive hæmorrhage must all be added to the list. It would be highly inaccurate to assert that the dropsical and œdematous conditions are solely produced by the watery state of the blood, as there are important changes in the blood-vessels as well; nevertheless, the state of the blood very greatly favors the transudation.

Raue (*Special Pathology*, 926) sums up the causes in two groups:

"1. *Long-continued pathological secretions of clear albumin or albuminous substances* (mucus, milk, etc.), in consequence of albuminuria, serous diarrhœa, pus-formation, exudation, loss of blood, mucous discharges, too copious flow of milk, too long continued nursing.

"2. *Insufficient supply of nutriment or disturbed nutrition*, so that the received nourishment is not converted into albumin and assimilated. Hydræmia is therefore found in connection with the most different morbid processes. We find it in combination with diseases of the heart and lungs, especially tuberculosis, chronic indigestion, protracted intermitting fevers, Bright's disease, etc."

Treatment must, of course, be studied in connection with the various diseases referred to, and need not detain us here. The hydræmic state, however, will be found very characteristic of certain remedies or groups of remedies. Those more prominently demanding study and comparison are *Arsenicum*, *Apis*, *China*, *Apocynum cannabinum*, *Rhus tox.*, *Sulphur*, *Pulsatilla*, and many others. In recent numbers of our periodicals *Elaterium* is spoken of in highest terms for serous effusions in general; in many instances, however, the remedy has been given in combination with Jalap, *Scilla*, and perhaps with other drugs, so that the value of the clinical reports is very much diminished.

PLETHORA.

BY J. G. GILCHRIST, M.D.

Plethora, from the Greek "I fill," refers to a "superabundance of blood," either local or general, according to the older authorities, but this classification does not now obtain. The condition is one of repletion, literally; hence, in some works of the past generation we meet such terms as polyæmia, angioplerosis, hæmatoplethora, hæmoplethora, etc., all referring to the same condition. It has been a matter of dispute whether there can truly be a condition of "too much blood," at least in the body generally, and even now it is difficult to give a definite answer, there being no possibility of determining with exactness the precise quantity of blood which should be found in a particular organism, or even what quantity there may be in a body, at the time of examination, during life. Unquestionably, the volume of blood varies in the same individual under different conditions and circumstances, and it is impossible at once to tell the amount needed and had. The presumption is, however, that the symptoms which have long been considered pathognomonic of plethora are due to a tardiness of change in the blood rather than an over-supply. It is probably a condition of sub-oxidation, the production being normal, but the waste diminished.

Older works, it has been remarked, divided plethora into "local" and "general," a natural division, perhaps, but one which the modern tendency to exactness in nosological description rejects. When there are symptoms of general "blood disturbance," the term plethora is still retained, chiefly, I apprehend, for want of a better term; more exact knowledge may supply a word which will better indicate the actual condition. The word used in this connection may be held to stand as the opposite to "*anæmia*," in which latter case, however, there is an actual deficiency of blood, either in elements or bulk. A condition of local superabundance, so long as the circulation is continued and there is absence of inflammation, is now spoken of as "*hyperæmia*," and is the opposite to "*ischæmia*," in which latter condition there is local deficiency of blood. When the circulation is impeded in a part, and there is more or less stasis, still without inflammation, the term "*congestion*" is preferable. Inasmuch as the plan of this work does not include a special treatise on hyperæmia, and the subject bears the same relation to plethora which ischæmia sustains to anæmia, the following quotation will prove of interest.*

Hyperæmia, derived from two Greek words meaning "over" or "above," and "blood," is a term used in pathology to indicate a state

* Gilchrist, Surgical Pathology. (In press.)

in which there is an unusual supply of blood in a part, a supply beyond what is needed for the purposes of life. At present we have to consider this as related both to irritation and sympathy, as well as a process somewhat distinct from either. It has already been remarked that "irritation" may be due to either hyperæmia or anæmia, but in the greater number of instances, I believe, the latter will be found to be the case. Viewed as a purely temporary and accidental occurrence, or as associated with purely mental emotions (as in the act of blushing), the process is exceedingly simple, and has no pathological significance whatever. The same may be said of the increased blood-supply to the stomach and digestive apparatus during digestion. But when it results from injury, or from morbid influences, one of two things is evident: either the state will pass over into inflammation, or the hyperæmia will remain as a reparative process. In either case the blood will undergo a notable change and assume some characters not present under other circumstances. When inflammation results, the characters are such as will be found described elsewhere; when repair alone is demanded, and when the act is purely physiological, transient or accidental, the conditions are as follows:

Experiments have shown that irritation of nerves governing the circulation of the blood, so far as it is influenced by contractions of the vessels, varies with the point of irritation, *e.g.*, whether *peripheral* or *central*. The blood circulates in the vessels through the combined agencies of the heart's contraction, the dilatation and contraction of the vessels themselves, the automatic action of muscles lying in close relation to the vessels, and, to some extent, the action of gravity in certain localities. The dilatation of vessels is due almost entirely to inter-vascular pressure from the blood forced in by the heart's action, and relaxation of the muscular contraction of the vessels, the muscular fibres having no power to dilate the vessel other than by ceasing to contract or opposing the inter-vascular tension. The contraction of the fibres, however, is under the control of the vaso-motor system, which, I am of the opinion, is a partially inhibitory influence—the direct stimulus to contraction is probably the same as in the heart itself. I am aware that Stricker, of Vienna, teaches differently. His views are fully elaborated in the *International Cyclopædia of Surgery*. He there attempts to show that there are two sets of vaso-motors, one *dilating* and the other *constricting*. His arguments are ingenious, but almost entirely unsupported by demonstrable facts, being furthermore opposed, it seems to me, to the usual, if not uniform, principles of vital mechanics, if the term may be allowed. It is not shown that a vessel, or any other tubular organ, has been observed to expand or dilate independently of the introduction of interior tension or pressure. Now, a direct irritation of a part, as a prick with a needle or the application of a concentrated acid, will show a momentary contrac-

tion of the vessels, at times so short in duration that it may entirely escape detection. If the irritation is central, however, say at the ganglia or root of the nerve which supplies the system of vessels under observation, the immediate effect is dilatation. This difference is not without significance.

The contraction of the vessel, in the first instance, is due to a sudden, almost tetanic, muscular effort, the subsidence of which leaves the fibres exhausted or momentarily paralyzed. In the second case, where the irritation is *central*, the vessels are dilated from a suspension of nervous energy at its source, the muscular fibres becoming relaxed from this cause. This, in brief, is the mechanism, so to speak, of hyperæmia, and can be at once recognized as something perfectly compatible with normal functional life; indeed, it is in this sense that I uniformly use the term. It does not fairly represent the old "local" plethora, however, as that is something abnormal and permanent. This condition is more properly an active or passive congestion, which is a later phase or stage of hyperæmia. In this case the hyperæmia is so extreme that more or less stasis occurs, or else there is morbid action back of it which renders the hyperæmia simply an initial stage of a definite pathological state.

Plethora, pure and simple, is something more or less than the former. We are justified in believing it representative of a retarded blood-change, rather than an actual superabundance of this fluid. The cause for this condition it is usually not hard to find, depending upon the disease with which the plethora is associated. When it occurs without a distinct disease, it is usually observed in indolent persons who live luxuriously, particularly in those who are devoted to the pleasures of the table, or are in the habit of using wine, or even stronger liquors, in excessive quantities.

The *symptoms* are as follows: The face is red and somewhat bloated; the eyes more or less injected and suffused; the skin is high-colored over the body generally, and feels warm and moist; perspiration is easily excited, and is often profuse; the saliva is so abundant that it almost amounts to ptyalism; the urine is copious in quantity, but watery; the bowels are irregular, sometimes loose, at others constipated; the mind is dull, yet often the individual is very irascible; drowsiness in the daytime, particularly after a meal, with occasional attacks of epistaxis make up the commoner list of symptoms. To these may be added, however, an unusual fulness of the bloodvessels, the arteries pulsating strongly, and a prominent and enlarged condition of the veins.

Some modern writers, quoting from Raue (*Special Pathology*, p. 926), "divide plethora of old into—

1. "*Plethora vera, true plethora*, which is said to characterize itself by

fulness of the arteries and veins, repletion of single organs, florid complexion, and increased temperature of the body.

2. "*Plethora serosa*, an increase of blood serum and decrease of corpuscles, which characterizes itself by fulness of the arteries and veins, paleness, or else quick change of color; and

3. "*Plethora ad vasa* or *false plethora*, which is not too much blood in general, but too great an afflux of blood into the bloodvessels, as in fevers, in consequence of bodily and mental exertions, spirituous irritating drugs, etc." Our learned author has failed, by the way, to tell us where the blood is when not "in the bloodvessels." Of course we understand this last form to be active congestion, and the second, really, more of an anæmia.

Treatment must depend very largely on the peculiarities of the case immediately in hand. When it occurs as a constant habit, the indications are mainly for moral and hygienic measures; when occurring in the course of acute fevers or other diseases, remedies are called for, the accompanying or causative state exercising a controlling influence on the selection.

In the first class of cases it is of the utmost importance that the diet should be carefully regulated, both with reference to quality and quantity of food. There should be more exercise taken, and the general habits should be reformed. To carry this out, will require the active coöperation of the patient; hence the treatment must be *moral* as well as hygienic.

In the second class of cases, those in which there is plethora as an accompaniment of certain diseases, remedies are chiefly indicated. An accurate selection of a remedy can only be made by securing the nearest *similar* to the condition as a whole; in general terms, *Belladonna*, *Gelsemium*, *Aconite*, and remedies of that class, will be oftener indicated. Reference to the appropriate chapters will give the exact indications.

A question of some moment remains to be considered, viz., is phlebotomy, or any form of bleeding, ever necessary under homœopathic management? Raue (*loc. cit.*) infers not; I, on the contrary, think it may be, and for the following reasons: There are two pressing dangers connected with plethora, viz., apoplexy of the various parts, particularly cerebral, and stasis with serous exudation. Elderly people of plethoric habit, in fits of anger or sudden or profound mental emotion, have had an apoplectic attack or "fit," as it is called, and examination shows a cessation of pulsation at the wrists, the vessels of the face being full to bursting apparently, and the circulation of the blood almost, if not completely, arrested. The heart may continue to beat for some time, adding continually to the stasis by forcing in more blood where there is too much already, and death may ensue before the circulation is re-established. In such cases I should certainly bleed the patient. I have never had occasion to do so, but should

not hesitate a moment should such a contingency arise. Under these circumstances, therefore, I hold that bleeding is an absolute necessity. To extract blood in an ordinary case of plethora, without such pressing symptoms, merely for the purpose of diminishing the amount of blood in the body, would be unwise as it would be futile, inasmuch as the temporary relief would, in all probability, be followed by a corresponding aggravation. The effect of abstracting blood in the first contingency, however, is to re-establish the circulation by relieving the vascular tension. An observing man who has been in medical practice for twenty, or more, years, and who has kept up with the intellectual progress of the age, must recognize the fact that this practice has saved many valuable lives, and would be much embarrassed to select any other method that has as good a record upon which to base its claims for consideration.

ANÆMIA.

BY J. G. GILCHRIST, M.D.

Anæmia is a term signifying a deprivation of blood, as opposed to plethora. It does not always mean a loss of blood, as to bulk or quantity, but sometimes, at least, a loss of plastic elements, a diminution more particularly of red cells, hæmoglobin. In this broad sense anæmia may be considered any impoverishment of the blood, whether as to quantity or loss of essential elements. Thus there are numerous states of the blood, some originating in the process of blood-making, and others associated with other diseases, which are anæmic in character. Leucocythæmia, Hodgkin's disease, miciocythæmia, chlorosis, and many others, are discussed in appropriate chapters in this work; at this time, therefore, it will be unnecessary to attempt more than a very general survey of the subject.

Considering anæmia to be a deficiency in the amount of blood in the body, we find that there may be a general or local loss, and to the latter the term *ischæmia* has been applied. Nevertheless, it is common, and also perfectly proper, to speak of anæmia of certain parts, as the spine, liver, brain, etc.; in obedience to strict nosology, however, the term *anæmia* refers to a general poverty of the blood, and *ischæmia* to a local deprivation. We will consider these topics separately, at this time.

Anæmia, as to diminution in the amount of blood in the body, may be traumatic or symptomatic. In the former, excessive hæmorrhage may drain the body, but the loss is usually quickly repaired; so also with anæmia from post-partum hæmorrhages. In exceptional instances, however, either through latent morbid action, active disease, or some functional disturbance caused by the hæmorrhage or the accident, the blood is very slowly and imperfectly restored; perhaps

some permanent loss may ensue. In the larger number of instances, however, the loss is quickly supplied, unless life is immediately imperilled; the effect of the sudden withdrawal of a large amount of the vital fluid is readily counteracted if the hæmorrhage is permanently arrested. When post-partum bleeding is profuse, repair is not so rapid, as a rule, the requirements of parturition and lactation having the effect to retard recuperation.

In non-traumatic or *symptomatic* cases the conditions are radically different. Here there is either a diminished activity in the blood-making process, or an exaggerated waste, the effect being the same in either instance. Thus, hypertrophic diseases of the spleen, of the bone-marrow, of the lymphatics generally, of the thyroid gland, or of other organs essential to the production of the blood, will result in a large increase of the leucocytes, which, if their conversion into red cells is interrupted, will impair the nutritive properties of the blood, thus inducing anæmia, so far as nutrition is concerned, as much as though the whole quantity were diminished. There may well be even a greater loss in nutrition, as it is far from certain that waste is not greatly increased under these circumstances. So, on the other hand, atrophic changes in the blood-making organs, by reducing the leucocytes far below the demands of the organism, will produce anæmia by a method similar to the above, the result being reached by another route.

Another class of causes is the lack of proper nutrition in the food, either from poverty, faulty habits of life, or dyspeptic affections interfering with digestion. So, also, pulmonary troubles, renal diseases, or, in short, almost any organic or functional disease which would in any degree interfere with nutrition, may be causative of anæmia.

The *symptoms* may be arranged in two groups, the *subjective* and *objective*. Among the former would be pallor of complexion, want of color in mucous surfaces, as the mouth, etc.; a lowered temperature; irritability of the heart; quick and small pulse; softness of the muscles; epistaxis; "anæmic murmurs" at the root of the neck; paleness of the blood, which coagulates imperfectly in extreme cases, while in others the clot is small and the serum exists in unusual quantity. The veins are prominent, and the whole physical expression is one of weakness and debility.

The *subjective* group includes weakness and languor; the voice is weak; giddiness or vertigo is common; there is want of appetite, perhaps unusual thirst; palpitation of the heart and dyspnœa; there may be some defect in vision, quite certainly in extreme cases, with humming or ringing in the ears.

There is in most cases a tendency to fainting, the patient being easily startled, the face flushing and paling. The bowels are often irregular, with perhaps a tendency to diarrhœa rather than to consti-

pation ; the urine is often profuse, generally quite watery. Perspiration is readily excited, and œdema of the face, feet, and genitals is a very common concomitant. The mind partakes of the general debility, and indifference or apathy is quite a characteristic symptom. Various reflex symptoms are observed, such as spinal irritation, and many conditions occur which are determined largely by the morbid action associated with the anæmia.

Ischæmia, or local anæmia, may be traumatic or symptomatic, the symptoms being similar in either case, and varying with the cause. Anything which diminishes the amount of blood entering a part being causative, we find the list of such agencies very extensive. Thus, fibrous degeneration, embolism, stenosis or atresia of vessels, ligature of vessels, pressure of tumors or foreign bodies, cicatricial contraction, or long-continued muscular contractions, will each and all have the same result; some of them will be temporary in character, ceasing as collateral circulation becomes established; others will result in atrophy and wasting of the part; still others in irritation and neuralgia. In traumatic cases, re-establishment of the blood-supply is the rule; in symptomatic or pathological cases there is usually progressive degeneration, the case proceeding steadily from bad to worse.

The *symptoms* of ischæmia will obviously be quite various, depending upon the organ or part chiefly affected. Ischæmia of the brain would present different symptoms from that of an extremity. The expression of such a state, at first, will be largely some functional disturbance, with lowered temperature, if the part is external; later there will be irritation, neuralgia, paresis, atrophy, and wasting, coming on in the order named in progressive cases, representing successively graver conditions. It is impossible, therefore, to attempt here anything like a complete review of the semeiology of ischæmia. The chief symptom being a local deprivation of blood, other symptoms may vary from a slight functional disturbance to complete disability or even death of the body.

Treatment.—The intelligent treatment of anæmia and ischæmia requires careful study of the case in hand, and must be based upon a clear distinction between the symptomatic and the traumatic forms.

Symptomatic anæmia, when associated with distinct morbid action, may not demand separate consideration, but will at the same time often prove a highly important indication in the selection of a remedy. Not only this, but the improvement or increase of the anæmia will quite accurately mark the progress or decline of the disease. The remedies are already given at length in appropriate chapters. In cases from innutrition, either from poverty or from the use of improper food, the chief indication is to furnish such food, in kind and quantity,

as is readily digestible, and to reform habits of living which may act as predisposing, exciting, or maintaining causes.

Traumatic anæmia is usually produced by excessive hæmorrhage. The first step in the treatment is to arrest the bleeding permanently and effectually. In ordinary cases, where life is not particularly endangered, this will be sufficient, but *China* will greatly hasten full recovery. In cases in which there has been much loss of blood, so that syncope or convulsions ensue, the patient must be laid on the back, with the head on the same level as the body, so that the brain may receive its share of blood unimpeded. In extreme cases much benefit will result from applying an elastic bandage to the extremities, thus forcing an increased amount of blood to the trunk. The bandages may be applied for from half an hour to an hour at a time, then loosened for the same period, and reapplied, if found necessary. At the same time warm milk should be given in as large quantities as can be borne, and water in amounts to satisfy the thirst. The remote consequences of such accidents may be met by the administration of *China*, and sometimes *Arnica*, as in cases of ordinary anæmia. It must be remembered, however, that convulsion following large loss of blood is almost a certain prelude of death, and its occurrence is at all times an exceedingly unfavorable circumstance.

GLANDERS.

BY J. G. GILCHRIST, M.D.

This disease, also known as *equinia*, and, in some of its forms, as farcy, is a peculiar contagious disease, developed in the horse, but communicable to man, and quite fatal in character. It belongs, in some respects, to the so-called "envenomed wounds" of surgery, and is classified by some authors with hydrophobia and snake-bites, chiefly, I have thought, because the virus is communicated to man from inferior animals. Recent investigation has shown that some of these communicable "diseases" are neurotic or septic in character, arguing against any specificity in the contagium, and probably developing symptoms of tetanus or ordinary septicæmia which are mistaken for specific disease because they follow such accidents as injury from animals either credited with being venomous or laboring under a form of disease supposed to be communicable. In the present instance, however, we are forced to admit that there is a specific virus, the symptoms developed being of a character to forbid any assumption of mere septicæmia, although pyæmia may possibly, in light cases, be suspected. As with hydrophobia, so glanders must be studied first as it appears in the horse, then in man. Youatt (*The Horse*), an acknowledged authority in such matters, gives the following account:

"The local symptoms are a nasal discharge, which is the earliest sign, and consists of an increased secretion, small in quantity and flowing constantly, and is of an aqueous character, mixed with a little mucus. It is not sticky when first recognized, but becomes so afterwards, having a peculiar viscidity and glueyness. The discharge soon increases in quantity, and becomes discolored, bloody, and offensive in the advanced stages. On the other hand, the discharge may continue for many months, or even for two or three years, unattended by any other symptom, and yet the horse be decidedly glandered. The glands under the jaw soon become enlarged, and are generally observed on the same side as the affected nostril; the swelling at first may be somewhat large and diffused, but this subsides in a great measure, and leaves one or two glandular enlargements which become closely adherent to the jaw-bone. The mucous membrane of the nose becomes of a dark purplish hue, or almost of a leaden color, never the faint pink blush of health or the intense and vivid red of usual inflammation. Spots of ulceration will probably appear on the membrane covering the cartilage of the nose; these ulcers are of a circular form, deep, and with abrupt and prominent edges, and become larger and more numerous, obstructing the nasal passages, and causing a grating or choking noise in breathing. The disease extends upward into the frontal sinuses, and the integument of the forehead becomes thickened and swollen, causing peculiar tenderness. The absorbents about the face and neck become now implicated, constituting farcy; these enlarge and soon ulcerate. The absorbents on the inside of the thigh, and then the deep absorbents of both hind legs, are next involved, causing them to swell to a great size and to become stiff, hot, and tender. The constitutional symptoms are loss of flesh, impaired appetite, failing strength, more or less urgent cough; the belly tucked up; the coat unthrifty and readily coming off. The animal soon presents one mass of putrefaction, and dies exhausted."

The same author gives an equally graphic description of farcy, which is a condition so very closely allied, in fact only a variation of the same type of glanders, that it is inserted at this place: "It is an affection of the absorbents and their glands, usually attacking the extremities, commencing in a kind of glanderous chancre or ulcer. The absorbents open upon every chancre, and take up a portion of the virus which is secreted by the ulcer, and as it passes along the absorbent vessels these suffer from its acrimonious quality (*sic*); hence the *corded veins*, as they are called by the farrier, or more properly the thickened and inflamed absorbents following the course of the veins. At certain distances in the course of the absorbents are valves, and these belly out and impede the progress of the matter towards the chest. The virus at these places causes swellings, which are very hard, even of a scirrhous hardness, more or less tender, and with perceptible

heat about them. They are observed about the lips, nose, neck, axillary spaces, and thighs. Suppuration and ulceration next ensue. The ulcers are rounded, with elevated edges and pale surface; they are true chancres (*sic*), and discharge a virus as infectious, as dangerous, as the matter of glanders. While they remain in their hard and prominent state they are called *buttons* or *farcy buds*, and are connected together by the inflamed and corded absorbents. The constitutional symptoms are drooping, impaired appetite, loss of flesh; the coat will stare. The horse may then rally and appear to be restored to health. By degrees, however, the affection soon becomes general; the myriads of capillary absorbents that penetrate every part become inflamed and enlarged, and cease to discharge their functions; hence arise the enlargements of the substance of various parts, swellings of the leg, chest, and head; these are sudden, painful, and enormous, distinguished by a heat and tenderness which do not accompany other enlargements."

While the description of the symptoms is well given in the above extract, the pathological speculations are open to grave criticism; but our purpose is served without meeting objections which will receive attention in the proper place. The general appearance and nature of the disease as it occurs in the horse can be understood, and attention can now be given to it as seen in man.

It should be observed before leaving this branch of our topic, that the eminently fatal character of the disease and its contagiousness, whereby not only other animals, but even man, may become infected, has led some governments to compel the killing of horses affected with glanders. There is no doubt that in cities, in large stables, or in places where isolation of the diseased horse is impossible, such regulations are wholesome and should be rigorously enforced; it is a question, however, if the same rule should apply to horses kept in private stables, or in country places, where caution and circumspection on the part of owners and attendants should prevent any extension of the disease to other animals.

This is more particularly true, as it is asserted that under homœopathic management the disease is frequently cured, and this assertion seems to be supported by ample clinical testimony. My own experience, limited to three cases occurring in man, would go to show that the disease is curable, as recovery was completely but slowly attained. It is true the cases were of a mild type, although, since treatment of each was commenced early, I have flattered myself with the hope that the mild character was due to the treatment.

Human beings are inoculated with the poison of glanders precisely as with any other organic poison. That is, there must be an abrasion of the integument, or the part must be otherwise capable of absorption. There can be little doubt that the word *contagion* must be used with a literal significance in this instance, emanations, exhalations, or float-

ing germs or spores in the air being out of the question; the poison must come into actual contact with the surface, and the surface itself must be capable of absorbing it. The poison having once found entrance, the development of the disease is as usual in exanthematous fevers. There is a period of latency or incubation; a prodromal stage; an eruptive stage, followed by resolution or death, as circumstances may determine. This is the same whether the poison of glanders or of farcy be introduced, for experiment has shown that farcy may follow inoculation with glanders, or glanders may succeed farcy-inoculation. The difference, I believe, is in the energy of one feature or another among the ætiological factors. Under all circumstances the lymphatics are chiefly concerned, but in some cases local peripheral lesions are predominant primarily (glanders), and deep, central, constitutional lesions are prominent in others (farcy). The progression of symptoms, given by those familiar with the disease, is as follows:

The *period of incubation* is of very uncertain duration, perhaps oftener running from two to fifteen days; like most of the contagious specific exanthemata, there is nothing to suggest infection; locally or generally, there is an entire absence of symptoms.

The *premonitory stage* is announced by an ill-defined feeling of uneasiness, depression, or indisposition, quickly succeeded by rheumatoid pains, shifting about from place to place, chiefly in the extremities or neck, particularly in the flexions of the joints. On close examination, in many cases, there will be found more or less glandular swelling of the painful part, sometimes small and multiple, at others extensive and illy defined. Rigors and fever rapidly ensue, and the muscles generally become painful, particularly in the region of the part through which inoculation occurred. The fever quickly rises in intensity, the pulse being high, the skin hot and dry, the face flushed, the head heavy, and the urine scanty; the tongue is heavily coated, and diarrhœa may set in of an exhausting character. Coincident with the fever there is quite profuse perspiration of a peculiar sour smell, which suggests septic infection.

The *eruptive stage*, in which, in the absence of a history of infection, a diagnosis first becomes possible, promptly succeeds the initiatory stage, sometimes within twenty-four hours, again not until after a day or two. In the acute form the symptoms very closely resemble those already given as occurring in the horse. The fever and prostration increase, as does the mental disturbance, if any exists; it is not uncommon, however, for a case to proceed from first to last without any delirium whatever. The pulse becomes exceedingly quick, small, and compressible, and all the constitutional symptoms are an aggravation of those of the initiatory stage. The characteristic features are quite dependent upon the method of inoculation; when it has occurred through

the medium of a wound, the objective symptoms commence at that point. Here there is much inflammation, a dirty, foul-smelling discharge, some gangrenous affection of the parts, and the eruptions seem to start from that point as a focus; the lymphatics are enlarged and hard, the glands are likewise tumefied, and the whole part notably swollen. In other cases, where the poison is absorbed through the mucous surfaces, there is little localization of the eruption; it breaks out generally as in the case of most exanthemata; perhaps the regions about the large joints first show symptoms. The eruption on the integument commences very much after the manner of its development in variola, viz.: a "feeling of shot" under the skin; red pimples then appear, either singly, with a more or less extended areola, or in groups; sometimes they are so close together that they may be considered confluent. These soon become pustular, and while they may remain flat, pointed, or conical, they rarely, if ever, become umbilicated, thus serving to distinguish the disease from small-pox. Virchow states that the pustules are *not* filled with pus, as would be expected from the appearance, but on section are found to consist of a dry mass, somewhat cheesy, contained in a circular excavation in the skin, and covered by thin epidermis. Other observers, however, almost unanimously affirm that the pus *is* pus, fluid, of very offensive odor, and ill-conditioned in every way. The lymphatics in the neighborhood are swollen and hard, the glands likewise become enlarged, and in some cases are firmly adherent to the bones or deeper parts. The surface later becomes dark, matted, or livid; bullæ form, filled with dark, bloody serum, particularly about the genitals and eyes, and erysipelas not unfrequently attacks the head and face. The nose, in acute glanders, is always affected early in the case, and discharges a profuse, gelatinous, thick, sometimes bloody discharge of very offensive smell; the mucous membrane is ulcerated, dark in color, and in some cases the septum is perforated. The throat and fauces are sore and inflamed, but seem to be very rarely ulcerated. Taking the general appearance of a typical case of glanders, as some one has remarked, "it represents variola, with the worst kind of syphilitic ozæna, complicated with pyæmia of the worst type."

The course of the disease in the acute form is very rapid, death occurring in from seven to fourteen days. In the rare instances of recovery on record, convalescence has been very tedious, and the cure imperfect. Some cases have continued for fifty or sixty days, but the commoner history is exceeding rapidity in development after the first symptoms appear.

Chronic glanders differs but little from the acute form; the chief points of difference are slowness of development, imperfect eruption, and less intensity in the symptoms generally. There is a probability that acute symptoms will supervene when the progress is extraordinarily rapid. In some cases of chronic glanders there is a marked remit-

tency in all stages. The premonitory rheumatoid pains disappear almost, if not quite, entirely; the eruption almost disappears, and then breaks out again; it is so with the nasal discharge. The prostration and other constitutional symptoms, however, gradually become more aggravated, and there need be no suspicion of resolution from the remittency of the local symptoms.

Farcy, both acute and chronic, differs from glanders in the same particulars as have been noted when speaking of the disease in the horse. There is little, if any, nasal discharge; the eruption is perhaps less, but the lymphatics and glands are much swollen and hard, and there are many abscesses, deep and superficial, in different parts of the body. The course of the disease is rapid, and it is not uncommon to observe glanders, acute or chronic, as a sequel to the farcy. The most superficial examination should be sufficient to establish the fact that there is more of a difference in degree than in kind between glanders and farcy. The latter shows an expenditure of the morbid action more in the lymphatic sphere than elsewhere, and there can be little question that the diseases are essentially the same. Finally, it will be observed, as common to all forms of the disease, that the discharge, whether from the nose, abscesses, eruption, or bowels, is intolerably offensive and fetid; the breath is very fetid, and even the exhalations of the body have the same bad odor. In all cases there is difficulty in breathing, showing early pulmonary implication.

Ætiology.—There can be no doubt that the primary source of the disease is inoculation, although some writers state that the disease may arise spontaneously, cases being cited to establish the assertion. In tracing the history of glanders back to the first case observed or recognized, it may be assumed that it appeared spontaneously, as there was no source from which inoculation could occur. If this was the case originally, there is no reason why it should not occur later. In cases in which the source of contagion could not be detected, the disease has been attributed to insufficient feeding, either in quantity or quality, want of care, overwork, or to exposure to cold or wet. However, sight must not be lost of the fact that such want of care as is indicated would show great lack of personal attention to the home of the owner or driver, and opportunity might not be wanting for inoculation from another animal. In the absence of definite information we are fully warranted in assuming that the disease, under rare conditions, may arise spontaneously, for otherwise we could not account for the first case. There is no question but that the vast majority of cases of equinia can be traced directly to inoculation from some other animal, and what is chiefly remarkable, the poison seems to lose none of its virulence by passing through innumerable successive organisms. Experiments show that inoculation with virus taken from an animal six, eight, or ten in remove from the parent source, is equally as

potent as when taken from one only once removed. Like nearly all the organic poisons, the morbid element is resident in the pus cell. The pus itself, while physically different from laudable pus, having an odor *sui generis*, being more viscid, and perhaps containing more *débris*, is not microscopically distinguishable from other pus, laudable or otherwise. In other words, while experiment shows that the pus itself is the medium of contagion, and the corpuscle the particularly noxious element, yet, the germ of the disease has never been detected, as is the case, I am strongly inclined to believe, in all contagious diseases.

As to man, the disease is obtained always by inoculation, either from the horse or from another man; it never arises spontaneously in man. The inoculation may occur *immediately*, that is, by the application of virus directly from the horse or from another man having the glanders, in which case, as already stated, there must be either an abraded surface, a wound, or the part must be naturally absorbent. Thus the virus might rest upon the unbroken integument for an almost indefinite time without being absorbed, but even a momentary contact with some of the mucous surfaces would suffice to produce inoculation. *Mediate contagion* would be such as occurs when the poison contained in a sponge, cloths, articles of harness, or the pail used in the stable, conveys the infection. Directly or indirectly, therefore, glanders can only occur in man from actual inoculation; there are no instances of its arising spontaneously. Cases are noted of its having been caused by wounds received in dissecting both the bodies of horses and men who have died from the disease; it is not believed, however, that the blood or normal fluids of the body will convey the infection, unless immediately after death, but that the specific discharges retain their contagiousness for an indefinite period, regardless of external temperature or even the state of the body as to decomposition. A very instructive case is reported by Arthur Gamgee, M.D. (Reynolds's *System of Medicine*, i., p. 186), which shows the virulence of the poison obtained in dissection, and at the same time is of interest as being the "first case of glanders which appears to have been recognized as such in this country (England)." The report is worthy of insertion at this place:

"*Statement of Sarah Hazelgrave (formerly Turpin), aged eighty-six years.*

"My first husband, John Turpin, whilst skinning a dead horse, in the month of March, 1821, cut the third finger of the left hand, and, heeding but little of this accident, on the following day he left me for a week, to fetch home to the Badsworths' kennels some young hounds that had been reared in the neighborhood of York.

"On his arrival at home, he was very weak and scarcely able to walk, and he at once said 'he should never go out again, he was so ill.' He complained of severe pain in the head, and there was profuse

discharge from the nostrils; and on different parts of his body there were a number of blisters of different sizes, which after a time became blue.

"Mr. Muscraft was sent for, and after he had been at my husband's bedside for some time, he said he was 'afraid Turpin was inoculated by the blood of the dead horse he had cut up, and that there was no remedy, the disease being horse farcy, or glanders, but that if the finger had been taken off at first this might not have happened.'

"Mr. Muscraft gave him medicines, and saw him daily until his death, which took place ten days after he returned from York. He retained consciousness to the last. Large lumps appeared on his forehead and face, and his throat was swelled. His head and face became very large. The wound of his finger was very bad, and the finger looked as if it would rot off, and from the wound there were hard cords, like the stem of a pipe, up the arm, and the arm-pit also swelled. The smell was very bad. May 18th, 1865."

The disease in the horse has been well-known for many years, but little was known of it in man until 1810, when Waldinger called attention to the danger of inoculation, followed by a similar warning from Lorin, a French military surgeon. Later, Schilling, Rust, Muscraft, and Travers, from 1820 to 1826, studied the disease, collecting a number of cases, fully establishing the fact that the disease is communicable from horse to man, and from man to man. So far as external appearances are concerned, there is little to add to our present sum of knowledge. The pathology, however, as well as the morbid anatomy, are not well understood, whether from want of material or from the dangers attending dissection, I know not; my impression is that in this country, at least, the disease is not common; at all events, comparatively few cases occur in man.

Pathology.—The most notable pathological lesions are found in the nose and pharynx, extending, in fact, to the larynx and trachea; they seem to be less mature in the latter region than in the former, probably because, being a later development, the case terminates in death before the final changes can occur. The mucous membrane is studded with minute whitish elevations, varying in size from a pin's head to a grain of wheat; on section these are found to be filled with pus. The pustules break down and form excavated ulcers, in some cases perforating the bones and cartilages; in cases which have continued long enough, the entire mucous membrane is found covered with ulcers, coalescing and running together, there being no pustules. The mucous lining, where not ulcerated, is of a dark color, leaden or mottled; in the latter case the color of the membrane surrounding the patches is normal or somewhat injected. In the case of farcy and in some cases of chronic glanders these conditions of the mucous membrane are not found. In all cases, glanders or farcy, acute or chronic,

the tissues generally are found full of minute collections of foul pus, sometimes cheesy and dry, at others fluid, at others viscid, and in still others in albuminous masses. In the lungs there is usually a number of these abscesses and fibrinous deposits; occasionally we find evidences of pneumonia. The glands are enlarged, softened, frequently adherent to surrounding parts; the lymphatics are distended with degenerated lymph or pus. There are petechiæ on the pleura, the pericardium, and the peritoneum, and the mucous surfaces, even when not ulcerated, have a gangrenous appearance. The liver, spleen, pancreas, kidneys, and the alimentary tract in general, present no pathognomonic appearances.

The pathological anatomy, as given above, might serve for a description of some forms of tuberculosis or pyæmia; apart from the history of the case, or from a knowledge of exposure to glanders, a diagnosis could scarcely be made. It is possible that a study of the disease experimentally, utilizing the means furnished by modern science, might develop something characteristic in the morbid anatomy and give some information of the manner of infection. At present, as already stated, either from paucity of clinical material or from unfrequent post-mortem examinations, our knowledge is exceedingly defective.

Therapeutics.—While treatment must be practically the same in the horse and in man, certain points of difference render it necessary to speak of them separately.

In the Horse.—The first indication is to isolate the horse as far as possible; it must be kept away from other horses, and the pail, sponge, cloths, and other articles which are used about the sick animal, must not be used about a well one; in fact, they should be destroyed as soon as used, or kept as clean as possible, and so guarded that they cannot be taken by others. The attendant should not touch any other horse, nor take part in their care; he must be as carefully isolated almost as the sick horse. Upon the death or recovery of the horse, the clothing of the groom, the articles used in the care of the horse, and his bedding, must be destroyed; the stall or room in which the animal was kept, the manger and rack, must be cleansed with boiling water, and either whitewashed or painted. The attendant, moreover, must be warned of the danger he runs of infection, and be particularly careful that none of the virus comes in contact with his person. It is safer to wear rubber gloves, to keep the hair covered with a rubber or oil-silk hat, and to use a sponge (moist) over the mouth and nose; there is much doubt, as already stated, whether the disease is communicable in any other way than by contact, but it is well to use every possible precaution to avoid inoculation.

The general care of the horse would include attention to the removal of the discharges as they appear at the nostrils; perhaps syringing the nose with carbolized water might be practiced if care is

taken that the injection is not returned into the attendant's face. Abscesses which point on the surface must be opened as soon as possible, and the cavity cleansed with carbolized water. The horse should be kept as clean as possible, discharges of all kinds, urinary, fæcal, and those from the nose and abscesses, must be removed at once, and either buried deeply or burned.

Attention should be given to disinfection. The popular agent is carbolic acid, which is to be used freely; chloride of lime or of zinc may be employed, or any of the agents which now are in common use. Material or articles used about the horse must never be treated in this way, with the intention of using them on other horses; the danger is too great of extending the disease. The injunction must be repeated that all such articles must be destroyed at once. They must not be thrown into running water, in the manure pile, nor buried in a *shallow* hole in the ground.

The persistence of the morbid principle in the excretions is so great that no confidence can be placed in the operations of time; the articles must be put forever beyond the possibility of future use.

Inasmuch as it is asserted by some writers that overwork, poor food, and damp, dark, or otherwise unwholesome stables may produce glanders and farcy without actual inoculation, care must be taken to put the animal in the best possible condition. The food must be improved and be made as nutritious as possible, although the animal may, and probably will, reject all food; water must be furnished in abundance, the best quarters as to light and air secured, and perfect rest observed. Many remedies have been theoretically recommended, the majority of them, however, proving utterly useless either as palliatives or curatives. Dr. James Moore (England), who is an authority on this subject, says: "The sovereign remedy for glanders and farcy is *Kali bichromicum*,—a drug which I was the first to recommend and use in this disease. At the present time I dissolve one grain of it in twelve fluid-ounces of water, and give a wineglassful of the solution three times daily. Locally, I apply night and morning to farcy-buds a solution consisting of one drachm of *Kali bichr.* and sixteen ounces of water."

The anonymous compiler of the *Manual of Homœopathic Veterinary Practice*, published by Boericke & Tafel in 1873, writes somewhat enthusiastically (p. 193) of *Carbolic acid*, a remedy which was then coming into very general use. His directions are quite full, and while I take exceptions to his assumption that the disease is of "germ origin," yet, inasmuch as he claims to have cured cases, both in "man and beast," I quote the passage entire. "Ten grains (or drops) of carbolic acid should be mixed in one pint of soft water, and the whole given to a horse affected with glanders in one day, dividing the solution into four parts or doses. At the same time make a lotion by dissolv-

ing twenty grains or drops of carbolic acid in one quart of soft water, and with this carefully wash out the nostrils, and bathe the affected parts. If there is reason to believe that the glandered surface extends beyond immediate reach up the nostrils, the lotion may be injected into them with a four-ounce syringe." In cases of farcy the treatment is the same, bathing the farcy buds with the lotion.

It is claimed by Dr. Moore, and by others, that under homœopathic treatment the disease is curable, and many cases are cited to substantiate this assertion. Inasmuch as immunity from the disease in man is dependent upon a like immunity in horses, I have given considerable space to the directions given for the treatment of horses.

Among the few reliable clinical reports available I may quote the following; the reporter's known reputation making them valuable. Dr. E. C. Price, of Baltimore, Md. (*Amer. Observ.*, January, 1873, p. 39), says: "A farmer had a valuable horse that was taken with the glanders. He communicated the disease to four other horses that died with it; but the perverse original infector would not die. The farmer's son wished to shoot him, but the old gentleman would not consent to it. The son went to a druggist in Baltimore and obtained *strychnine* enough to kill a horse, and gave it to him on going home at night. On going to the stables in the morning he expected to find the steed stretched in his stall 'cold in death,' but instead of that he neighed for his breakfast. On going to the city again, he berated the druggist for fooling him; the druggist declared that it was the genuine article that he had given him, and that he would certainly give him enough 'to fix him this time;' so he gave him a double quantity. This was also given with a like result. The son, thinking it was useless trying to kill him, let him alone, and in a short time afterwards he was perfectly well. I saw him for several years afterwards, with head erect, carrying the old gentleman about as sprightly as ever."

The same gentleman, in the same periodical, reports as follows a case of farcy cured: "Mare swollen from udder up to the forelegs, and extending part way up the sides and down the inside of the hind legs. From the centre of each farcy bud a yellow, watery, viscid serum exuded, which hardened into a gummy substance. Four doses of the 9th (*Graphites*) dilution in pellets cured in a week. My brother, who had treated many cases of farcy in which, though successful, the cure was protracted, afterwards gave *Graphites*, 2d decimal trituration, with success. His neighbors began to use it, using the drug crude in teaspoonful doses. In either dose used, the cure was equally certain."

The assertion of Dr. Moore that a specific is found in *Kali bichr.* only, and of Dr. Price that *Graphites* is the remedy, should not lead to the conclusion that one is right or that both are wrong; it is rather an additional testimony of the necessity for individualizing cases. It is possible, also, that *Kali bichr.* may be the specific remedy for

acute glanders, and *Graphites* for the farcy; at all events, two gentlemen of unquestioned veracity and abundant experience have given us valuable data bearing on this matter, and their conclusions can only be verified or controverted by clinical experiment.

In Man.—The general principles of treatment of glanders occurring in man are the same as in horses. As to prophylaxis, as with other infectious and contagious diseases, the chief consideration is to keep out of reach of the infection. A man engaged in the care of a glandered horse is in imminent danger of inoculation, and the lodgment of the virus on his person will surely result in the development of the disease if the conditions for absorption are favorable. Having the care of a glandered horse, unusual attention must be paid to cleanliness, and every precaution taken to furnish protection. The hands should be covered with rubber gloves, the hair with an oiled-silk cap, the mouth and nose protected by moist sponge, and any abrasion of the cuticle must be protected by collodion or some other effective covering. The same precautions should be observed in nursing men who may have contracted the disease.

The disease having become established, the indications for treatment are the same as in the case of the horse. The nose is to be kept as free as possible from the discharges; abscesses near the surface are to be opened and thoroughly evacuated as soon as practicable; the excretions are to be destroyed at once, by fire if possible; and the clothing, both of the bed and person, as well as articles of the toilet, are to be burned as soon as soiled, or removed. Light, air, and good diet are to be secured, and none should be allowed to approach the sufferer except those absolutely needed to attend to his wants.

Remedies are probably the same as in the case of the horse, viz., *Kali bichromicum* and *Carbolic acid;* probably the doses need not be as heroic as in the former instance. Hering has recommended *Arsenicum*, *Phosphoric acid*, *Calcarea*, and *Sulphur*, but I cannot find that he has given any clinical experience. *Arsenicum* would unquestionably be of value in many cases, but it is difficult to comprehend under what circumstances the other remedies would be useful. *Lachesis*, *Mercurius*, or *Rhus*, possibly *Tartar emet.* or *Kali permang.*, would seem to be useful in some cases, but they are mentioned suggestively only, which I fear is very often the case in the few references to be found in our text-books and periodicals. The *Times Retrospect* for 1875 quotes from Ehrhardt (*Archiv*, xvii., 1, p. 30) a case cured with *Arsenicum*, which I quote entire, as of interest in this connection:

"Man of 36 years was poisoned with the virus of glanders. After a period of fourteen days, during which he was quite ill, there came some very sore boils; three (3) days later he had the following symptoms: Afternoons, about 3 or 4 o'clock, trembling; feeling of external coldness with internal warmth, especially of the hands and feet; the

chill began with thirst, vertigo, and drawing, tearing pain in the feet, extending upwards to the head, causing there the most terrible pains, with heat and nausea. The heat then appeared in the face, with burning in the eyes and redness of the face; wanted to be kept very warm in spite of the heat. Headache worse from motion, with heaviness, dizziness, hissing, and roaring in the brain; especially evenings and towards morning, alternating with mild delirium, starting up and tossing himself about with heat; anxiety, palpitation of the heart, nausea, trembling of the hands, and fainting. Some hours after the heat, sweat with a sour smell, when the symptoms lessened.

"The face appeared suffering, sunken, yellow; sunken eyes, with blue rings around them, red, easily weeping; photophobia; nose dry; lips dry, easily jerking and trembling; tongue slightly coated, inclined to be dry; thirst, especially during the fever, unquenchable; drank little and often, but shivered often after drinking; retching. Disgust for food; that eaten tasted flat; immediately after, there followed a bitter, sour eructation; raw, painful feeling in throat on swallowing. Neck sensitive to touch; heaviness and feeling of fulness in pericardium; pressure in stomach after eating. Cutting pain in bowels, relieved after a green mucous stool, mixed with hard lumps; hard pressure developed a sensitive spot in the region of the cæcum; urine dark brown. Pressure in the chest, with fugitive stitches below and to the right side of the sternum, on breathing deeply, and a sore feeling at the border of the ribs; with this, almost constant necessity to inspire deeply, with a feeling of suffocation, and sometimes in the evening, palpitation in the heart, and drawing pain in the back.

"Stiffness of the neck and pain in shoulder, better after a slight sweat. Lameness, heaviness, and painfulness of all the limbs and joints, worse from motion; emaciation; very weak, so that standing or sitting caused at once vertigo, darkness before the eyes, and even fainting. ℞. *Arsen.* 30, and later *Arsen.* 6."

The duration of the case is not given, nor do we find a word as to the length of convalescence. The symptoms, however, point to chronic glanders, and the presumption is that recovery was slow. One of my cases, already referred to, went through a similar course, and ultimately recovered after six weeks on *Arsenicum* 12. Another case presented somewhat different symptoms. The eruption was very scattered, and the nose not affected, yet the history of infection was authentic and unmistakable. The course was chronic, and the most urgent symptoms were the extreme debility and the formation of deep lymphatic abscesses in the right forearm. As soon as fluctuation could be detected, the abscess was opened, and a large amount of gelatinous "albuminous" pus evacuated, having a very offensive odor. No local treatment of any kind was employed. *Arsenic* 12 was the remedy used, but it was fully three months before recovery was secured. The

study of my own cases, as well as of cases of others, has led me to believe that the infection is not as profound in some cases as in others, but I am not able to discover what the mitigating conditions are.

HYDROPHOBIA.

BY ANNA WARREN, M.D.

Synonyms.—Rabies, Lyssa; (Fr.) Hydrophobie, La rage; (Ger.) Hundswuth, Wasserscheu, Tollwuth.

Definition.—An acute disease affecting man and certain lower animals, due to a specific animal poison, communicated by inoculation, usually through wounds inflicted by animals suffering with the disease; it manifests itself by symptoms indicative of great disturbance of the nervous system, and characterized by madness or rage.

History.—In both ancient and modern times the accounts of rabies have filled a large space in the annals of medicine. The disease has excited a great deal of attention, owing to its peculiar and terrible nature, its communicability from one species of animals to others and to man, and its supposed incurability. We find numerous records of the prevalence of rabies among nations of antiquity. The accounts as given by ancient writers are, however, of little value, except for the purpose of historical study. Referring to the antiquity of rabies, Wise's *History of Medicine* gives the credit of the earliest account of the disease to Susrata, a Hindoo physician living about ten centuries before the Christian era. In this record the description of the disease and its treatment differs not widely from a true account of the same in modern times (Russell).

Flemming gives from Plutarch an interesting account of the early history of rabies. "According to Athenodorus it was first observed in mankind in the days of the Asclepiadæ, the descendants of the god of medicine, Æsculapius, by his sons Podalirius and Machaon." They spread through Greece and Asia Minor as an order of priests, prophets, and physicians, preserving as a hereditary secret the results of the medical experience which they had acquired in the temple. They are the earliest physicians known to us, and it is not unlikely that they may have been the first to observe the madness of animals transmitted to mankind. Perhaps Plutarch is more accurate in this statement than in many of his stories of the contrasted heroes in his "Lives."

Of all ancient authors on the subject of rabies we are perhaps most indebted to Cælius Aurelianus, a Roman of the second century A.D., contemporary with Galen. He wrote an accurate description of the disease and a most exhaustive treatise on the subject of hydrophobia in man. Passing from ancient to mediæval history we find in German literature some reports of scientific interest referring to outbreaks

of the disease among wolves in Franconia in 1271. From that time to the first quarter of the present century there are, in different portions of Europe, many records of epizoötics of rabies among dogs and wild animals, and of its fearful ravages among mankind. The most notable outbreaks of the disease in this century were in the summers of 1803 and 1804, and again in 1830. Europe has suffered more from rabies than has any other part of the world. It was so rife in England in 1830 that the House of Commons deemed it advisable to appoint a committee of investigation. Since that time, owing to sanitary police measures, there has been a great abatement of the disease. There has never been a severe outbreak of the affection in the United States, although so stated by some writers, as Bollinger and Bigelow. The disease prevailed to some extent throughout the country in 1785 and 1786, and in some portions in 1803 and 1804, since which time there have been only occasional outbreaks, limited in territory and numbers. It is remarkable that in this country rabies has never been known to be epizoötic among the wild animals of the western plains; it is only occasionally that an instance is noted of a wild animal afflicted with the disease. An army officer reports a case of a rabid wolf straying into a fort in New Mexico and biting several soldiers. The wounds were cauterized, and no bad results followed.

In 1818, after a severe outbreak of hydrophobia in Russia, much attention was excited among the medical profession by the announcement of Marochette, a distinguished physician of that country, that he had accomplished prophylactic treatment of hydrophobia by cauterization of the sublingual vesicles, the lyssi of the Greeks. Marochette does not claim to be the discoverer of the sublingual eruption nor of this plan of treating the disease. The treatment is traditional in Greece, and probably originated there.

Of recent authors on the subject of rabies and hydrophobia, Dolan, of England, and Bigelow, of the United States, have written exhaustive treatises; both contain much that is of scientific interest regarding the pathology of the disease and positive assertions of its curability. M. Pasteur's experimental researches are filling the medical world of to-day with still greater interest concerning its pathology; he positively asserts that the disease invariably ends in death.

Ætiology.—Hydrophobia is produced in the human subject by the introduction of the virus into the system by means of the bite of a rabid animal, usually the dog, the vehicle of communication being the saliva, which is abundantly secreted by the diseased animal, and which contains the poison.

Inoculation has taken place from the mere licking process by a rabid dog on the thin, delicate skin of a child. An instance of this kind was observed by the writer a few years ago. The affection can be trans-

mitted from the human subject back to animals, but, it is thought, not from man to man.

Hydrophobia has resulted from wounds made at post-mortem examinations of mad dogs, and it is held by many that inoculation with the blood of the rabid animal will produce a like effect.

It cannot be denied that in a goodly number of cases there appears to exist a lack of susceptibility to the contagion of rabies; at least not all persons exposed to the action of this malignant poison develop the disease. It is, however, impossible to determine satisfactorily to what extent this lack of susceptibility exists and upon what conditions it depends, since the evil effects of the bite are modified more or less by the peculiar circumstances surrounding each case. Not only does the location of the wound, whether inflicted upon an exposed and raw or upon a well-covered surface, affect the result, but a considerable portion of the poisonous material may be absorbed by clothing covering the part, or washed away by a copious hæmorrhage immediately following the infliction of the bite. Furthermore, the agencies usually applied in such cases, as cauterization and sucking of the wound, undoubtedly are often employed with excellent effect, and as often forestall serious results from the bite of a mad dog, as the dread of so great a calamity, in case of a bite from a perfectly healthy dog, leads to the almost certainty of belief that the animal was suffering from rabies, thus greatly complicating the question of individual insusceptibility to the action of the poison.

It has been held that rabies is primarily a disease of the carnivora, particularly of the dog, and many theories, more or less ingenious, but practically unsatisfactory, have been advanced to account for its existence and origin. While the disease is most frequently observed among dogs, probably because dogs abound wherever man dwells, we know that wolves, foxes, pigs, cats, badgers, and even horses, sheep, cattle, and other grass-eating and domestic animals, often suffer and die from rabies. The American skunk is also known to fall a victim to this affection, and a number of cases have been recorded of rabies in man resulting from the bite of the skunk. In an overwhelming majority of cases the appearance of the disease in one animal depends upon its inoculation from the bite of another suffering from rabies; it has, however, been ascertained that very similar results may follow from the bite of a healthy animal enraged, and a considerable interest attaches not only to this fact, but also to the peculiarly disastrous effects following the bite of man in a state of fury.

Pathological Anatomy.—The virus of rabies causes no lesions, either coarse or microscopic, differing in any way from those found after death from various other causes. The changes observable to the naked eye are fluidity of the blood and derangement of its circulation. There is increased vascularity of various organs and tissues,

mainly due to the great disturbance of the nervous system and the asphyxia of the last stage (Trousseau). This hyperæmic condition is more intense in the pharynx, extending often to the bronchi and stomach. There is frequent congestion of the lungs, and the brain and spinal cord are often in a similar state.

The lesions shown by the microscope are also vascular. These minute changes are particularly referable to the finer vessels of the nerve centres—the medulla, the origin of the seventh, eighth, and ninth nerves, the spinal cord, and the convolutions of the brain. The accumulation of leucocytes in these minute vessels, perivascular spaces, and surrounding tissues constitutes the chief change (Gowers). There is also granular degeneration of the ganglion nerve-cells, particularly noticeable in the parts most congested.

None of these morbid conditions can be considered as strictly characteristic of hydrophobia; they are neither primary nor uniform, nor are they found in all cases of death from rabies; on the other hand, similar lesions are observed as the result of other causes. However, their nature and location, and the constitutional symptoms developed, point to the primary excitant, and have been of value in determining the nature of the affection.

It may be of interest to note the conclusions of some recent pathologists on this subject. Dolan says: "I am strongly of the opinion that future investigations will point to the existence of a blood ferment as the exciting factor." Gowers's opinion is "that the vascular changes from their variability and occasional absence are probably secondary effects of the disturbed action of the nerve centres produced by the poison carried by the blood." Coats thinks "that there is an irritant in the blood which attacks a considerable number of organs, the signs of irritation being most manifest in the vicinity of the smaller bloodvessels; it is probable that this irritant attacks some vessels more than others, that the medulla oblongata and spinal cord are the most affected." Hammond: "It is not necessary to suppose that hydrophobia is a nerve disease from the beginning; it is possible however that it may be. The disease presents many analogies to tetanus, both in its morbid anatomy and natural history, and yet there is no suspicion of blood poisoning in tetanus. Hydrophobia is probably of the nature of a ferment, but this cannot be satisfactorily proved." Bigelow "believes the primary excitant to be a blood irritant which chiefly affects the finer vessels of the central nervous system, that the condition of disorganization found upon post-mortem examination of the cord is an effect of the altered blood supply." Mr. Pasteur, after independent experimentations which cover a period of four years of careful investigation, states: "that the virus of rabies always develops itself in the nervous system, in the brain, the spinal cord, the nerves and salivary glands, and never simulta-

neously invades all parts. It may, for example, fix itself in the spinal cord, and then attack the brain, or it may be found in one or more parts of the brain, and not in others." There is only one part in which he invariably found the poison, and that is the medulla. This was ascertained by repeated inoculation into the arachnoid cavity with material from the bulb of an animal dead from rabies. As this operation, in hundreds of animals inoculated, never failed to communicate the disease, two results are adduced: "the invariable presence of the poison in the medulla of the animal dead of the disease, and the certainty that rabies can be communicated by inoculation in the arachnoid cavity." These results Pasteur takes as an "experimental basis" for a vaccination method with attenuated virus against hydrophobia.

The period of incubation of hydrophobia is remarkable for its variability, this fact exciting much interest among observers and leading to the formation of many different theories, all more or less unsatisfactory. Pasteur states that the length of the period "of incubation may depend very much on the quantity of active virus, that is the virus which reaches the nervous system without diminution or change." This he proves by experimental inoculations with virus in diminishing quantities, the result being that the smaller the quantity of virus, the longer the period of incubation. In one case reported three dogs were inoculated, the first with a stated quantity, the second with the hundredth part of the first, and the third with the two-hundredth part; the first dog developed the disease in eighteen days, the second in thirty-five days, and the third showed no symptoms of the disease; the last animal was inoculated again, four months later, and died of the disease, thus demonstrating that it was not insusceptible.

In the above experiment the virus was introduced into the popliteal vein, and the result is not regarded quite as satisfactory as in the following experiment performed by trephining. Several rabbits were inoculated with varying amounts of virus, and the period of incubation was lengthened by the diminution of the virus so that while the rabbit receiving the most virus was affected in eight days, those receiving $\frac{1}{5}\frac{1}{12}$ as much virus were not affected until the sixteenth day. In no rabbit did the period of incubation end earlier than in others having a greater amount of virus. The conclusion deduced is that whether rabies be produced by bite or by intentional inoculation, the length of incubation sustains an inverse ratio to the amount of virus which reaches the central nervous system. It is also demonstrated that animals which, on account of the small amount of virus received, have passed through a long period of incubation, produce a poison of the same strength as if they had been inoculated with a large quantity; furthermore, if other animals are inoculated with an abundance of virus from them a brief incubation will result. It is, therefore,

believed that the amount of virus, or the amount of active poison in the virus, can always be determined by the length of time which elapsed from the moment it reaches the nervous system until the incubation is complete. To this rule there is, however, an exception when an animal transmits the virus to one of another species before it reaches its maximum, for in that case there is considerable irregularity in the length of the period of incubation.

A discovery still more marvellous is the fact that in some degree in rabbits, and in a more marked degree in Guinea-pigs, the period of incubation gradually shortens, and the severity of the attack grows correspondingly greater if the virus is imparted from one animal to another, from the latter to another, and so on in succession. The period of incubation in Guinea-pigs has been shortened in this way to five days. Dogs inoculated from Guinea-pigs thus severely affected are attacked by rabies much more severely than is commonly known.

Of still greater interest to medical science is Pasteur's discovery that virus transmitted from monkey to monkey gradually produces a lengthened period of incubation and a diminished severity of attack. This transmission of the disease through monkeys was continued until no perceptible attack resulted from inoculation; then, with the virus thus weakened, inoculation was performed upon a rabbit, and then continued from rabbit to rabbit with gradually increasing virulence through all the series. From each rabbit in succession, until the most fatal result is reached, virus was preserved, and from inoculation with these successive viruses dogs were rendered insusceptible to hydrophobia. Inoculation from the first rabbit prepares the dog to receive without danger the more virulent poison from the bulb of the second rabbit, and so each successive inoculation qualifies him to resist a more active virus until at last he is proof against any ordinary inoculation. Pasteur submitted to a commission for experiment nineteen dogs thus fortified against rabies, and they were exposed in the same way as nineteen other dogs not prepared. Of the nineteen dogs not prepared, thirteen died of rabies; of the nineteen prepared by successive inoculations against rabies not one showed signs of rabies although all the animals were exposed in the same manner.

The medical world will await with interest the prosecution of these experiments, hoping that we may eventually succeed in thoroughly protecting man against the ravages of hydrophobia. But if we should fall short of this accomplishment, we may at least, it seems, bring about very similar results by preventing the spread of the disease among those lower animals which are the sole means of its dissemination. M. Pasteur expresses the belief that eventually we may find ourselves able to secure the successive preventive inoculations effectually between the time of inoculation by bite and the end of its natural period of incubation.

Symptoms.—During the stage of incubation the system shows no indication of the presence of the poison in the system, unless it be the appearance, for a short time, of the sublingeal eruption which, it is claimed by some authors, exists in the early part of this period. Trousseau attaches much importance to this symptom; he maintains that it has been observed by men whose honesty and reliability cannot be called into question; that we have no right to deny, as has been done, the existence of the eruption, and he does not hesitate to intimate that those who deny its presence have not looked for it at the right time.

The wound inflicted by a rabid animal presents absolutely no characteristics. It heals usually as readily as a wound made from the bite of a healthy animal. It may remain open and irritable during the stage of incubation, but otherwise shows no unusual symptoms.

Hydrophobia develops after an incubation stage varying from a few days to years, but usually lasting from two weeks to three months.

The phenomena which develop as the disease declares itself are not uniform. Sometimes the premonitory symptoms are entirely absent or not noticeable, the affection, at its first appearance, showing its full malignity. Usually the cicatrized wound remains unchanged and no local symptoms are observed, but sometimes the cicatrix becomes painful and irritable, or the open wound becomes inflamed. The sensations proceeding from the cicatrix are variously described by writers. The convulsions follow a kind of "aura," starting from the cicatrix (Brown-Séquard). Tearing pains often proceed from the wounded part, and are frequently attributed by the patient to the effect of a cold and to rheumatism thereby induced. . . . . Peculiar sensations are frequently experienced at the seat of the bite or in adjacent parts, a sensation of pricking or boring, and a feeling of picking or burning always proceeding from the wound (Bollinger).

Usually, the first indication of the impending malady is the extreme melancholy of the victim, a feeling of depression, the shadow, as it were, of the approaching evil. To this is added an anxious, restless manner, dull headache, insomnia, and loss of appetite. Then follows dyspnœa, an uncomfortable feeling of stiffness in the muscles of the neck and throat, and constriction of the chest, with some difficulty in swallowing, frequent sighing, and a general feeling of oppression and weakness. Sometimes the initiatory symptoms are pains in the stomach, with nausea and vomiting. There is more or less excitement; the pulse is accelerated and the temperature increased. All the symptoms gradually grow in intensity. The ingress of the hydrophobic stage is marked by the beginning of the spasmodic action of the muscles of deglutition when the sufferer attempts to eat or drink. As these spasms become more painful, the mere sight of

water, or perhaps the mention of it, causes shuddering; any attempt to allay the intense thirst from which the patient suffers gives rise to convulsive action, involving not only the pharyngeal muscles but the whole body. These convulsions increase the dread of drinking or swallowing, and in many cases this becomes a source of perfect terror. In some instances this symptom is wanting, and there is then but little difficulty in swallowing and no "dread of water." No doubt, this is owing to the absence of lesion at the nerve centre for deglutition. The horror felt by the patient is depicted on the countenance, and spreads dismay among his friends. There is a secretion of viscid, tenacious mucus in the throat, an increased secretion of saliva which cannot be swallowed and is with great difficulty spit out. The effort to clear the throat is made with a snapping motion of the jaws, accompanied by a sound resembling somewhat the bark of a dog. The convulsions, which at first were caused only by the attempt at deglutition, are now caused by any unusual sight or sound or disturbance of any kind; even a sudden draft of air on the face will cause convulsive action. This excessive cutaneous hyperæsthesia is one of the most marked features of the disease. The pulse is now rapid, small, and irregular; the skin is hot and dry; the breathing is labored, and respiratory spasms intervene during convulsive action. As the disease advances to its termination, the paroxysms increase in violence and frequency, until, in many cases, there are continuous convulsions, often accompanied with maniacal fury. The delirium is sometimes continuous, and again there are intervals of quiet and consciousness. Death from asphyxia may intervene during one of the paroxysms, or it may result from paralysis produced by exhaustion after the subsidence of the convulsive stage.

The duration of hydrophobia is usually about four days. One case recently reported lived but eight hours; the longest duration is about ten days. The mental condition observed in the early stage of the disease has much to do with the duration.

As the virus of hydrophobia does not always select the same point of attack in the brain, medulla, and cord, the phenomena developed thereby often vary. There may be no cerebral excitement, the mental faculties remaining clear to the last, thus showing a violent contrast to the wild maniacal fury of other cases. The spasm of deglutition may be slight, and consequently there may be no dread of water. Again, the general muscular spasm may be absent or light. Cases occur of a mild form showing none of the most violent symptoms.

Diagnosis.—It is impossible to form a correct diagnosis of hydrophobia during the stage of invasion or from the premonitory symptoms; it is equally impossible to mistake a fully developed and marked case for any other disease. The symptoms of greatest value in making the diagnosis are the extreme excito-motor susceptibility, the spasm

of the respiratory muscles when attempting to swallow, especially liquids, and the hypersecretion of tenacious mucus in the throat with salivation.

The diseases most liable to be confounded with hydrophobia are acute mania, tetanus, and mental or hysterical hydrophobia, sometimes termed spurious hydrophobia.

The resemblance to acute mania is shown when the cerebral lesion is evinced by the occurrence of great mental disorder at the onset of the malady. The history of the case, the persistency of the return of the respiratory and the general convulsive action which, in such cases, is never absent, and the rapid course of the disease would determine its nature.

The points of difference between hydrophobia and tetanus are so marked that the differential diagnosis is not difficult. In tetanus the result is apt to follow the injury in a short time, in hydrophobia it does so exceptionally. The convulsions of tetanus are continuous, are usually combined with trismus, and are not accompanied by the respiratory spasm which marks those of hydrophobia. There is also entire freedom from mental disturbance, and no increase in the secretion of saliva.

It is sometimes difficult to distinguish the genuine disease from a similar mental affection induced by excitement and apprehension. There may be present in a case of the latter all the convulsive phenomena, the difficult deglutition, excessive hyperæsthesia, increased flow of saliva, and excited manner; yet, there is an absence of all mental derangement, except the great fear and anxiety; the countenance fails to express the horror and despair of true hydrophobia, and the symptoms yield to quieting treatment.

A case came under the writer's observation a few years ago, in which a woman was bitten on the finger by a pet dog that was ailing. The dog died the next day, showing, however, no signs of hydrophobia. Little was thought of the bite at the time until, the wound continuing painful and refusing to heal, thoughts of hydrophobia filled the patient's mind. Being of an excitable temperament, and subject to hysteria, she became intensely anxious. Soon local spasm and globus hystericus appeared, followed by general convulsions. There was also extreme hyperæsthesia; any attempt to swallow, or any unusual disturbance, such as the appearance of a stranger, or a bright light, or noise, would induce paroxysms. There was hypersecretion of mucus, and a hysterical cough resembling the bark of a dog. There existed no mental disorder except the great apprehension that she was going to die of hydrophobia. The general appearance was not that of a hydrophobic patient. The character of the local spasm was merely that of dysphagia, and the muscles of respiration were not involved. By firm control she was tranquillized, and being assured that she could

drink, she did so, with little apparent effort. The symptoms of hydrophobia disappeared in a few hours.

Dysphagia sometimes accompanies different affections of the throat, but they are not easily confounded with hydrophobia.

Prognosis.—The prognosis is exceedingly grave, and very few, if any, cases of cure are recorded.

Treatment.—Little confidence is to be placed in the success of any treatment for hydrophobia after it has fully developed. Suggestions relating to remedies for the disease are numerous, but not much faith can be placed upon them. Our main hope at present lies in preventive measures. Prevention of possible inoculation first merits our attention. If the number of animals from which mankind is most liable to contract the disease were reduced to those that are actually useful, cases of hydrophobia would be comparatively rare. Police measures for the enforcement of well-regulated dog-laws would greatly lessen the risk of infection, and such laws should be strictly enforced whether there be known cases of hydrophobia, or not.

The adoption of active measures for prevention immediately after a person has been bitten is of the utmost importance. These means consist in removing from the wound the virus deposited through the bite of the rabid animal before the poison enters the system. There are several methods of accomplishing this. The most approved is excision of the bitten part immediately, or as soon as possible, after the bite, provided the operation is not objectionable on account of the situation of the wound. Compression will increase the flow of blood, and thus facilitate the removal of the virus. After the dissected wound has bled freely for a few minutes, a solution of sulphurous acid and hot water should be allowed to flow freely over the wound for half an hour, or should be applied hot with a sponge.

Suction is one of the most effective means of extracting the virus, and is usually the only one that can be applied instantaneously. Objection is made to this method by some on account of the supposed risk to the operator, but since it has been shown by experiments that the virus is innocuous when brought into contact with the mucous membrane of dogs, it is believed to be harmless to human beings under similar circumstances. If there be no abrasion of the mucous membrane, and the mouth be well rinsed out after each application, there is little or no danger of absorption by the mouth. Kneading or expression of the wound will aid the operation by causing copious bleeding. The principle on which the so-called "mad-stone" is supposed to act, is that of suction. It is said to adhere to the wound until it has absorbed the poison, the surface which is applied to the wound being porous.

Trousseau recommends cauterization as the only prophylactic from which success may be hoped, and he strongly advises that the sub-

lingual eruption be looked for in every case, and, if found, cauterized. The hot iron is not used for cauterization so much as formerly; caustics are preferred. Of these, the nitrate of silver and the caustic potash have been found most effective. Youatt, a man of experience, second to none in the use of caustics in the prophylactic treatment of individuals bitten by rabid animals, states that not one of those so treated developed the disease (Bigelow). The use of the hot iron should not be neglected when other means are not available. The efficacy of any method of extracting or destroying the virus depends on the promptness and thoroughness with which it is used.

Vapor-baths are recommended as an aid to the removal of the virus from the system, before or after the development of the disease. Hot baths of all kinds are useful, not because of any supposed power to eliminate the poison, but because they exert a quieting, soothing influence on the patient, which is of much importance.

We are not, however, confined to local measures. After these means have been sufficiently used, the patient should be put under the influence of Belladonna, and the use of this remedy in one of the low dilutions should be continued for a long period of time.

The remedies likely to prove of the greatest service in the treatment of hydrophobia, fully developed, must belong to the class which exert a powerful influence upon the brain and nervous system, such as Belladonna, Stramonium, and others. The serpent poisons, also, in their provings present many symptoms which would justify their exhibition in such cases, and Crotalus, Lachesis, and others of the same class, as well as the various animal poisons which, like Tarentula, Curare, etc., present marked convulsive action in their pathogenesy, should be carefully studied; it might seem well to administer remedies of this class by hypodermic injection. Laurie claims that Scutellaria has been found "very useful in many cases, both as a preventative and curative." Reports have been published showing encouraging results obtained, both in America and in Russia, from the free inhalation of oxygen.

General measures for the care of the patients should be strictly attended to. Every cause of excitement should be avoided, and quiet observed. The patients should be tranquillized as much as possible by hopeful, cheering words. Nourishing enemata may be given to avoid as much as possible the pharyngeal spasm. Bits of ice in the mouth will relieve the burning thirst. If the great nervous excitement continues, the convulsive action is excessive, and the necessity for restraint is obvious, resort should be had to chloroform, nitrite of amyl, or pilocarpin.

SUDAMINA AND MILIARIA.

BY J. G. GILCHRIST, M.D.

Sudamina and *miliaria* are names given to two forms of eruption, quite different in character, occurring for the most part in connection with febrile affections, and to some extent intimately related as to causation. Taken alone, without reference to the condition with which they are associated, they have little, if any, pathological significance, nor are they of a character to call for any therapeutic consideration; their only interest or value to the practitioner lies in the fact that in some cases prognosis may be assisted by observing them; but even here the same conclusions are as readily reached in other and more positive methods.

Sudamina is a term constructed from the Latin *sudor*, "sweat," from the fact that this eruption is preceded by sweating, or is caused by profuse perspiration. It appears as a minute miliary eruption of vesicles, filled with a clear, transparent serum, unaccompanied by redness, itching, heat, or any signs of local irritation. In the large majority of instances the patient is unconscious of the eruption, unless his attention is directed to it, and not unfrequently the vesicles are so small as to escape detection. Even in cases where the eruption is quite extensive, to the unaided sight there is little, if anything, to be seen; on passing the hand over the part a roughness will be felt; if the skin is now examined with a lens, or obliquely, the vesicles may be detected. Examining the fluid with the microscope, no organic elements are found, unless it be a few epithelium cells. Analysis shows an acid or neutral reaction, and a small amount of chlorides, the fluid itself being watery, colorless, and transparent.

The number of vesicles varies greatly. In some cases they are so few that they may be counted; again they occur in incalculable numbers. They are oftener found on the trunk, particularly on the abdomen, or sides of the chest, also on the neck, low down at its root. In some instances they are found on the arms and lower extremities. They usually attain their full development in the course of a few hours, and either pass away insensibly, burst, and disappear in scales or crusts, or, when very numerous, they may coalesce, forming considerable blisters or bullæ, causing the epidermis to peel off in large pieces.

The eruption usually appears on what are called the "critical days" of continued fevers, and after profuse perspiration. In tropical countries it is very commonly seen among all classes of people; in fact, it may have no relation to pathological states, as laboring people, in perfect health, often observe it after severe exertion accompanied by profuse perspiration. The fact that there is entire absence of irritation

or inflammation is additional proof, if needed, that there is no pathological basis. Hence the causation, or rather, what might, although inappropriately, be called the pathology, is exceedingly obscure. The most generally accepted explanation is that the sweat ducts are occluded by dead epithelium, and the increased perspiration causes both an enlargement of the duct and a transudation between the cuticular layers. Inasmuch as the occurrence of profuse sweat in acute fevers indicates a fall of temperature, the occurrence of sudamina may assist to some extent in establishing prognosis; the same phenomenon occurs, however, from extreme weakness.

No treatment is required for sudamina as such, nor is the existence of the eruption of any therapeutic value as to the fever in general.

Miliaria, so called from its resemblance to millet seed, is an eruption differing in appearance and significance from sudamina, but, like it, occurring in connection with perspiration. It appears as a minute vesicular eruption, occurring oftener in long rows, following the furrows of the skin. It is not as firm a vesicle as the sudamina, the contents are turbid, and there is a faint reddish blush around the base, giving to the skin between the patches a mottled appearance. Upon examining the contents of a vesicle, it is found to be of acid reaction, turbid, and under the microscope is found to be filled with granular cells, shrivelled and poorly developed; the addition of acetic acid shows the cells to be polynucleated, at least two nuclei in all, as a rule, some having more. The eruption occurring for the most part on covered surfaces, it usually soon disappears on exposure to the air in a very short time.

As to causation, Sidney Ringer (Reynolds' *System of Medicine*, i., 123) says: "To the author it appears probable that the vesicles of miliaria are not formed during the act of sweating, but that they result from the irritation which the sweat causes. This view is supported by the following considerations: The vesicles are especially apt to occur on those parts of the body from which the free evaporation of sweat is prevented. Thus they are found under the band of the drawers when seen nowhere else; and in cases of profuse sweating, if a piece of flannel be worn for some time, firmly tied around the neck (at which part of the body these vesicles are easily produced), they not unfrequently appear—ceasing, however, to be formed when the flannel is removed. Moreover, in rheumatic patients these vesicles are very abundant over the back, at which part the perspiration is confined, and often allowed to accumulate, because of the pain caused in such movements of the patient as would be required for washing this part of the body. They are also most numerous in those rheumatic patients whose sweat is usually offensive and disagreeable. And further, according to the author's experience, they are most apt to occur in other patients when, from impairment of the health, either

by overwork, want of sleep, excess of smoking, or other causes, the sweat smells offensively, and when probably it causes greater irritation of the skin. For the further settlement of this question the following experiments were made: Dry spongio-piline was placed on various parts of the body, especially round the neck, and kept on the surface several days. By the action of this dry spongio-piline, sudamina, but in no case miliaria, were produced." On the same patient other applications were made of substances which were irritating, or obstructed evaporation, and miliaria were produced.

The inference which is to be drawn from these and similar experiments is that the condition is to some extent inflammatory, due at once to the irritation of the parts from the perspiration, and to the retention of epithelial scales or débris in the sweat ducts.

Notwithstanding there is some ground for considering miliaria a form of morbid action, yet, as it appears to be an accidental addition to an already existing morbid action, soon disappears when the exciting cause passes away, and is quite without any pathological significance, treatment is never called for. Bathing and exposure to the air, when possible, will in most cases cause it to soon disappear.

TYPHOID FEVER.

BY THOMAS NICHOL, M.D.

General Description.—Typhoid fever is an endemic disease of uncertain but protracted duration, caused by a morbid poison the precise nature of which is still undefined, though it is known that it is associated with decomposing organic matter. It resembles the eruptive fevers in that it principally attacks the young, that, as a general rule, it occurs but once in the same subject, and that it is unquestionably contagious. Da Costa further observes that it differs from most of the essential fevers in that it has constant and appreciable anatomical lesions.

The commencement of the disease is often insidious, languor and malaise creeping on so gradually that even intelligent patients can hardly tell when they ceased to be well; the patient rarely takes to the bed till the commencement of the second week. Slight rigors are common, accompanied by dull headache and anorexia, with nausea and vomiting. At first the fever consists of mingled chilliness and heat, with a soft and frequent pulse, and, in the milder cases, distinct remissions are present. The febrile movement is really made up of two distinct portions, the *primary* fever being the resultant from the absorption of the specific poison, and the *secondary* from the intestinal ulceration and the resorption of septic fluids. Abdominal pains soon appear, especially in the right side, with spontaneous diarrhœa, at

first devoid of mucus. In the earlier stages the tongue is red, further on it is brown, dry, and fissured. As the disease advances, the abdominal tenderness increases, and is accompanied by tympanites and gurgling in the right iliac fossa, while the diarrhœa is now profuse, watery, ochre-colored, and distinctly alkaline in reaction. In severe or fatal cases intestinal hæmorrhage accompanies the diarrhœa, and perforation of the intestine is to be dreaded. Splenic dulness is common. On the seventh or eighth day isolated rose-colored spots appear on the skin, especially on the chest and abdomen; these spots disappear on pressure, and are developed in successive crops, each lasting about three days. The headache is frequently followed by stupor and delirium, though the mind is often clear even in severe cases. As a rule the pupils are dilated and epistaxis is common. Pulmonary complications are so common as almost to be part and parcel of the disease, and, generally speaking, prostration is late and convalescence tardy. The average duration of the disease is twenty-three days, and in fatal cases death often takes place towards the close of the third or the commencement of the fourth week. After death the solitary and agminate glands of the ileum are almost invariably found to be inflamed or ulcerated, while the spleen and mesenteric glands are enlarged.

The Nature of the Disease.—Writing thirty years ago, Dr. Elisha Bartlett pointed out that "the local lesion of typhoid fever is not primary, but secondary; that instead of being the single cause and origin of the disease, it constitutes only one of its elements, and is itself dependent upon some other and ulterior morbid condition as *its* cause, the seat, nature, and operation of which are not known to us." The well-marked intestinal lesions, then, as well as all other changes in other parts of the body, are the effects and not the cause of typhoid fever, and we must ascribe all these varied lesions to a specific cause only known to us by its effects. But certain laws appear to govern the action of the specific poison, and a consideration of these laws enables us to form a somewhat accurate idea as to its nature. In the first place, then, the poison of typhoid fever is frequently, but not invariably, derived from a previous case of the disease. Many excellent observers hold that it is *always* derived from a previous case, but there can be no doubt whatever that a large number of cases are apparently independent of contagion. The mere exposure to the emanations from decaying organic substances, and even the drinking of water contaminated with them, will not cause typhoid fever, though when the stools of typhoid patients are mingled with decomposing sewage an outbreak of the disease is almost inevitable. Dr. Murchison remarks that when the disease is imported it does not spread, unless there be at the same time defects in drainage or in the water-supply. Again, as Dr. Cayley first pointed out, drinking-water may be con-

taminated by ordinary fæcal matter for an indefinite period without giving rise to typhoid fever till the arrival of a person infected with that disease. Again, the specific germs of the disease, styled by J. von Niemeyer "low organisms," may be carried about in the clothing or bedding of patients, and these *fomites* retain their infecting power for a long time. J. von Niemeyer holds that the absorption of the germs appears to take place chiefly through the lungs, and Sir Thomas Watson urges that care should be taken not to inhale a possibly poisonous breath. One single case of the disease may be the *fons et origo* of a widespread endemic, and a mere "walking case" may give rise to the most serious form in others. The period of incubation seems to vary from ten to fourteen days, though Liebermeister thinks that it averages three weeks, or even longer; I have, however, seen many cases in which the period of incubation did not exceed forty-eight hours. The poison is undoubtedly eliminated with the alvine discharges, and these seem to constitute the chief vehicle of communication. People who drink water polluted with the *putrid* discharges of typhoid fever, even when the polluting matter is in very minute quantity, or who breathe air loaded with emanations from the same dejections, or who wash or otherwise handle the clothing or bedding soiled with decomposed typhoid stools, are exceedingly liable to contract the disease. But merely being in the same room with patients is not likely to cause the disease, even though fresh dejections are in the apartment at the same time. Indeed, it is conclusively proved that *fresh* stools are incapable of reproducing the disease, and a period of twelve to fifteen hours must elapse before they acquire their virulent powers. The poison, as a rule, does not emanate from the body of the patient, but from the *decomposing* stools. Again, these fever-germs retain their activity for a very long time, as long as two or three years, and Dr. Aitken asserts that "*the living human body is the soil in which this specific poison breeds and multiplies; and that most specific of processes which constitutes the fever itself is the process by which the multiplication is effected.*" No condition of their existence is better known than that remarkable one in virtue of which these germs are capable of reproducing themselves in enormous numbers outside of the human body. The germs most frequently gain access to the body in water, though it is clearly proved that they may reach the blood by the medium of the respired air. When an individual has once suffered from typhoid fever he is effectually protected from a second attack,—though second attacks are occasionally noted. From all this it appears that typhoid fever is an *endemic* disease, and though it often appears to be epidemic, it will be found on analysis that the epidemic is made up of a number of endemics. After all that has been said, the present writer feels certain that typhoid fever can be communicated by the sick to the healthy; still, in a vast number of cases it is impossible to determine the precise

mode of communication, and it is a curious and suggestive fact that physicians and nurses rarely take typhoid, and also that solitary cases in large families are quite frequent.

"No acute disease," writes Dr. Murchison, "presents itself under a greater variety of forms than enteric fever," but it should be noted that these numerous forms are merely differences in the mode of attack, or else certain groups of symptoms force themselves into notice, and thus give color to the disease. There can be no reasonable doubt that the *putrid fever* of Stoll, the *malignant nervous fever* of Huxham, the *bilious fever* of Tissot, the *synochus putris* of Cullen, the *mucous fever* of Rœderer, and the *adynamic fever* of Brown are all identical with what Bretonneau styled *dothinteria*, and English-speaking physicians call typhoid fever or enteric fever.

Division.—Dr. John Harley divides the disease into three varieties: (1) Simple inflammatory enteric fever; (2) Contagious enteric fever; (3) Paludal enteric fever; but no one pretends that the dejections of the first form are incapable of conveying the contagium, or that the third variety, which Harley believes to be the common form, differs in anatomical lesions from the other two.

The best, because the most practical, division is that of Murchison, which is substantially as follows:

(1.) The *mild form*, including what is known as the *abortive variety*, which runs from twelve to sixteen days; in this class some practitioners include cases which can hardly be real enteric fever.

(2.) The *grave form*, subdivided into the acute, inflammatory, gastric or bilious, ataxic, adynamic, abdominal, thoracic, and hæmorrhagic.

(3.) The *latent form*, often called "walking," because instead of going to bed, the patient walks about during the entire attack. But it must be noted that *the local lesion of the intestines is present in these cases*, and also that perforation is quite common, often resulting in sudden death.

Its Relation to other Continued Fevers.—Our knowledge of this disease is due to the labors of several generations of investigators, but the disease has only been separated from the other continued fevers within the present century. Some of the cases mentioned by Hippocrates were almost certainly typhoid, and it is described by other Greek writers. During the seventeenth century several writers in England, France, and Germany described cases of fever which, both in symptoms and post-mortem appearances, closely corresponded with typhoid fever. Prost, of Paris, in 1804, pointed out that mucous, gastric, ataxic, and adynamic fevers had their seat in the mucous membrane of the intestines, but, according to Murchison, although Prost described correctly the ulcerations peculiar to enteric fever, he regarded them as merely the ultimate stage of ordinary inflammation. Breton-

neau, of Tours (1818–1820), showed that typhoid fever was always localized in the solitary and agminate glands of the ileum, and he maintained that the disease was dependent upon a poison capable of passing from the sick to the healthy.

In 1829, Louis published his great work on this disease, giving it for the first time the somewhat unfortunate name of "typhoid fever," which soon passed into general use. But though typhoid was most exhaustively studied in that great work, Louis erred in considering it identical with the typhus of the English writers, probably from want of opportunity of studying the latter disease, always rare in France. In 1836, Gerhard and Pennock, of Philadelphia, enunciated with great clearness the differences between these two fevers, and it may be truthfully said that American physicians have always possessed clear and distinct views on that most important point. In his second edition, which appeared in 1841, Louis fully recognized the difference between the two diseases, though the doctrine of identity still continued to be taught in the medical schools. Finally, Sir William Jenner (1849–1852) published a series of essays in the *Medical Times* which placed the doctrine of non-identity on an immutable basis.

Causes.—Youth is a powerful predisposing cause of this disease, though Dr. John Harley holds that "young people are not more liable to this than they are to other inflammatory diseases." It is, however, quite certain that individuals under thirty years of age are more than four times as liable as are those over that age, and also that one-half of the whole number of cases occurs between fifteen and twenty-five. It was formerly supposed that it never attacked children, but Trousseau quotes cases in which it occurred in children between two and seven months, adding, "the nearer we come to the age of puberty, the more common is dothinenteria." It is by no means rare between the ages of eight and fifteen, but most of the cases occur after fifteen. It is not often seen after fifty, and Dr. E. Bartlett is inclined to think that it occurs more frequently after the fortieth year of life in the country than seems to be the case in cities. Sex has little or no influence in the causation of this disease, at least in the adult, though Dr. Charles West states that it is much more common in boys than in girls. Thus out of 330 infantile cases observed by Taupin, Friedleben, and Rilliet and Barthez, 212 were boys and 118 girls.

While typhus fever is emphatically a disease of the poor, it is otherwise with typhoid fever, for it apparently attacks by preference those in easy circumstances. Thus in Windsor, England, during the epidemic of 1858, the disease was chiefly confined to the upper and middle classes, while the poor escaped in great measure. Dr. J. C. Wilson thinks that the presence of stationary wash-stands in bedrooms and the arrangement of bath-rooms and water-closets near sleeping-rooms expose

the well-to-do to dangers of infection that the less fortunate escape. Occupation does not appear to exercise any very marked influence in predisposing to the disease, though Murchison remarks that nearly one-third of the typhoid patients in the London Fever Hospital were female servants, most of whom had been in comfortable situations, and many of whom had been attacked shortly after changing their residence. The late Dr. George B. Wood was in the habit of remarking that people removing from the country to Philadelphia were exceedingly liable to be attacked with typhoid fever, and European observers have reached the same conclusion. Thus Louis noted that out of 129 cases, 73 had not resided in Paris more than ten months, and 102 not more than twenty months. Trousseau remarks that foreigners coming to reside in Paris are soon attacked with it, and Andral noted that medical students were most liable to be attacked within a few weeks of their arrival in Paris. Murchison says that upwards of six per cent. of the typhoid patients in the London Fever Hospital had not resided in London three months before the date of their admission to the Hospital, and he further states that a large proportion of the patients were first attacked within a few weeks of changing their residence from one part of London to another. Habitual exposure to the poison seems to confer a certain immunity from the disease, especially in the case of people in feeble health or suffering from certain chronic diseases. On the other hand, healthy and robust individuals are most likely to be attacked. The disease, strangely enough, seems to be entirely independent of crowding, though imperfect ventilation undoubtedly favors the action of the poison.

Filth does not cause typhoid fever, though filth is the soil in which the fever-poison germinates. Something more is necessary besides the decomposition of excrements, and that something is as yet only known to us from its effects. A certain individual susceptibility predisposes to the disease, though the most careful examination often fails to detect the idiosyncrasy before the advent of the fever. Murchison considers that there is no evidence that intemperance, fatigue, or mental emotions predispose to the disease. It chiefly rages in the fall months; probably five cases occur at that season for two in the spring. Murchison states that in the two months October and November, 27.7 per cent. of the entire number were admitted; but in April and May only 7.3 per cent., and this continued for many years, with the single exception of the year 1860. True, Dr. J. C. Wilson writes: "The development and spread of enteric fever is favored by the high temperature of summer, and checked by the low temperature of winter," but a very large experience has convinced the present writer that vastly more cases occur in January and February than in July and August. Summers and falls marked by great heat and long-continued drought are almost invariably marked by a great increase of typhoid fever, and when the same seasons are cold and wet, the dis-

ease declines in frequency and also in virulence. Thus, in 1860, only one-half of the average number of cases entered the London Fever Hospital, and this diminution, according to Murchison, was due to the long-continued cold and wet weather. Lastly, typhoid fever is a disease of the northern temperate zone, possessing what Wilson felicitously calls *a fixity of tenure*, especially in Great Britain, the United States, and Canada. But it rages everywhere, and tropical fevers, supposed to be miasmatic, are really enteric fever.

Symptoms.—Typhoid fever may set in suddenly, but as a rule its advent is gradual; in no other acute disease is the attack so slow and insidious. In a majority of cases the health declines so gradually that the patient can hardly state when his illness commenced, and further, he is generally unable to tell in what his illness consists. The patient suffers from discomfort and malaise, and he feels exceedingly weak and languid. He has but little inclination to physical exertion and still less to mental, and many of his actions seem to be mechanical. Dull headache is present, with soreness or pain in the back and limbs, and these pains increase towards evening. The hearing is dull, and complaint is made of ringing in the ears. The muscular debility increases, and the walk becomes uncertain and staggering. Sleep is restless and unrefreshing. The patient has no appetite, and the tongue is heavily coated; thirst is present, and the mouth is dry or clammy. The face indicates anxiety, and the expression is dull and stupid. Insomnia is common, and bleeding from the nose is frequent. Constipation may be present, or diarrhœa with ill-defined abdominal pains, and, as Murchison remarks, the concurrence of diarrhœa or gastric disturbance with an evening temperature of 103° or 104° and prostration, in a young person, ought always to make the practitioner suspect that typhoid fever is the disease which he has to combat.

This state of things lasts for a week or ten days, or even longer, and it merges very gradually into the fully-developed disease. During this stage of incubation the thermometer shows little or no change in the temperature, but now it rises, and all through the first week of the disease there is a marked and steady increase of heat. Sometimes the fever, at this period of the disease, is of an intermittent type, but it soon becomes remittent, the remissions taking place in the morning, and the exacerbations in the afternoon or evening. The pulse, too, falls in the morning and rises towards evening, and it varies much in the same patient, both in frequency and character. In general terms it may be said to vary from 90 to 100 in the morning, and from 110 to 130 at night. The skin is inclined to be moist during the morning hours, but towards evening it becomes dry and hot; but even when the thermometer shows a notable elevation of temperature in these evening hours, the patient may feel distinct sensations of

chilliness. All the symptoms of the stage of incubation are now intensified. The headache becomes almost unendurably severe; it is chiefly frontal, but occasionally it is occipital, or it may be felt all over the head. The feeling of languor and fatigue is now so marked that the patient is glad to keep his bed, and he feels giddy when he attempts to rise. The deafness increases, and is accompanied by buzzing in the ears. When awake, he is perfectly conscious, but the mind acts with slowness and difficulty, and he is disinclined to any mental exertion. If any delirium is present at this stage, it makes its appearance just between sleeping and waking. The expression of the countenance is dull and heavy, but it is quite different from the stupid, besotted look of typhus. The lips are dry and parched, but they are almost unchanged in color. The tongue is usually covered with a whitish or yellowish fur, though the tip and edges are red and shining; the papillæ are enlarged, and the mucous membrane is distinctly swollen. At times the tongue is red and glazed, or else thickly and uniformly coated with a yellow, creamy fur. Towards the close of the first week the tongue becomes dryer and smaller, but it shows little inclination to clean. Sometimes, however, the coating comes off in irregular patches, or it may altogether disappear, leaving a red and shining surface. The tongue trembles when protruded. The appetite is now completely lost, while the thirst is increased—though often the patient drinks but little at a time. The pharynx is red and swollen, though deglutition is usually unimpaired and no complaint is made of pain. If diarrhœa has been present during the stage of incubation it is now aggravated, though I have met with many cases in which there was no diarrhœa during the first week of the declared disease. The stools, numbering four, five, or six in the twenty-four hours, are thin and brownish, or of an ochre-yellow color, painless, and without tenesmus. Sometimes, but rarely, they are thick, but they are never natural. The abdomen begins to swell about the middle of the first week, and it rapidly becomes tense and tympanitic. Pressure over the right iliac fossa often causes gurgling, and tenderness on pressure over that region is almost invariably present. The spleen, which is somewhat swollen even in the stage of incubation, now becomes so large that its size can be determined by percussion. The swollen spleen feels soft, quite unlike the dense hardness of the spleen of miasmatic fevers, but the distension of the abdomen often prevents examination of the organ by palpation. The urine is scanty, thick, and high-colored, with, at times, a trace of albumin. The urea is always increased in amount, while the chlorides, as might be expected, are notably diminished. According to Vogel, the increase of urea depends on the elevation of temperature, which again is caused by the increased transformation of tissue, and T. von Niemeyer points out that the diminution of the chlorides partly depends on less salt

being eaten with the food, partly on increased excretion of the chlorides by the bowels, partly perhaps because, while the blood is deficient in albumin, it retains more salts. Bronchitis, or rather bronchial catarrh, is very common. At first the cough is dry, with but little pain or feeling of oppression in the chest. Usually the bronchitis has its seat in the posterior parts of the lungs, where coarse mucous râles may be readily detected, though dyspnœa hardly exists, even when the râles are very prominent. Towards the end of the first week, or the beginning of the second, the rose-colored eruption appears, which, though often overlooked, is really one of the most characteristic phenomena of the disease. First seen on the abdomen, it soon spreads to the chest, and sometimes to the extremities. I have several times noted it on the face, but it is rarely seen there. The eruption consists of small, round rose-colored spots, very slightly elevated above the skin, disappearing on pressure with the finger, and returning on the removal of the pressure. It is always isolated, never confluent, and it never appears during the stage of incubation. The spots vary greatly in number, sometimes not more than three or four are present, sometimes three or four hundred—few cases present more than thirty or forty. They are developed in successive crops, each lasting three or four days, and the entire duration of the eruption is from five to fifteen days. It appears somewhat earlier in children than in adults, and it is also shorter in duration, rarely exceeding a week. Most observers, notably the late Professor George B. Wood, of the University of Pennsylvania, look upon a copious eruption as a favorable omen, and Louis remarks that the eruption is more scanty and is oftener absent in fatal cases than in those which recover. The eruption is never present on the dead body.

During the second week the fever is continuous or nearly so, but in mild cases the morning remissions become more distinct. The skin is dry and hot, with flushed face and dull, heavy expression; at times the countenance is almost dusky. Curiously enough, the headache and pains in the limbs lessen, and by the end of the second week but little complaint is made of them. The apathy and drowsiness deepen, and yet the sleep is not sound. The drowsiness is often broken by delirium, at first only at night, but gradually becoming more constant and severe. Generally speaking, the delirium of typhoid fever is more noisy than that of typhus, but it varies much in intensity. Many cases, perhaps one-third of the whole, pass through the entire course of the disease without any disturbance of the mental faculties, while in many of the remaining cases the delirium is but slight and occasional. But the absence of delirium is not by any means indicative of the mildness of the disease, for of thirty-two cases, treated by Louis, in which delirium was absent, no less than eight died. At first, when the patient's strength is comparatively unbroken, the delirium

is active and noisy, with shouting and screaming. This occurs chiefly at night, and in many cases the patient can with difficulty be kept in bed. As the prostration increases, this active delirium passes into the low muttering form known as typhomania, or it may assume features strikingly like those of delirium tremens; a fidgety, fatuous state with trembling of the limbs and tongue. All authorities agree that the more active and noisy the delirium, the greater the danger. Thus Louis lost twelve out of seventeen cases, and Murchison lost nine out of eighteen, and the latter writer thinks that active delirium is more common in typhoid fever than in typhus. The ringing in the ears and deafness increase, and partly owing to this, partly to the dulness of the mental faculties, the attendants need to speak loud in order to attract the patient's attention. Liebermeister remarks that the more marked cases of deafness usually depend upon catarrh of the pharynx extending into the Eustachian tubes; the slighter cases depend on changes in the central nervous system. No complaint is made of thirst, but the patient drinks when fluids are offered.

The tongue is red, dry, and glazed, covered with sordes, and often gashed with deep fissures from which blood may flow. After repeated requests, it is protruded with a certain amount of difficulty, and often the patient forgets to withdraw it. After his attention is fixed tolerably correct replies are given, but, owing to the difficulty of moving the tongue, the words are almost unintelligible. Fæces and urine are passed involuntarily; retention of urine, arising from a partial paralysis of the bladder, is much rarer. Sir W. Jenner noted involuntary evacuation of the bowels in ten out of twenty-three fatal cases. The dark color of the urine passes away, and in the advanced stages of the fever is paler and less dense than in health.

The swelling of the abdomen increases, and the tenderness and gurgling in the ileo-cæcal region are more marked than in the first week. The diarrhœa, too, is more profuse, thin, and watery, or greenish and flocculent, compared by Liebermeister to pea-soup. On standing, the discharges separate into two distinct layers; the upper one turbid and of a light-brownish hue, the lower one a brownish flocculent mass, made up of morsels of undigested food, sloughs from the intestinal ulcers, disintegrated epithelium and blood-corpuscles, with masses of crystals of triple phosphate, once supposed to be peculiar to typhoid fever. Occasionally the evacuations are frothy and pultaceous, and in a number of cases that I observed in 1882 they were strikingly like moist yellow clay. Respiration is quick and superficial, and, often in spite of an extensive secretion of mucus, there is little or no cough and expectoration.

The distinctive mark of the third week is the change in the type of fever which, from being continuous, gradually assumes a remittent type by means of increasing morning remissions. But it must be noted

that though the morning remissions are quite marked, the evening exacerbations are almost as high as during the second week. The patient is now excessively weak, for day by day he has lost flesh and strength, so that now he cannot sit up, and he slips down to the bottom of the bed as often as he is lifted up. The noisy delirium now ceases and the stupor deepens, so that he can hardly be roused by loud cries, or even by pulling and shaking. The coating on both mouth and tongue is thicker, dryer, and darker, and the nostrils are closed with plugs of bloody mucus, and as a result the breathing is accompanied by a nasal whistling. The speech is almost unintelligible, and deglutition is difficult. Many patients pick the bed-clothes, and this was recognized two thousand years ago as one of the worst signs. Retention of urine is more frequent than in the second week, and sometimes the bladder is enormously distended without, however, attracting the patient's attention. The stools are now less frequent, and they often contain some consistent matter.

Towards the close of this third week new rose spots cease to appear, and the old ones gradually fade away and are replaced by sudamina, a small, transparent eruption not peculiar to the disease. They were once supposed to be the result of excessive perspiration, but they frequently appear in patients who have perspired but little. T. von Niemeyer remarks that in most patients there is erythema about the sacrum with detachment of the epidermis, but I have noted this in but a very few patients.

The dull face is now dusky and often quite cool; the cheeks are hollow, with a faint flush in the cheek-bones; the eyes are dull and sunken, while the skin is closely adherent to the nose and other prominent parts of the face. This is the time when bed-sores form, especially over the sacrum and hips, and complications, often very insidious, may be looked for at this period of the disease. Thus pneumonia of a low grade may remain undetected unless auscultation is systematically resorted to, for the patient makes little or no complaint; or acute peritonitis may be overlooked because no complaint is made, though pressure will usually elicit evidences of pain. Bronchitis, if present, is now less severe, breathing is more normal, and expectoration is easy, for the mucus is no longer tough and adherent. It will thus be seen that, speaking generally, the third week is simply a deepening of the severe symptoms of the second.

The fourth week is marked by the intermittence of the fever, though when the patient has been very ill the fever merely remits. The morning is now marked by an apyrexia which is often quite complete, and the evening-temperature is only about a degree and a half higher than that of the morning. The pulse is fuller and slower, though the beats increase in frequency towards night. The stupor passes away, and the patient begins to take an interest in surrounding objects.

The mental faculties are clear but weak, and the silence and apathy of the preceding weeks give place to querulous complaints and inquiries after food. Sleep, when it comes, is natural and refreshing, but the patient is apt to be wakeful at night. The tongue cleans, the mouth becomes moist, and deglutition becomes easy. The abdomen is no longer tender and swollen; the stools are less frequent and more normal; the diarrhœa is often replaced by constipation. The spleen recedes to its normal size. The urine is pale and abundant, and perspirations are often copious, especially during sleep. *Lysis* takes place, but, contrary to popular opinion, there is no *crisis*, and lysis may commence as early as the beginning of the third week, that is, when the abdominal lesion does not proceed to ulceration. But, as a rule, lysis does not take place till some time during the fourth week.

Convalescence is gradual, and the precise date is difficult to determine, but the remission of the fever is usually the first sign of amendment. When the fever has been long and severe, convalescence is correspondingly protracted, and, when it does commence, emaciation is frequently very great. The feet and ankles are often œdematous, and falling of the hair is common. The hearing is apt to be dull for some few weeks, and in rare cases this dulness of hearing becomes permanent. Successive crops of boils often harass the patient, and abscesses are not rare.

When the case is about to terminate fatally, the abdominal pain and swelling increase, while the diarrhœa becomes uncontrollable. The face becomes hippocratic, the insensibility deepens into coma, the tongue, lips and teeth are covered with dark sordes. The pulse gives way and becomes small and thready or fluttering and intermittent, the hands and feet become strikingly cool and of a purplish hue, clammy sweats break out on the face, trunk or limbs, and, when the prostration has reached the very lowest point, œdema of the lungs sets in, paralysis of the heart takes place, and the patient passes quietly away.

Death usually takes place by asthenia about the end of the third or beginning of the fourth week, or even further on, and severe intestinal symptoms, quite independent of hæmorrhage or collapse, are apt to precede the fatal event. Death by coma—the result of defective äeration of the blood or of retention of urea in the blood—is rarer than death by asthenia, and it may take place any time from the fourteenth day of illness. Or death may take place by a combination of coma and asthenia, and a sudden collapse from failure of the heart's action is not uncommon.

Relapses are not very frequent in typhoid fever, varying from 3 per cent. in London to 10 per cent. in Dundee. Murchison draws a distinction between a mere *recrudescence*—an increase of the disease after a temporary remission—and a true *relapse*, which he defines to be

a second evolution of the specific febrile process after convalescence from the first attack is fairly established. A sudden and prolonged rise of temperature announces the advent of a relapse, say eight or ten days after convalescence from the first attack. Flying chills are followed by a perfect picture of the first attack, headache, shooting pains in the limbs, furred tongue, loss of appetite, nausea and vomiting, diarrhœa, swelling of the spleen, and a fresh crop of rose spots. A relapse is thus a true second attack of the fever, but it is usually somewhat shorter, averaging, according to Michel, sixteen days. All the morbid changes are more rapidly evolved; thus the rose spots may appear on the third day. Precisely the same changes are produced in the bowels, the mesenteric glands, the spleen and the skin, and it may be fairly inferred that these changes are caused by the same poison that lighted up the first attack. Relapses are said to be milder than first attacks, yet of Murchison's 53 cases followed by relapse, 7 died, and in one-third of the whole number the relapse was more severe than the first attack. A mere error in diet or a slight over-exertion will, as a general thing, cause a recrudescence, not a relapse, though Liebermeister thinks that such mishaps may serve as exciting causes to the processes that follow, stimulating the development of germs which would otherwise have remained dormant or which might even have been eliminated from the body. Murchison says that relapses are more common in men than in women, in the proportion of 3 to 2, but Griesinger found them more common in women. The thirty-eight relapses that I have attended were equally divided between the sexes, and I am satisfied that neither age nor sex influenced their production. As a rule, relapses are single, but Trousseau, Wunderlich, and Murchison have recorded several cases marked by second relapses.

This is a description of enteric fever as it usually appears, but since "no acute disease presents itself under a greater variety of forms," it is necessary to give a brief account of the chief of these. Of most of these erratic cases it may be said that they depend upon two chief factors, firstly, the varying receptivity of the individual, and secondly, upon the intensity of the specific poison of the disease.

Murchison speaks of an *acute form* of the disease in which the attack is abrupt and violent. Delirium is present almost from the beginning, pulmonary congestion is early and severe, and death may occur before the eighth day. Fortunately these *foudroyante* cases are comparatively rare, and many practitioners have never seen a single case.

The distinguishing mark of the *mild* form of typhoid is the lower grade of the febrile movement. The temperature is but rarely 104°, and when it reaches that point it soon begins to fall. The onset is always gradual; the patient feels chilly, but decided chills are rarely

seen. A slight headache, accompanied by nosebleed, is almost constantly present, the rose spots are profuse, and the spleen is almost always enlarged. The duration of the disease is usually shorter than in the so-called normal cases, but I have often seen it run the full four weeks.

The *abortive* form is rare on this continent, though quite common in Great Britain. It does not run the regular course, and the shortening is owing to the fact that the intestinal lesions never advance to ulceration. The attack is usually abrupt, it is not preceded by prodromata, and even on the second day the temperature may be 104°, or even higher. All the symptoms of the normal disease are present, but after the eighth or ninth day the temperature gradually falls, and decided morning remissions soon appear. In many cases the leading symptoms of the disease are absent, and in 100 cases of the abortive disease Liebermeister found that the spleen was not enlarged in 29 cases, diarrhœa was absent in 29, and rose spots in 79 cases. Serious complications are rare, and this type, as a rule, is only fatal in the aged.

The *latent* form—the *typhus ambulatorius* of some German writers—differs in many respects from the abortive. All the symptoms are mild, and the febrile movement is often so slight as to be hardly noticeable, and yet it usually runs the full four weeks. But often the monotony of the disease is broken by sudden delirium or alarming hæmorrhage, often followed by perforation and death. This form is often styled "gastric fever" or "bilious fever," and it is often fatal if purgatives are administered, as they frequently are by physicians of the dominant school.

In aged people, and indeed in all over fifty, enteric fever runs a modified course. The onset is insidious, the febrile movement is less marked, the prostration is extreme, and the entire type of the disease is adynamic. Some of the most prominent symptoms of the normal type of the disease—such as acute delirium, rose spots, marked diarrhœa—are seldom seen, and yet sudden and fatal collapse is far from being rare. But perforation is not so frequent in advanced life as it is before forty.

Complications.—No disease, either acute or chronic, has such numerous complications as typhoid fever. Some of these complications and sequelæ, such as perforation and hæmorrhage from the bowels, are simply unusual developments of the disease itself, while others, as pneumonia, bronchitis and erysipelas, are rather to be looked upon as accidental complications, not necessarily dependent on typhoid fever.

Perforation of the intestines, justly styled by Dr. Murchison, "the most important and dangerous complication of enteric fever," is almost peculiar to this disease, being but very rarely noted in connec-

tion with tuberculosis and, possibly, with dysentery. Murchison has collected elaborate statistics from which it appears that perforation took place in 196 cases out of a total of 1721, a percentage of 11.38. He adds that in England, of every 33 persons attacked with enteric fever, one dies of perforation, and that perforation is found in nearly one-fifth of the fatal cases. I may remark that in my experience, entirely with homœopathic treatment, perforation is nothing like so common, and I have had only one case of perforation in many hundreds of cases of the disease. Perforation may happen as early as the eighth day, but it is more likely to take place in the third or fourth week, *quite close to convalescence.* It is most likely to take place in severe cases in which abdominal pain and diarrhœa are prominent, but it must be borne in mind that it may take place in mild cases attended by constipation.

Perforation is attended by sudden and severe pain in the abdomen, which at once becomes tense and tympanitic. This may be accompanied by rigors and vomiting, but collapse from the severity of the pain is more common, cold hands and feet, cold sweats and a decided fall of temperature. The pulse is small, rapid, and thready; the respiration is quick and shallow, and suppression of urine may lead to unfounded suspicion of injury to the bladder. In very severe cases the patient may die at once, but generally he survives for three or four days. Many eminent pathologists—Louis, Chomel, Rokitansky, and others—look upon perforation as being inevitably fatal, but more extended experience has shown that recovery sometimes, but rarely, takes place. Liebermeister reports 6 recoveries after perforation, Tweedie 2, Murchison 2, and single cases are reported by Todd, Griesinger, and others. Perforation is far more common in men than in women, the proportion being as 5 to 2. Diffuse peritonitis at once results from perforation, and it is apt to be severe in its symptoms, and fatal in its results; peritonitis of a milder type may occur without perforation.

Hæmorrhage from the bowels is another very frequent and fatal complication of enteric fever, occurring in about four per cent. of all the cases. It varies much in size, from a mere streak of blood in the stools to a formidable hæmorrhage which may at once prove fatal. It is rare in the first week, more frequent in the second, and less frequent in the third and fourth. It is usually marked by a sudden fall of temperature with weak pulse, pale face, cold hands and feet. Soon the temperature rises, and the disease resumes its march, possibly to be interrupted by another hæmorrhage. Some observers, notably Trousseau, look upon intestinal hæmorrhage as being attended with but little danger, while others, as Graves, think that "marked benefits result from them;" but most of us agree with Murchison, who says that, though he has known many patients to recover, he has never ob-

served benefit from the occurrence of hæmorrhage. Murchison lost 32 out of 60 cases, or 53.35 per cent., and Liebermeister reports a mortality of 38 per cent. I incline to think that both perforation and hæmorrhage are rarer and less fatal under homœopathic treatment than under that of the dominant school.

True dysentery occasionally coexists with typhoid fever, but the relation between the two diseases is not so close as Dr. John Harley considers it to be, and an exhausting chronic diarrhœa may result from the non-cicatrization of the intestinal ulcers. According to Liebermeister, parenchymatous degeneration of the liver is found in every serious, prolonged, or fatal case of typhoid fever, but in my experience only in miasmatic regions; abscess of the liver is rare. Jaundice is an unfrequent, but very fatal, complication, occurring in perhaps 2 per cent. of all the cases; it is caused either by catarrhal inflammation of the biliary passages or by the parenchymatous degeneration already mentioned. Congestion of the parotid gland is not common, and under homœopathic treatment it never proceeds to suppuration.

Venous thrombosis is common, especially in the form of obstruction of the femoral vein, which, according to Murchison, takes place in fully one per cent. of all the cases. Spontaneous gangrene is less common than in typhus. Much more common is the degeneration of the muscular tissue of the heart which exists in nearly all really serious cases of typhoid fever, resulting from the excessive fever. But inflammation of the heart is very rare. Hæmorrhage from the kidneys, bladder, or gums is sometimes present. Epistaxis is very common during the first week of the disease, and both Murchison and Liebermeister report cases fatal from this complication alone. Œdema of the glottis is, according to Jenner and Trousseau, occasionally the cause of death, and Louis reports a fatal case of croup in a powerful man aged twenty-three. Simple laryngitis is more common, especially in Germany, while laryngeal ulcers were found by Griesinger in 31 out of 118 *post-mortem* examinations. They are seldom seen in the United States, probably because they may be present without causing any symptoms referable to the larynx. Some French writers record diphtheria as an occasional complication, but though I have seen many hundreds of cases of both diseases, I have never seen them co-exist.

Bronchitis occurs in about 20 per cent. of all the cases, and is chiefly seen during the first ten days of illness. It may, however, appear during the fourth week, and prove fatal through the supervention of hypostatic engorgement of the lungs. Often there is no cough or, in fact, any objective symptom whatever, and it is only recognizable by auscultation. According to Louis, no acute disease is so frequently complicated with pneumonia or enteric fever, and his opinion has been confirmed by every observer. It is commonly of the lobular variety, and it rarely occurs before the third or fourth week. It may

terminate in circumscribed gangrene of the lungs, which, however, may not be recognized during life. Hypostatic congestion of the lungs, followed by œdema, is dependent on the weakness of the heart so often present in this disease. It is most likely to come on if the patient lies constantly on the back, and it is seldom seen till the disease is far advanced, say during the third week. The pneumonic processes may terminate in pulmonary phthisis, and Hoffman considers that it is developed by the accumulation of broken-down cell-masses which cannot be absorbed, owing to the general depression and interference with the circulation of fluids in the body. Pleurisy is somewhat common, but not under reasonably good homœopathic treatment.

True meningitis rarely occurs in enteric fever, and Louis, long ago, pointed out that the cerebral symptoms of the disease do not depend upon inflammation of the encephalon. Œdema of the brain is more common, and moderate effusions of blood are occasional complications.

Temporary paralysis, usually in the form of paraplegia, is an occasional sequel, and Nothnagle, who has carefully investigated the matter, believes it to be due to cell-proliferation in the sheaths of the nerves. Dangerous fainting fits often supervene when the patient assumes the erect position, and death may result if he does not at once lie down. Hæmorrhagic infarction of the kidney is still another rare complication, and slight vesical catarrh is common. Albuminuria appears late in the disease, rarely before the sixteenth day. According to the best statistics, it happens in about one-third of all the cases, and Murchison asserts that cases of enteric fever with much or persistent albuminuria are usually severe and have the typhoid state well developed.

Boils and abscesses in the skin are not rare during convalescence, chiefly affecting the buttocks, and bed-sores may result from them, though of a different stamp from the well-known "gangrene resulting from pressure." Liebermeister considers that the true bed-sore results from the elevated temperature and the lowering of the force of the circulation, and he points out that they frequently co-exist with hypostatic consolidation of the lungs.

The œdema so often seen about the feet and ankles is simply the result of a weakened circulation, and it usually passes away as strength returns. Falling of the hair is a common sequel, especially in severe cases. The new hair is often dull and lustreless, though I have seen some striking exceptions. Marasmus is occasionally noted, and Murchison reports several cases which proved fatal months after the cessation of the fever, where no lesion could be discovered after death, except an unusually smooth appearance of the mucous membrane of the ileum, and a shrivelled condition of the mesenteric glands.

Scarlatina may co-exist with enteric fever, but Dr. John Harley is

certainly in error in holding that scarlatina and enteric fever are merely different manifestations of the same morbid poisons, that, in fact, enteric fever is but an abdominal scarlatina. Erysipelas is a rare, but fatal, complication.

Course and Duration.—From the insidious mode of attack, it is difficult to fix with accuracy the precise duration of this disease. Speaking in general terms, it may be said to run from three to four weeks, and very many fatal cases prove so on or near the twenty-first or twenty-eighth day. Murchison reports that the mean duration of 200 cases which ended in recovery was 24.3 days; and the mean duration of 112 other cases, which were fatal, was 27.67 days. The same accurate observer speaks of having had several cases in which fresh spots appeared on the skin as late as the thirty-fifth day, and in one remarkable case, where the general symptoms were mild, fresh spots were noted almost daily from the fourteenth to the sixtieth day. The average duration of the cases in the Parisian Hospitals (1834–40) was 19.6 days, while Dr. Jackson, of Boston, assigns 22 days as the average of his cases, and he adds that it was a little less than this in those under twenty-one years, and a little more in those over. Of course, sequelæ and complications protract the disease much, as well as true relapses which may set in even two weeks after the patient is apparently quite restored to health.

The course of enteric fever is distinctly typical, and in no disease is the thermometer of greater value, for very often the abnormal temperature points to something which otherwise might have been overlooked. During the *first week* there is a rapid and progressive increase of the temperature, and yet, as Wunderlich points out, enteric fever is *not* present when on the first day, or even on the second morning, of the disease the temperature rises to 104°. But on the fourth evening that temperature may be reached and, indeed, often exceeded. There is a remission in the morning, followed by a rise at noon, which attains its height between 7 P.M. and midnight, when the fall begins. The lowest temperature is reached between 6 and 8 in the morning, and this cycle continues all through the first week. But the temperature at night, say at 9 o'clock, is about two degrees higher than on the morning of that day, and each morning there is a fall of about 1° compared with the preceding night, so that there is an average daily rise of 1° or thereabouts. Wunderlich writes: "We may exclude abdominal typhus, when between the fourth and sixth day the evening temperature in a child, or adult under middle age, never reaches 103.1° F., and, indeed, if it has failed to do so two or three times." These two rules, then, both of which we owe to the illustrious Leipzig professor, should be constantly in mind: first, "*when the temperature is* 104° *F. from the first or second day of the attack, the disease is not enteric fever;*" and again, "*when by the evening of the fourth day the temperature*

has not attained 103.1° *F., the disease is not enteric fever.*" Finally, if, as early as the second half of the first week, the temperature fall notably, enteric fever is excluded.

During the *second week* the fever is more continuous and, as a result, the temperature varies less. The evening temperature is between 104° and 106°, though it may reach 108°, and the morning shows only a slight remission. I have noted that towards the close of the second week the temperature falls a little as compared with the preceding night; 106° one evening is followed by 105.7° the next, and so on. The same thing takes place in the morning, but a little more marked. If between the eighth and twelfth days the night temperature is below 103°, enteric fever may be excluded with the greatest probability.

During the *third week* the continuous type gives place to the remittent, but the morning remissions are accompanied by a night temperature almost identical with that of the second week. Thus, a morning temperature of 101° will be succeeded at night by one of 105° or even, in severe cases, of 106°. Occasionally during the third week the evening temperature may be normal, which, as Murchison remarks, is the only certain proof of the termination of the fever.

During the *fourth week* the remittent type is replaced by the intermittent. The morning remissions are now real intermissions, while the evening temperature falls steadily; but all this is accomplished in the most gradual manner.

Patients rarely recover after a morning temperature of 105° or a temperature at any time of 107°. And all irregularities of temperature during the second week demand the closest attention. It must be noted, however, that the greater the regular daily fluctuations of the fever, the less severe is that particular case likely to be. A sudden increase of rapidity in the pulse accompanying a sudden fall of temperature, say at the end of the second week, almost certainly points to intestinal hæmorrhage. Lastly, a persistent rise of temperature can only be the result of some complication or of a relapse.

Pathological Characteristics.—Early in the disease physical examination of the chest discovers the existence of a dry, sonorous or sibilant rhonchus, very often quite loud, and heard all over the thorax. Further on this is replaced by mucous râles, which, however, give rise to less cough and dyspnœa than might be expected. On auscultating the posterior aspect of the lungs, it will be found that respiration is weak and imperfect, the result of a kind of hypostatic congestion. The percussion sound is always dull, especially in serious cases.

In discussing the pathological anatomy of enteric fever, it must not be forgotten that, in the words of Trousseau, "*the intestinal lesions, as well as the lesions in other parts of the body, are the effects, and not the cause.*"

Typhoid fever differs from typhus and relapsing fevers in the invariable presence of specific lesions, which are so characteristic that they are found in no other disease whatever.

Following Hoffman's classification, the lesions of enteric fever are naturally divided into two groups, the first including all changes essential to the disease and consequently found in every well-developed case, while the lesions included in the second group are not necessary results of typhoid. Again, the essential lesions are subdivided into two groups, the first including the direct effects of the typhoid poison, such as the lesions of the intestinal canal, the spleen and the mesenteric glands, while the second group comprehends the degenerative changes in the heart, liver, kidneys, pancreas, and muscles which are the result of the general disease.

The second principal group is made up of the non-essential lesions, as bronchitis, pulmonary congestion, pneumonia, peritonitis, and so forth.

Of the *primary local lesions* the changes in the lymphatic system of the intestinal canal are undoubtedly the chief. These changes, according to Liebermeister, consist essentially in a process of new growth combined with intense inflammation, producing increase in size of the glands spoken of, with subsequent partial destruction of them. At the commencement of the first week of the disease, the mucous membrane adjacent to Peyer's glands becomes congested and swollen, and this hyperæmia gradually extends to the patches themselves, so that by the end of the week all are infiltrated that are likely to become the seat of the disease. The disease may be arrested at the end of this first stage, and such a result is not rare under homœopathic treatment. In the second week the affected Peyer's patches continue to increase in size, while the surrounding mucous membrane becomes less hyperæmic. Towards the end of the week, some of the diseased patches become necrotic, while in others a kind of retrograde process commences. In the third week the greater part of each affected patch is detached in the form of a slough, leaving an ulcerated surface behind, extending to the muscular coat, or even deeper. These ulcers are circular when they correspond to a solitary gland, and oval when they correspond to a Peyer's patch; when several ulcers unite, the form is irregular. They vary in size from a line to an inch and a half, and are chiefly found in the lower third of the small intestines. The fourth week is marked by the cicatrization of these typhoid ulcers, though often the process is not completed till the fifth week. This infiltration of the intestinal glands is produced by an enormous multiplication of their cells, so that each gland may be six times its normal size. These cells proliferate till each affected patch is changed into a mass of diseased gland-tissue, and even the neighboring mucous membrane is flooded with cells. When completely developed, an affected patch is a soft rose-colored mass strongly re-

sembling the medullary substance of the fœtal brain. The scars of these ulcers may readily be recognized years after they are healed, but they never diminish the calibre of the intestine. The *mesenteric glands* are always enlarged, and this hypertrophy seems, as a rule, to be in proportion to the severity of the intestinal lesion. This swelling begins with the fever, and reaches its height at the end of the second week, when an ordinary gland is often of the size of a pigeon's egg. They are firm in consistence, and of a purplish-blue color during the continuance of the congestion. As soon as the affected Peyer's glands begin to slough off, the congested mesenteric glands diminish in size, but they are still abnormally large at the beginning of the fifth week. Occasionally, other lymphatic glands participate in the congestion, especially the retro-peritoneal and bronchial. The *spleen* is almost invariably enlarged, the average weight in 30 cases being 12¼ ounces as compared with a normal weight of 4½ ounces. This enlargement, too, begins with the fever, continues to increase till the middle of the third week, and slowly diminishes during the fourth week. The capsule is dense and firm, purplish-blue in color, and brownish-red on section. Enlargement of this organ is more likely to be absent in the old than in the young.

The lesions which make up the second group of pathological changes are always the result of the long-continued fever, consequently they are chiefly degenerative changes in the parenchyma of various organs. The liver is hyperæmic in about one-quarter of all the cases, and softening is not rare. The hepatic cells are enlarged and, according to Liebermeister, they appear like a conglomeration of granules, which finally lose all cohesion and break down into a formless mass of granular detritus. The color is grayish-red, but in the advanced stage it is grayish-orange, and the tint is in exact proportion to the duration and severity of the fever. The secretion of bile is greatly diminished, and the mucous membrane of the gall-bladder is frequently inflamed. The pancreas is generally healthy, but occasionally it participates in the hyperæmia of the adjacent organs. The degeneration of the parenchyma of the kidneys closely resembles that of the liver. The epithelium becomes granular, the nuclei of the cells disappear while their contour is changed; these changes commence at the cortex and gradually extend to the pyramids. Albumin is often present, but is not necessarily dependent on the degeneration of the kidneys.

A softening of the muscular tissue of the *heart* is the rule in severe cases, and this is the cause of the feebleness of this organ so characteristic of the disease. Marked softening occurs in about one-third of all the cases, and Zenker affirms that it is due to similar changes to those which he discovered in the voluntary muscles. The organ is pale and flabby, and in extreme cases, when placed on the table, it settles down into a shapeless mass. Most of the great bloodvessels

share in the same degenerative changes. The *blood* is dark in color, with a small, soft clot; the venous blood is especially dark in hue. If death has taken place at an advanced stage the blood is thin and pale, while the vessels are almost empty.

Still another lesion is granular and waxy *degeneration of the voluntary muscles.* The granular variety differs little from ordinary fatty degeneration, while in the waxy form the muscular tissue is converted into a lustrous, waxlike mass, in which the striations completely disappear. This change, as its discoverer, Zenker, points out, is not peculiar to typhoid fever, and it has usually been attributed to the long-continued high temperature. This degeneration often extends to the muscles of the tongue, causing the often noted trembling of that organ, with stammering speech. The high temperature also causes a degeneration of the brain tissue, the effects of which are seen in the weakness of thought and memory which often continue long after convalescence. At times congestion or inflammation of the meninges is noticed, and at a late stage œdema of the brain is not rare.

Of the non-essential lesions, the principal are found in the organs of respiration. The epiglottis is inflamed in about one-fifth of the cases, and it is sometimes ulcerated. The larynx is often ulcerated, and these ulcers have been erroneously looked upon as being analogous to the intestinal ulcers. The trachea is generally normal, while the bronchial tubes almost invariably show evidences of inflammation. Hypostatic congestion of the lungs is common, and pneumonia is present in about one-fourth of the cases. Pleurisy is often present.

Ponfick notes alterations in the medulla of the bones in which are found enormous cells, each containing twenty-five blood-corpuscles, or even more. Liebermeister thinks that these changes are primarily dependent upon the high temperature. The rose spots are never observed on the dead body, but sudamina are not uncommon. The cadaveric rigidity is quite marked, and emaciation is often extreme.

Diagnosis.—It is not at all times easy to diagnose enteric fever, simply because there is no one symptom which can be regarded as pathognomonic. The diagnosis is especially difficult during the first week, though even here the constantly increasing nightly exacerbations should rouse suspicion. If at the same time there is epistaxis, diarrhœa, and enlargement of the spleen, the diagnosis is tolerably clear, and if an eruption of rose spots appears, it is quite certain.

A *typhoid state*, made up of drowsiness, delirium, and brownish tongue, with extreme prostration, may be superadded to various diseases, such as pneumonia, dysentery, and erysipelas. But the main disease always precedes the development of the typhoid state, and the matter is made still plainer by the use of the thermometer.

Severe remittent fever presents many symptoms of enteric fever, such as vomiting, with diarrhœa, enlarged spleen, hyperæmia of the brain,

together with the typhoid state just alluded to. But the protracted course of typhoid fever, with its characteristic thermometrical indications and its peculiar eruption, form marks of distinction which render a mistake exceedingly difficult.

I have seen some cases of influenza which simulated enteric fever very closely indeed. But influenza never has rose spots, and the typical temperature curve of enteric fever confirms the diagnosis.

Murchison makes the almost incredible statement that he has more than once known a copious eruption of rose spots mistaken for variola, and Harley observes that "if, in the accession of variola, the severe lumbar pain be absent, and the eruption makes its first appearance as a few isolated papules upon the chest and abdomen, the case may be doubtful for a few hours." But the eruption of variola first appears on the face, while the rose spots of enteric fever are very rarely seen there. The eruption of variola is hard and acuminated, and it feels to the finger as if a shot or small pea were underneath the skin, while the rose spots are soft and but little raised above the surface of the skin. Lastly, the variola eruption appears on the third day, passes through very characteristic changes, leaving evident marks behind, while the rose spots of typhoid fever appear on the seventh or eighth day, and change but little till they fade away.

Sometimes the rose spots are preceded for two or three days by a fine scarlet rash all over the body, disappearing on pressure, while at the same time slight sore-throat is present. But the tongue is not that of *scarlatina*, and the throat is not really sore, but merely dry, and the steady rise of temperature in enteric fever differs greatly from the sudden and abrupt rise in scarlatina.

In children enteric fever is very liable to be confounded with *meningitis*, especially tubercular meningitis, and the difficulty of diagnosis is increased by the frequent absence of rose spots in children. But in meningitis the vomiting is usually very urgent and sudden; the temperature differs from that of enteric fever; the bowels are usually constipated, with retracted abdomen and no pain on pressure; the spleen is never enlarged, and general convulsions, so rare in the typhoid fever of children, are frequently present.

Pneumonia conjoined with a typhoid state may be mistaken for typhoid fever, but auscultation, percussion, and the thermometer will soon clear up the diagnosis.

Acute phthisis is sometimes very like enteric fever, and fever, vomiting, delirium, and various cerebral and thoracic symptoms certainly occur in both morbid states. But the really distinctive phenomena of enteric fever are absent in acute phthisis, and the regular temperature range of typhoid is strikingly unlike the irregular one of phthisis, while in the latter disease intestinal hæmorrhage and enlarged spleen are never seen.

Enteritis has been taken for enteric fever, but in the local disease you find no rose spots, no enlarged spleen, no very great prostration, and, as a rule, no cerebral symptoms.

Peritonitis may possibly be confounded with enteric fever, but the constipation and the intense tenderness of the abdomen are sufficient for diagnostic purposes, especially when the temperature is carefully noted. Tubercular peritonitis is more difficult of diagnosis, as it has high fever, with occasional sweats, abdominal pain with vomiting and diarrhœa, pulmonary râles, occasional delirium, and ultimately great prostration and emaciation. Here the thermometer must decide, for in tubercular peritonitis the temperature, after a time, becomes subnormal, in striking contrast to the temperature-curve of enteric fever.

Pyæmia sometimes bears a very close resemblance to enteric fever, but the absence of rose spots, the icteric hue of the skin, the rigors and profuse perspirations, and the whole history of the case suffice to mark pyæmia.

Prognosis.—The prognosis of enteric fever is one of the most difficult problems in practical medicine, for perforation of the intestines may occur in the very mildest case, while, on the other hand, apparently hopeless cases may "pull through" in the most surprising manner. I remember a case in Prince Edward County, Ontario, in which the patient, a young man of twenty-five, lay as if dead for nearly a fortnight, for neither pulse nor heart-beat could be detected, and a mirror held close to the mouth remained unaltered by his breathing. The appropriate remedy (Hyoscyamus) was regularly given, food was injected *per anum*, and after twelve days he slowly came back to life. A good rule, then, is never to give up *any* case till death has actually taken place, but, at the same time, the physician's statements to the relatives must be guarded in the extreme.

A sudden and violent onset, with quite high temperature, usually presages a short illness, but I have noted many exceptions to this observation. Marked morning remissions, beginning early in the disease and steadily increasing, are of favorable omen, and the same may be said of late evening exacerbations. Sudden rises of temperature are always unfavorable, and so are sudden falls, which often mark collapse from intestinal hæmorrhage. A high temperature, say 105° and upwards, always indicates danger, and very few recover in whom the thermometer marks 107°. High fever beyond the end of the fourth week indicates either a complication or a relapse, and it often denotes that the intestinal ulcers are still unhealed. Here the patient must be kept very quiet, and the food should be bland. Louis, Chomel, and Murchison agree in stating that a temporary remission during the second or third week, followed by a return of pyrexia and an aggravation of the other symptoms, often terminates fatally. It is invariably a bad sign when the patient persistently says that he is "*quite*

well." The prognosis is, of course, worse in neglected cases than in those which have had appropriate treatment from the very inception of the disease; hence the importance of an early and correct diagnosis. Corpulent people stand typhoid much worse than the lean, wiry ones, and the mortality is very great among men who are intemperate or subject to gout and kidney disease. Debility does not greatly increase the danger, and very feeble persons often struggle through. Murchison asserts that "pregnancy is a less serious complication than is commonly imagined," but I believe with Liebermeister that the danger is very great when typhoid appears during pregnancy, and certainly, when abortion takes place but few recover. The younger the patient, the more likely he is to get well, and this holds good with children, except during the first year of life. Cerebral complications are always of evil omen, and coma is of the very worst augury. *Subsultus tendinum* is a bad sign, especially if the mind is still clear; and picking imaginary things off the bedclothes was associated with a fatal termination as far back as the time of Hippocrates. Delirium is always serious, and active delirium, coming on early in the disease, is especially so. Congestion of the lungs supervening during the first week often ushers in death a week later. A dry and dark-brown tongue is always of serious omen. Vomiting early in the disease is of little moment, but occurring at the commencement of the second week it is often a sign of approaching peritonitis. Abdominal pain, especially if accompanied by excessive tympanitis, is an unfavorable sign, and if peritonitis should supervene during a serious case of enteric fever the prospect of recovery is not good. A severe and long-lasting diarrhœa is always serious, and if it is accompanied by hæmorrhage collapse may supervene, and then the chances of recovery are very small indeed. Cardiac paralysis is one of the great dangers, and a weak and frequent pulse is a threatening sign. If the beats exceed 130 to the minute the case is grave, even if all the other symptoms are favorable, *especially if the pulse intermits.* Profuse epistaxis is unfavorable. Retention of urine is rarely present, but when it is, it always points to danger. Erysipelas is an unfortunate complication, but it, too, is fortunately rare. I have seen patients die who had few or no rose spots, while an abundant eruption is often seen in very mild cases. Perspirations are of but little prognostic value. Noisy, hissing, and irregular breathing indicates a serious cerebral complication, and such cases usually go from bad to worse. The pinched, cadaverous, hippocratic face usually presages dissolution. Deafness, *especially of one ear*, is an unfavorable omen, and Trousseau has never seen a patient recover when parotitis complicated the disease.

Preventive Treatment.—The prophylaxis of enteric fever is of vast importance, and the one thing needful here is the prompt removal of the dejections of the patient. Carbolic acid (one part to thirty of

water) should be at once poured on the stool, and it should then be buried in a deep trench at a respectful distance from any well or reservoir of water. A fresh trench should be dug every day or two. Soiled clothes and bedclothing should be soaked in carbolic acid water (one part to a hundred of water), and then boiled. Enteric fever patients should be carefully separated from the healthy, as a single case may become a centre of contagion.

With the view of preventing the generation of the poison germs, steps should be taken to secure good drinking-water. All such water should be carefully boiled and filtered. Dr. Murchison writes: "Drinking-water ought to be tested from time to time to discover if there is any organic taint. All that is necessary is to add to a tumblerful one or two drops of Condy's (crimson) fluid, which will give it a very faint pink hue. If, after standing for half an hour, the pink color has gone or turned to yellowish, the water is tainted and cannot be drank with safety; but if the pink hue maintains itself, it is free from organic impurity." All house-drains should be inspected by an expert, and all drains should be flushed at least once a week.

It at all possible, the sick chamber should be large, well ventilated, and on the upper story. An open fire-place is preferable to a stove, and ventilation should be carefully attended to, especially at night. I never knew a typhoid patient "take cold," but I have known cases made desperate by defective ventilation. The temperature should be kept up to 60° or 75° F., according to the susceptibility of the patient. *Rest in bed* from the onset of the disease is of imperative necessity. But *quiet of mind* is just as important as quiet of body, and the patient must not be hurried with business or annoyed with noises of any kind, especially whispering. Tattling visitors, and, indeed, visitors of any kind, must be kept out with the strong hand. The position in bed should be frequently changed, and the bedclothes should be kept smooth, so as to avoid bed-sores. At each visit the physician should inquire whether or not urine has been passed, and retention must be seen to promptly. The entire body should be sponged with tepid water at least once in the course of the twenty-four hours, but I have nothing but condemnation for the hydropathy run mad which orders a typhoid fever patient to be put in a bath of 68° F., or lower, so that twelve baths are given every twenty-four hours till eighty to one hundred baths have been given. The proper nourishment of the patient is of the first importance, and great authorities like Trousseau look upon dietetic management as the chief feature in the treatment. The food should be bland and fluid, and it should be given at stated intervals, even if the patient has no desire for it. Milk is the chief food, but it must not be given in the enormous quantities so much in favor with the English practitioners, simply because, as Sir W. Jenner points out, "a pint of milk contains as much solid

matter as a full-sized mutton-chop." I always have the milk boiled, strained, then given while still tepid. Barley-water and *weak* beef-tea are also excellent, but strong beef-tea often acts as an irritant to the bowels, and the same may be said of chicken-broth. Starchy foods are to be avoided, for the secreting powers of the salivary glands, and also of the pancreas, are greatly impaired. During convalescence the food should consist of easily digested articles, such as bread and butter, light puddings, custard and beef-tea, and solid food should not be given till the temperature has been normal for a week.

Pure water is the best drink, and it should be given quite often. Tea and coffee are both inadmissible.

Stimulants are out of place in the early stages, and also at the height of the disease. I have often seen benefit result from the administration of wine-whey far on in the disease, but I have treated many hundreds of cases without any alcohol whatever.

Therapeutics.—Aconite has no place in the treatment of typhoid fever, though a long array of excellent observers—Trinks, Kafka, Jousset, Panelli, and others—are of the contrary opinion. Dr. P. P. Wells, of Brooklyn, counsels us to avoid Aconite in the first stage, with very rare exceptions, and forcibly adds: "*no one but a madman would think of giving it in a subsequent stage.*" I may add that in fourteen hundred cases I have not noted one for which Aconite was appropriate, and Kippax, of Chicago, our latest systematic writer on fevers, entirely omits it from the list of remedies.

Baptisia tinctoria.—In the mind of very many—perhaps a majority—of homœopathic physicians, typhoid fever is indissolubly connected with Baptisia, and indeed, in former years not a few would agree with a distinguished English physician who said that "*he used Baptisia tinctoria in every case where he could diagnose the disease to be enteric typhus.*"

Repeated failures have gradually toned down these extravagant views, and no one who has had an opportunity of comparing the results of treatment obtained from an indiscriminate giving of Baptisia with the results obtained from the carefully selected homœopathic remedy will ever pin his faith to this much-vaunted panacea. More moderate and much more accurate are the views enunciated by Dr. Kippax: "Baptisia may be justly considered our sheet anchor in the treatment of typhoid fever during the first week. For it is capable of exciting a fever resembling that of typhoid, and of producing congestion and catarrhal inflammation of the intestinal mucous membrane, with abdominal tenderness and diarrhœa, the pathological condition present during this period." Even this temperate statement is open to criticism, for other remedies produce these symptoms, and in order to *diagnose the remedy* we are forced to look to the minute shades of difference elicited by physiological provings and confirmed by clinical experience.

Personally, I would never think of giving Baptisia in typhoid fever merely because it is typhoid, any more than I would give Belladonna in all cases of scarlatina, or Bryonia in all cases of rheumatism. Again, Dr. Hughes writes, "throughout the progress of the malady I advise you to give it as the best means of keeping down the high temperature in which so much of the peril consists, and only to supplement or supplant it when certain special manifestations of typhoid poisoning become prominent." But to give Baptisia in all typhoid fevers with high temperature would be to give it in nearly all the cases, and I would repeat that the best success attends those practitioners who individualize the closest. In the deadly typhoid fever of the Bay Quinté region (Ontario) I have rarely seen Baptisia indicated, and I am certain that I have not given it to ten per cent. of my fourteen hundred cases. In this disease the only safety lies in a rigid individualization and a close adherence to the single remedy.

The Baptisia patient feels chilly all day and hot at night; chilliness and soreness of the whole body, with intolerance of pressure on lying; the pulse is soft, full, and quick. Heavy, dull, bruised sensation in the head; stupefying headache; confusion of ideas; nightly delirium with stupor. Heavy sleep with frightful dreams; the patient can

scarcely be roused long enough to answer a question; he changes position frequently because the bed becomes too hard. The face is dark-red with a besotted expression; dark sordes collect on the teeth and lips; the tongue is dry and red or coated brownish, with red edges; the breath is very offensive. Indeed, *fetidity* is the marked characteristic of the advanced Baptisia typhoid, the breath, sweat, urine, and stool are all offensive, and a certain disposition to ulceration is often present. Marked debility and nervous prostration, with a tired, bruised, sick feeling all over the body. I have several times verified Dr. J. B. Bell's much-ridiculed symptom: "The patient cannot go to sleep, because she cannot get herself together; her head feels as if scattered about, and she tosses about the bed to get the pieces together," and also the kindred symptoms, "feeling as if the lower limbs were severed from the body," and "sensation as of a second self alongside in bed."

Bryonia alba.—This was formerly the first remedy considered in typhoid fever, and it is still a most distinguished remedy, equal in value to any other save only Arsenicum album. It is chiefly indicated in the early stages, not quite so often in the diarrhœic stage, and I have never seen any good from this remedy when coma was about to set in with intense prostration, involuntary evacuations, and muttering delirium. It is always first in my mind when bronchitis or pulmonary congestion complicates the fever, especially when with the dry, irritative cough there are stitching pains in the chest, and pressure, as of a weight, in the middle of the sternum, with anxious or difficult breathing. But it must be noted that the true place of Bryonia is in the early stage of the pulmonary complication; further on, Phosphorus, Tartar emetic, or Sulphur may be indicated.

Can Bryonia cut typhoid short? Dr. Edwardo Fornias, of Philadelphia, writes: "And I think that if any abortive power can be ascribed to any drug here, Bryonia has it; its success will depend on its early application, a thing not always possible, as we are generally called too late. I am not an enthusiast, but I have seen this drug work marvels, subduing the gastric irritation, cleaning and moistening the tongue, healing the cracks, and enabling the stomach to retain liquid food, diminishing and changing the color of the stools, and finally bringing the whole condition to a favorable turn." Formerly I believed that no remedy could materially change or shorten this disease, but now I am of the opinion that the homœopathically indicated remedy can change the type of fever from the normal to the mild or abortive, but in order to effect this, you must begin treatment early, that is, before the disease is developed. And then you never can be quite certain that it was typhoid fever you have been treating, for in mild or abortive cases the pathognomonic symptoms are absent. In my experience this abortifacient power has chiefly been exercised by Bryonia and Baptisia

The Bryonia typhoid patient is restless and anxious, with weakness on waking from sleep; he feels sluggish and drowsy; better on lying down. In temper he is exceedingly irritable and inclined to be angry and ill-humored. He is inclined to escape from bed, or he wants to go home, and during the nightly delirium he talks irrationally of his business, especially of that in which he has lately been engaged. The mind feels weak, with dulness and confusion of the head. Stupefaction of the head; a kind of vertigo, as if he were drunk and as if the blood rushed furiously to the head; throbbing in the forehead and occiput, worse on motion. Vertigo and reeling of all objects while walking; the general exhaustion increased to a feeling of complete prostration. The violent, oppressive, and stupefying headache continues, and is increased by moving or opening the eyes. A pressive pain in the occiput, with drawing down into the neck; this pain was relieved towards noon, but appeared in the afternoon as a pressure in the temporal bones, also frequently in the frontal and occipital regions. Bleeding of the nose after rising or during sleep, and this may recur for several successive days. During the chilliness the face is pale and yellowish, but at night it is red, hot and puffy, while the lips are dry and cracked. The tongue is at first white or yellowish, but it soon becomes dry, rough, and dark in color. The breath is offensive, with dryness in the mouth, so that the tongue sticks to the palate. The taste in the mouth is flat and nauseous, or intensely bitter; frequent drinking of cold water relieved the bitter taste and the inclination to vomit. The thirst is chiefly for cold water or for acids, and he does not drink often, but much at a time. The stomach feels tender, with nausea, or even vomiting, after eating. He cannot sit up from nausea and faintness, and is obliged to lie perfectly quiet, because the slightest motion causes nausea, even to vomiting; in the morning on waking, nausea and vomiting. Transient stitches in the right hypochondrium; painful sensitiveness of this region, especially to hard pressure and deep inspiration. Distension and pain in the abdomen, as if diarrhœa would come on; rumbling in the abdomen, especially in the evening in bed. All day long

feeling in the abdomen as if diarrhœa would come on. Diarrhœa every three hours, with sudden and almost involuntary discharge, with weakness which compels to lie down, especially in the morning or at night, with burning in the anus; offensive diarrhœa, like putrid cheese; pain in the abdomen before the diarrhœa. The urine is brown and loaded, often hot and scanty.

The patient is sleepy all day; heavy sleep with anxious delirium; at night, in bed, he lies without consciousness, with groans, cold sweat on the forehead, followed by weakness; thirst with frequent drinking; delirium on waking from sleep. The patient awakes heavy and unrefreshed, with cough and oppression on the chest. At the commencement of the fever chilliness and heat alternate, but further on the heat is intense and almost continuous.

Rhus toxicodendron.—Another frequently indicated remedy, said by Rapon to bear the greatest possible analogy to Bryonia, while Bœhr insists that its indications differ so essentially from those of that remedy that it is scarcely possible to confound the two remedies with each other. Speaking in general terms, the Rhus typhoid patient is much sicker than the Bryonia one, for in Rhus there is a tendency to a putrid decomposition of the fluids which is almost wholly absent in the other remedy. Rhus is a splendid remedy when the patient lies stupid and semi-comatose, so weak that even when conscious he is unable to move, with an involuntary watery diarrhœa streaked with blood, bluish petechiæ on the extremities, and a thin, watery epistaxis. But you rarely meet a Bryonia typhoid patient so far gone.

The Rhus-typhoid commences with a chill, followed by burning heat. Chilliness and heat in the evening; the face seemed very hot, though the cheeks were cold to the touch, and pale. About 6 P.M., warmth of the body, with internal and external heat of the head and shivering of the body, without thirst; at the same time stretching, drawing, weakness in the limbs, and headache like a dulness and compression in the side of the occiput, together with violent cough, with very short breath, and pain in the throat as if the tonsils were swollen; slight perspiration over the whole body, towards morning. Bruised feeling over the whole body with soreness in all the bones; constant desire to lie down. Soporous slumber, filled with uninterrupted dreams full of difficulties; in sleep at night he talks about his business, wishes to throw everything away, and desires this and that. Paralytic sensation in all the limbs. Restless slumber, filled with fretful, disagreeable thoughts and events. Restless sleep, with tossing about, rising, and throwing off the bed-covers. Sleep restless, interrupted, with much turning over. Fearful dreams, for example, that the world is on fire, with palpitation on waking. The patient sleeps with open mouth, and the breathing is very short.

The mind moves very slowly, and the patient is despondent and depressed. Inexpressible anxiety, with pressure at the heart and tearing in the small of the back. Great apprehension at night; cannot remain in bed. Absent-minded, as if absorbed in thought, and yet a want of ideas; illusions of the phantasy, and visions; delirium also loquacious; prostration of the mind, he cannot bring two ideas together, as if quite stupid; thought is difficult, and he is averse to speaking; weakness in the head; if he turns, he loses his consciousness for the moment, and after stooping he cannot rise; while sitting, stupid, as if drunk; on rising, dizzy, as if he would fall forward or backward; vertigo, as if drunk and as if he would fall, after rising from the bed.

The face is pale, sunken and drawn, with blue rings round the eyes. The lips are dry and bleeding, and the tongue is dry, hard, red or brown; a red, triangular tip is very characteristic. The lips and teeth are covered with bloody sordes, and the taste is gone; he desires no food. At times great thirst for cold drinks, especially cold milk.

The abdomen is sore, bloated and tympanitic, with diarrhœa which is frequent, sudden, with excessively offensive evacuations, at first thick, afterwards watery, mixed with flatus, with violent griping and digging in the lower abdomen. The fæces are yellowish, dark-greenish, or brown, sometimes bloody, with cadaverous smell, sometimes almost without odor; they are often passed involuntarily.

Pulmonary symptoms are not wanting, especially those indicating infiltration of the lower lobes of the lungs. The respiration is hurried, and short cough, from severe tickling and irritation behind the upper half of the sternum, followed the feeling of discouragement and apprehension.

Bœhr makes the profound remark that "cases adapted to Rhus never run a speedy course, nor will the crisis have to be expected previous to the seventeenth day; until then the medicine will have to be continued without fear, unless some other medicine should be indicated by particular symptoms."

Arsenicum album is probably the chief remedy in true typhoid fever, and some practitioners, notably Fleischmann, of Vienna, treat their cases with it exclu-

sively. This, of course, is an error, but it is nevertheless true that it is called for in a greater number of cases than any other remedy, and that these cases are almost always of a grave character. In the most disheartening cases, cases which seem to be utterly hopeless, when the vital functions are in the grasp of a morbid poison of the most malignant kind, and the very life-blood is profoundly and completely altered, *then* this great remedy is capable of saving life. But a mere indiscriminate giving of Arsenicum will not suffice. The case must be rigidly individualized, for China, Veratrum album, and Carbo vegetabilis all touch it very closely on several points of its domain. For example, it is rarely indicated when both body and mind are tranquil, for *restlessness with anxiety* is one of its most prominent key-notes.

In the Arsenicum-typhoid, heat is at first intermingled with flying chills. Soon the chills disappear, and their place is taken by anxious heat and restlessness, with burning, as if hot water were flowing through the veins, or with throbbing in the head, and desire to throw off the covering of the bed. The heat of the skin is for the most part dry and burning; dry, anxious, nocturnal heat; the patient drinks much, but little at a time. The pulse is small, weak, and rapid, or irregular and intermittent. It is at times so feeble that it cannot be felt; exhaustion both in body and mind; the patient tosses about the bed complaining only of anxiety. The intellect is enfeebled, but coma is very rarely present. But even from the very first, signs of decomposition of the fluids are visible. The odor of the stools is very foul, and even the smell of the patient is more fetid than usual. Then the ichorous nose-bleed, the blood-streaked diarrhœic stools, the brownish bloody sputa, all tell of a threatening decomposition of the blood. Bed-sores, too, break out earlier in the Arsenicum-typhoid than in any other, and the fetid breath tells of the presence of unhealthy secretions of the respiratory tract. Delirium comes on, often very violent, especially at night, together with great restlessness. Delirium with open eyes; raving with pain in the head, anxiety, noises before the ears, great restlessness, loss of speech, trembling, and anxious sweating. Excessive vertigo, with trembling and inclination to vomit: stupefying pain in the head, with humming in the ears; great intolerance of light. The features are greatly changed; pale, yellow, cachectic look, often livid or lead-colored; the expression is distorted and unnatural. Deafness, with ringing in the ears and also in the head. The eyes are dull, glazed, and sunken; the lips dry, cracked, and covered with sordes. The tongue is at first fiery-red, smooth, and dry, later it becomes brownish or blackish and leather-like; it trembles when the patient endeavors to protrude it. The stomach is excessively tender to external pressure, the spleen is swollen and painful, and the swelling of the abdomen is also excessive. But, as Dr. P. P. Wells points out, "The swollen abdomen has not the tense tympanitic character of that produced by China. It is softer, though full, and gives out more frequent and marked sounds of moving flatus and liquid in the intestines. The flatus with China is pent up, and the noises from its transit are less." The stools are black, acrid, and putrid with fetid, offensive flatus; colic pains and great weakness accompany the evacuations. Or they may be watery, small, and yellowish, or greenish-brown and acrid, or ash-colored like dirty water. But the exhaustion of the patient increases with each evacuation, and diarrhœa in the Arsenicum-typhoid is earlier and more prominent than in any other remedy. The dark urine is very turbid, usually diminished in quantity, sometimes passed unconsciously. The patient is greatly emaciated, bluish petechiæ appear on the dependent parts of the limbs, and the vital forces sink in the most striking manner.

Dr Kippax remarks that this remedy is especially useful during the second half of the second and during the third week, but remarking upon this dictum Bæhr observes: "we doubt whether this is practically correct; in our opinion we should accomplish a great deal more by means of Arsenicum if the remedy were more frequently administered from the commencement or at least in the first week of the disease, for in such a case it might show its effect upon its whole course."

Iodum.—Iodine is suggested by Dr. Richard Hughes "when the typhous deposit in Peyer's patches is giving trouble in its elimination—when active ulceration is showing itself by re-accession of the febrile phenomena, with abdominal pains and tenderness and glazed tongue, or when sloughing of the diseased patches is involving hæmorrhage." In support of this piece of practice, which is entirely new, the distinguished writer quotes a case of slow poisoning of an animal, conducted by Dr. Cogswell, in which the following appearances were presented after death: "The lining membrane of the intestines, for about three feet from their origin, was remarkably vascular; oval spots, about the size of a chestnut, then began to occur at every three inches, *on the side opposite the mesentery;* a similar spot at the junction with the colon was two or three inches in length, and was expanded at its lower termination over the whole circuit of the gut. These spots were not injected, and were composed of little

aggregated eminences with black points in the centre, separated from one another by white cellular bands. *They appeared to consist of the agminated glands enlarged, as sometimes noticed in the early progress of fever.*" Liebermeister, the author of the essay on typhoid fever in *von Ziemssen's Cyclopœdia*, treated more than 200 cases with Iodine, and, while admitting that it did not produce any marked effect on the course of the fever, he states that neither the diarrhœa nor the intestinal symptoms generally seemed in any degree the worse, and in some cases they seemed even to be improved thereby. He thus sums up: "In fact, looking at the individual cases as they occurred, it was impossible to recognize any distinct effect from the Iodine. But the mortality was notably less than in those cases treated at the same time and in all other respects in precisely the same way, without the use of Iodine."

Carbo vegetabilis is scarcely ever given during the early stage of typhoid, but it is universally looked upon as being our last resort in critical cases with putrid, cadaverous evacuations, or in that other class of cases in which the patient lies exhausted and partially comatose, with loose and rattling breathing, burning heat of the trunk with coolness of the face and extremities, and a pulse so small that it can hardly be felt. In such cases the heart's action fails rapidly and, as a result, congestion of the lungs sets in with threatening pulmonary paralysis. The eyes are dull and sunken, with no reaction of the pupils against light; the face and lips are partially cyanosed; the tongue is dry, dark, and tremulous. Rumbling and gurgling in the distended abdomen; sensitiveness of the ileo-cæcal region; involuntary stools which are as offensive as carrion. The urine is turbid, reddish, and strong smelling.

Muriatic acid is one of the neglected remedies in typhoid fever, especially since the introduction of Baptisia. Hughes ranks it with Arsenicum as *the* remedy against the essential lesion of typhoid: "Under ordinary circumstances, all that is required to promote the resolution or other termination of the 'dothiénentérite' is the moderation of the fever with *Muriatic acid* or Arsenicum, to subdue intestinal hyperæmia and consequent diarrhœa." Muriatic acid is the great remedy not only when putridity threatens to set in, but also when it is fully developed. The diarrhœic stools are frequent, foul, and scanty, often blood-streaked, sometimes accompanied by hæmorrhage, and the discharges are mingled with shreds of intestinal mucous membrane and fragments of whitish mucus. The weakness of the patient almost amounts to general paresis; constant settling down in bed, with excessive prostration of strength; stupor with total unconsciousness of surrounding events; the lower jaw hangs down, and the throat is sore and foul-smelling; the abdomen is swollen and tender, and the sphincter ani is partially paralyzed. The breath is very offensive, and the mucous membrane of the mouth is ulcerated in patches.

Nitric acid is a leading remedy in hæmorrhage occurring in the course of this disease. It is chiefly indicated in the advanced stage when the abdominal lesion assumes great prominence; marked tenderness of the abdomen, especially in the ileo-cæcal region; gurgling on pressure, with constant blood-streaked diarrhœic stools which are foul-smelling, brownish, pasty or slimy. The tongue is smooth, glossy and deep red; sometimes it is fissured and the buccal mucous membrane is raw and ulcerated. In common with its congeners, Muriatic acid and Phosphoric acid, this remedy has stupidity, muttering delirium, and extreme prostration.

China officinalis is an almost indispensable remedy when a malarial taint is superadded to the typhoid fever, also in the great prostration caused by serious hæmorrhage or severe diarrhœa; also in the last stage when the patient, thoroughly worn-out, suffers from night sweats with progressive loss of flesh and strength, constipation with clean tongue, and either absence of appetite or excessive hunger.

The China patient has very great prostration, with such weakness of body and mind that physical and mental effort are alike distasteful; all the limbs feel heavy and, as a result, the patient is averse to movement. Heavy sweats during motion or in sleep, with excessive sinking of the vital forces. Uneasiness, with subsequent sleepiness; frightful phantasies in the evening, in bed, with frightened starts on closing the eyes to sleep; anxiety on waking from frightful dreams; insensibility on waking, or vertigo, which is increased by raising the head. The patient is indifferent and apathetic, quite unlike the restlessness and anxiety of Arsenicum. Vertigo and heaviness of the head; contracted pupils; pale face; dry mouth, yellow coated tongue, with slimy, bitter taste and great thirst. The abdomen is inflated and tender, with pains and diarrhœa; slimy stool, containing undigested food, or thin, yellow, and involuntary stool. The breathing is oppressed, especially in the evening; general chilliness with small, feeble pulse and cold extremities.

Colchicum is a valuable but neglected remedy. According to Dr. P. P. Wells,

of Brooklyn, it occupies ground between Arsenicum and China, its almost entire want of brain-symptoms placing it close to Arsenicum, while in its abdominal symptoms, the lymphatic distension of the abdomen, with watery diarrhœa and great weakness, it very closely resembles China. The patient is very weak, and the entire surface of the body is sensitive; all external impressions disturb him, especially strong odors. The vital forces sink so suddenly that in less than a day he can neither speak nor walk; he lies on his back comatose, with half-closed, hollow eyes, sunken countenance, and cadaverous aspect. The forehead is covered with cold sweat, and both hands and feet are cold. The lips, teeth, and tongue are covered with brownish sordes; the lips are cracked and the tongue bright red; it seems to be partially paralyzed, for it is heavy, stiff and numb, so that speech is difficult. The epigastrium is extremely sensitive to pressure, and the abdomen is distended, tense, and hard, while, at the same time, it is hotter than the rest of the body. The stools are liquid, black and offensive, or watery and bloody, with fragments of whitish mucus; the discharge is almost invariably preceded by colic. Involuntary stools are common. The secretion of urine is suppressed; the pulse is small, quick, and scarcely perceptible; the legs and feet are œdematous.

Mercurius solubilis.—Hughes ranks Mercurius solubilis with Iodine in the very serious forms of typhoid, and Jousset, of Paris, apparently shares the same views; according to him it is a chief remedy in the second period, being indicated by the predominance of the abdominal affection. Jahr only uses it when hepatitis supervenes on typhoid, while Kaspar, of Vienna, thinks it only useful in typhoid parotitis. It has been recommended for typhoid in persons of delicate constitution and lymphatic nervous temperament, with pale yellowish face, coated and fetid tongue, insipid taste, little thirst, painful sensitiveness of the epigastric and hepatic regions, especially when the stools are copious, liquid, flocculent, and bloody. The skin is yellowish, with clammy, fetid sweat.

Digitalis is rarely indicated, but, nevertheless, it has a sphere of its own, with well-marked indications. The pulse is a leading indication, sometimes rapid, sometimes slow and irregular, sometimes slow and very feeble, and it is accelerated by motion, especially by rising up from bed. The stomach is irritable, with constant disgust, nausea and vomiting, swelling and fulness of the hepatic region; notwithstanding these well-marked gastric symptoms, the tongue is nearly normal. Baehr gives the singular indication, which I have twice had an opportunity to verify: "although there is no diarrhœa, yet the strength and the flesh waste away very rapidly." The patient is heavy and stupid, but not quite unconscious; the prostration is very great.

Sulphur has done wonders in typhoid fever when other remedies, though apparently indicated, have failed; and in a number of very serious cases I have given this remedy with remarkable results. The face is pale and sickly, the eyes dim and sunken, with bluish circles round them, the lips are dry and cracked, the mouth dry or coated with thick brownish mucus. The tongue, too, is dry, with offensive smell, especially in the morning. Both stomach and abdomen are tender, and there is much rumbling and gurgling in the bowels, with offensive flatus. Every two or three hours a diarrhœic discharge, watery, brownish and offensive, especially at night. The urine is dark brown, thick, and offensive. The prostration is extreme, and the patient is always weak and fatigued, with trembling after every effort. Restless sleep, with dreams and muttering; during the day both body and mind are indolent, with complete inability to concentrate the attention. All the senses are dull. The pulse is small, weak, and quick; dry heat of the skin, with itching eruption. I have never seen any good from Sulphur given continuously as you would give Rhus or Arsenicum; all the benefit it is capable of rendering will result from one or two doses.

Belladonna is recommended by Dr. Edwardo Fornias as an intercurrent remedy if Bryonia should not control the inflammatory cerebral irritation, and Baehr, who, however, does not draw a sharp line of demarcation between typhus and typhoid, writes as follows: "Belladonna, which undoubtedly seems to be indicated in the first week of the fever, may sometimes moderate its violence at that period, especially the excessive cerebral hyperæmia, but it will scarcely ever produce a striking and incontrovertible effect." In opposition to these excellent writers I would remark that Belladonna is an indispensable remedy in many cases of typhoid, and also of typhus, as will be shown in the chapter on that disease.

In the early stage of the Belladonna typhoid the patient has a sense of weariness and heaviness in the limbs, with marked debility and weakness; sleepiness in the afternoon. Very soon the cerebral congestion, which is the leading characteristic of the drug, is developed; incessant drawing and expansive pain in the head, as if some-

thing in it rocked or swayed in a jerking manner. Headache, as if the brain would be pressed out, in the forehead, just above the orbits, which prevents the eyes being opened, and obliges the patient to lie down. Vertigo, with staggering on attempting to walk. The pains in the head are aggravated by noise, motion, when moving the eyes, by shocks, by contact, by the least exertion, and in the open air. The carotids, and, indeed, all the cerebral arteries, beat and throb more markedly than in the normal state. The patient is sleepless, yet desires sleep; frightful visions are seen as soon as the eyes are closed; anxious and frightful dreams; sighing during sleep; suddenly the patient wakes with a start and fright. Often the soporous state becomes true coma, with subsultus tendinum, pale, cold face and cold hands, and hard, small, rapid pulse, and stertorous respiration. At times during his stupefied sleep he opens his eyes, looks about him wildly, and relapses into stertorous slumber; and there is also a tendency to bury the head in the pillow and draw up the legs. Even when quite wide-awake there is an evident impairment of the mental faculties, the speech is heavy and embarrassed, and the patient does not know his nearest friends. The delirium is furious, with constant attempts to escape from bed, or the delirium is either continuous or recurring in paroxysms, mirthful at first, but subsequently changing to fury. Violent delirium, with staring eyes; loquacious or muttering delirium. Visions and delirious talk of dogs, wolves, mice, giants, and fire. Vertigo, with great anxiety. The eyes are red and staring, brilliant, distorted, while the pupils are either very small or very large. The face is hot and very red, especially the cheeks; the lips are dry, cracked, and red, while the entire buccal mucous membrane is very dry. The tongue is red, hot, and dry, and the papillæ are of a deep red color, inflamed and much swollen. The evident congestion of the tongue results in a partial paralysis, so that the speech is difficult and stammering. On the skin of the chest, abdomen, face, and neck are reddish spots like flea-bites, with marked inclination to perspire. Spasms of the pharynx are not unfrequent. The Belladonna diarrhœa is watery, profuse, and is accompanied by a similar disposition to perspiration.

Stramonium.—The delirium of Stramonium is even more furious than that of Belladonna, and it is accompanied by the same desire to escape out of bed. One of the characteristics of the Stramonium delirium is that the patient takes no notice of surrounding objects, but is solely occupied with the objects of his own fancy. The things and persons around him appear to be changed; although he knows at first that his friends are around him, yet he forgets it immediately after; he imagines that he is quite alone in a wilderness, abandoned; he is afraid; animals jump suddenly out of the ground, so that he moves quickly to the other side, where, however, others start up, pursuing him so that he runs forward. Illusions, as if his body were cut in two in the middle; as if all surrounding objects were very small, while he himself is very large and elevated on high; believes he sees a great company of people about him, and grasps at them. The chief characteristic, however, of the Stramonium delirium is a desire for light and company. While Belladonna has love of being alone, Stramonium has fear of being alone. Like Belladonna, this remedy has trembling of the whole body, with paralysis, but the Belladonna paralysis is often painful and one-sided, while that of Stramonium is generally painless and on both sides. The sleep is profound. often comatose, with loose, rattling respiration and dark, hot face. The pulse is small, rapid, irregular, often intermittent, but it differs from the Belladonna pulse, which is sometimes intermittent and slow, with quick respiration, while the Stramonium pulse is sometimes double and very quick, with quiet respiration. Again, when the Belladonna pulse becomes slow it is full, but when the Stramonium pulse becomes slow it is weak. The head is dull and stupid, with beclouding of all the senses, but while in Belladonna the memory is sometimes very active, that of Stramonium is always weak. The eyes are staring or sparkling, with greatly dilated pupils, or else half closed and languid. The mouth and tongue are raw, sore, and dry, with paralysis of the tongue, partial or complete. The Belladonna patient drinks often, but little at a time, while the Stramonium patient drinks seldom, but much at a time.

Hyoscyamus niger is so closely related to Belladonna and Stramonium that I shall merely give the points of difference—the differential diagnosis as it were. The Belladonna paralysis is generally painful, while that of Hyoscyamus is generally painless. When the Belladonna pulse becomes slow it is full, but when the Hyoscyamus pulse becomes slow it is small. The thirst of Belladonna is not constant, most rare during the chill, while in Hyoscyamus thirst is wanting only during the chill. In Belladonna, when the pupils are dilated, there is a staring look, with eyes lustreless, dull, glazed; but in Stramonium, when the pupils are dilated, the eyes are sunken, staring, and lustrous. The respiration of Belladonna is, as a rule, low, while that of Hyoscyamus is loud. Belladonna has remission in the forenoon and after midnight,

while Hyoscyamus has remission of complaints during the day. All the complaints of Belladonna are worse in the afternoon about 3 or 4 o'clock, while all the Hyoscyamus symptoms are worse in the evening. Belladonna is worse particularly from candle-light, while Hyoscyamus is worse particularly from daylight. Belladonna is better when lying and in bed, while Hyoscyamus is worse when lying, but better from the warmth of the bed. Belladonna is worse when getting out of bed, but better afterwards, while Hyoscyamus is better when getting out of bed, but worse afterwards.

The hæmorrhages of Stramonium are generally of dark blood, while in those of Hyoscyamus the blood is light-red. The pulse of Stramonium is very irregular, sometimes trembling, while the Hyoscyamus pulse is generally regular. Stramonium has the curious inclination for light and company which has been already noted, while Hyoscyamus has an aversion to light and company. In Stramonium there is remission of complaints during the day and evening, while Hyoscyamus has remission during the day only. Stramonium is generally better in company and worse when alone, while Hyoscyamus is worse in company and better when alone. The Stramonium delirium is very seldom lascivious, and it ceases on awaking, while the Hyoscyamus delirium is often lascivious in its nature and may continue while awake.

Opium.—Opium has complete stupor from which the patient cannot be roused, or only with the greatest difficulty. Even when awake he comprehends little or nothing, and he soon falls off into unconsciousness. Sometimes this coma alternates with the wildest delirium, but this is somewhat rare, and so far as I have observed there is first a gradually increasing delirium followed by a gradually increasing coma.

Belladonna has heat, with aversion to being uncovered, while Opium has heat, with inclination for being uncovered. In Belladonna the pulse is generally quick, full, hard, and tense, while in Opium the pulse is varying, full and slow, with snoring respiration, or quick and hard, with heat and quick respiration. The Belladonna dreams are generally anxious, while the Opium dreams are predominantly pleasant. The respiration of Belladonna is predominantly low, while that of opium is predominantly loud. Lastly, in Belladonna there is remission after midnight and in the forenoon, while Opium has remission during the day and in the evening.

In Stramonium the pulse is very irregular, while the Opium pulse is slow and full or quick and hard. Stramonium has heat or sweat with aversion to uncover, while Opium has heat or sweat with inclination to uncover. In Stramonium a disposition to sweat is predominant, while in Opium dryness of the skin predominates. Vertigo is predominant in Stramonium, but in Opium congestion of the brain. In Stramonium inspiration is slow and expiration quick, while in Opium inspiration is quick and expiration slow.

I would further remark that these indications are no mere speculative closet-ideas, but true indications which helped me scores of times to discriminate between these remedies, so much alike in their action.

Lachesis.—When the patient is greatly exhausted, and when it is evident that this exhaustion results from progressive decomposition of the blood, Lachesis is emphatically the remedy. Both body and mind are worn out, with relaxation of the muscular system. The patient suffers from congestion of the brain; heat in the head, with throbbing from every movement; heaviness of the head, with dulness, like lead in the occiput, with vertigo. Much muttering during the evening; fever, which increases to delirium as the night advances. Tendency to stupor, which may develop into coma with dropping of the lower jaw and bleeding from the nose. The mouth is dry, black, and stiff with dry, red, or blackish tongue, which is almost always cracked and bleeding; partial paralysis with difficult protrusion of the tongue. The abdomen is hard and distended, with rumbling and gurgling in the bowel before the diarrhœa, which is almost invariably offensive. Intestinal hæmorrhage containing flakes and granules of decomposed blood.

Helleborus niger.—If the congestion of the brain should proceed to effusion, if the patient cannot be roused, if no impression can be made on his senses, if he lies completely unconscious, then Helleborus niger in repeated doses will help if any remedy will.

Arnica occupies a place intermediate between Bryonia and Rhus. The fever sets in with complete stupefaction and involuntary defecation and micturition; the patient lies in an unconscious condition, as if stunned, with half sleep; eyes open, or delirium. The heat is unequally distributed over the body, the pulse is not greatly accelerated, and the cheeks are pale, with flushes of redness. Great heaviness of the limbs, as if from extreme fatigue; weakness, weariness, and bruised soreness, which compels to lie down; lassitude and sluggishness of the whole body; general sinking of the forces.

Bleeding from the nose, with dry lips and mouth. Putrid smell from the mouth. The abdomen is hard and distended with diarrhœa at night, with pressure in the abdomen as if from gas; with distension of the abdomen before the stool; with rumbling in the abdomen during the stool. All the organs of sense show an extraordinary sensitiveness.

Calcarea carbonica has been recommended during the formation of the intestinal ulcerations, and also later on when the diarrhœa does not give way to remedies apparently well indicated. Lilienthal, who apparently has had much experience with this remedy, advises its administration at the very onset, in persons inclining to grow fat, after great anxiety and worriment of mind; utter sleeplessness from over-activity of the mind, where the same disagreeable idea always rouses the patient as often as he falls into a light slumber; constant tickling under the middle of the sternum, causing a hacking cough, worse from talking or moving; during the cough, painful shocks in the head, the brain feeling hot and burning; or at the end of the second and beginning of the third stage, with diarrhœa and intestinal ulceration; palpitation; tremulous pulse; anxiety; restlessness; redness of the face; delirium; jerkings, especially in children. It relieves by bringing out the miliary rash; the meteorism and insensibility of the abdomen diminish, and with it the agitation and anxiety; the stools become more consistent and more rare.

Nux vomica is another important remedy in the early stage of typhoid when there is chilliness with the slightest motion; hard, full, and frequent pulse; pains and debility in all the limbs. Sudden sinking of the vital forces, with a kind of paralytic loss of strength. Great desire to lie down, with relief from doing so. At night delirious fancies on lying down; dreams full of frightful images; delirious and extravagant dreams. Tightness and dulness of the head, with vertigo as if the brain were whirling in a circle, with momentary loss of consciousness; vertigo on rising from lying on the back, with obscured vision. The pupils are contracted or dilated, and the nose is dry as if stopped up. Putrid smell from the mouth, with dryness of the tongue, especially the tip. The tongue is often blackish and cracked, with deep red edges. Food is without taste, and there is complete loss of appetite; thirst, especially at night, with aversion to water. The epigastrium is distended and sensitive, with frequent, small, diarrhœa-like stools, which are excoriating to the external parts; putrid, watery diarrhœa, with cutting and drawing pains in the abdomen and loins, extending to the thighs. All impressions from without are intolerable to the patient, he is deeply affected by them, he moans, groans, becomes vehement, even unto rage.

Pulsatilla.—The earlier homœopathic writers considered that Pulsatilla is an efficacious remedy for typhoid fever in lethargic, lymphatic constitutions, where shiverings predominate, an absence of thirst and appetite, bad mouth, white tongue, nausea, mucous vomitings, mucous stools, unhappy and crying mood. Hartmann, however, considers that Pulsatilla is a great remedy in typhus gastricus, which I presume is the equivalent for our modern phrase, gastric fever. But a recent writer, Dr. P. P. Wells, after mentioning its use during the stage of attack, thus proceeds: "It has also important relations to the later stages and to the severer forms of the fever. This is obvious from the fixed ideas, violent delirium, frightful visions, desire to escape, and from the symptoms of the abdomen and diarrhœa. It has succeeded in rescuing patients from the utmost danger in these stages, in the experience of the writer, and he feels to recommend it to the careful consideration of his readers in the treatment of cases characterized by the above symptoms."

In the Pulsatilla typhoid the febrile heat is always mingled with chilliness, which comes on as soon as the patient uncovers himself; heat of one side, with coldness of the other; perspiration on one side of the face or body. Light sleep, with the feeling on waking that he has not slept at all; restless, stupefying, dull sleep, with constant tossing about; slumbering long continued, full of phantasies and dreams; great restlessness and tossing in the bed, as if from great heat, or throwing off of the bed-covering because of heat, with heat of the palms of the hands; he casts off the clothes because they are too tight or too warm, yet he shivers as soon as he is uncovered. A crowd of notions throng the mind of the patient, with fixed ideas and dulness of the head. Delirium at night, with sopor; terrific visions, with fear and desire to hide or run away; vertigo with intolerance of light. A foul-smelling slime covers the mouth in the morning on waking, with cracked lips and dark, slime-coated tongue. Rumbling in the bowels with frequent evacuations of only mucus, with colic before every stool; stools that consist of only yellow-white mucus mixed with some blood. Slimy diarrhœa of greenish mucus, especially at night; stools during sleep. Brownish-red urine, with a brickdust sediment, also with burning.

Dulcamara has been advised when the fever is the result of getting wet, when the tongue is clean, with neither nausea, vomiting, nor any gastric disturbance whatever, but simply pain in the abdomen, especially in the region of the navel; pressure and gripings with rumbling and yellowish fluid stool. Dulcamara is an excellent remedy for this morbid state, but then it is a mere intestinal catarrh, widely different from enteric fever.

Veratrum album.—I have never seen a case of typhoid fever in which Veratrum album was indicated in the first stage, and though Rapon tells us confidently that it has proved itself to be of great efficacy when the disease commences with vomiting and fluid stools, with cold limbs and cold sweats, I am satisfied that such cases are very rare indeed. It is rather a remedy for the advanced stage when sudden and violent prostration takes place, very often without any assignable cause. This sudden sinking is characterized by general coldness, with cold perspiration over the whole body, or only on the trunk, faint purplish hue of the face, and small, slow, almost imperceptible pulse. The patient is not restless and anxious, as he is when Arsenicum is the remedy, but rather indifferent and silent. I remember a number of cases, all occurring during one epidemic, all attacked with profuse purging of greenish, watery, blood-streaked fæces, full of whitish flakes as if oatmeal had been stirred in them. There was rumbling with severe pinching pains in the abdomen during stool; chilliness, shuddering and faintness after the stool. The extremities were very cold, with bluish petechiæ, pale face with sharp nose and sunken cheeks, wrinkled skin; involuntary discharge of urine. Nine out of every ten recovered, and Veratrum was the only remedy given.

Cocculus indicus is recommended by Dr. Wurmb when the animal life is chiefly involved, while the vegetative is scarcely affected. It is sometimes indicated at the commencement, especially in very nervous patients, but it is more frequently called for during convalescence for the relief of the oppressive debility and lassitude. The patient trembles in all his limbs, and is prostrate from the slightest exertion. He is indolent and silent, and desires to lie down and be left to himself. Vertigo and dulness of the head, with loss of memory and disposition to sleep, which may progress into actual coma. The tongue is rough, dry and coated, with dryness of the mouth at night. Distension of the abdomen, with rumbling in the intestines. Retention of urine, or frequent passage of small quantities at short intervals.

Phosphoric acid—a close analogue of Rhus toxicodendron—is never indicated when the fever and the nerves are greatly excited. Like Rhus it has a direct action on the blood, vital forces, and intestinal mucous membrane, and it often exerts an almost magic control over the diarrhœa when yellow, thin, and slimy; this state is usually accompanied by a pale, moist, thinly-coated tongue. It acts both on the vegetative and animal spheres, and in general terms it is indicated when the vital powers are gradually sinking without any reaction on the part of the organism.

The Phosphoric acid typhoid patient lies on his back prostrate and apathetic, but not comatose—for a stupid apathy is the leading mental characteristic of this remedy. He can be easily aroused from his stupor, and is then fully conscious, but soon sinks back again into his former condition. He is disinclined to talk, simply because both mind and memory are weak. Mild, muttering delirium may be present, but it never becomes furious, though a fixed desire to run away is quite characteristic. The face is pale, with dry, cracked lips; the eyes are glassy and lustreless or sunken and weak; the nose is pointed, and a debilitating epistaxis is common; deafness with roaring in the ears. The mucous membrane of the mouth has a scorbutic appearance, and the taste is completely vitiated. Burning in the stomach, with rumbling and gurgling in the epigastric region. The abdomen also is distended with rumbling and gurgling. The diarrhœa is thin, copious, whitish-gray or yellowish and very fetid; occasionally streaked with blood. Finally, though often passed unconsciously, *it does not prostrate the patient.* The urine is albuminous, like milk, mixed with jelly-like bloody pieces; it is passed in large quantities at night and it decomposes rapidly. Petechiæ are apt to appear on the dependent parts, and sudamina with copious sweats are common.

Phosphorus, as might be expected, is very similar to Phosphoric acid, and these remedies bear about the same relationship to each other that Arsenicum does to Rhus. It is chiefly indicated in the severe cases of the adynamic type when paralysis of brain or lungs threatens, and it has always been our chief reliance when Bryonia has been insufficient to control the lung mischief. It is of especial value when about the middle of the third week pulmonary congestion or pneumonia supervene, and

no remedy equals Phosphorus for the laryngitis which occasionally complicates this disease.

The Phosphorus typhoid patient is constantly sleepy, yet is often haunted with coma vigil. There is more sensorial excitement present than in the Phosphoric acid fever; violent delirium, at first alternating with intervals of consciousness, afterwards continuous; delirium with constant attempts to escape; it was necessary to confine the patient to the bed; this was followed after some hours by complete unconsciousness, with sunken face. The trunk of the body is burning hot, with cold sweat on the head and extremities; the pulse is rapid, small, and soft, or hard and rapid. The stomach is sensitive to the touch, with vomiting of watery, bilious, and slimy masses, accompanied by great pain. The abdomen is tense and tender, with rumbling and offensive flatus. The diarrhœa is streaked with blood, looks like water in which meat has been washed; or of pure blood, blood and mucus; black, like coffee-dregs, from decomposed blood; painless; involuntary; out of a wide-open, paralyzed anus. Numerous spots, like roseola, with ecchymoses and sudamina. Great emaciation, with weakness of the extremeties, as if paralyzed.

Tartar emetic is an intercurrent remedy for œdema of the lungs with rattling in the chest from accumulated mucus. Should paralysis of the lungs progress in spite of Tartar emetic, then *Moschus* will help, if anything can.

Hamamelis virg. and **Terebinthina.**—Profuse passive hæmorrhage from the bowels would suggest Hamamelis virginica, but Terebinthina should be used when extreme tympanitis is present, with retention of urine.

Dr. Kippax suggests that the *Mercuric cyanide* may prove an efficient remedy when ulcerative changes, attended with great prostration, take place in the pharynx and larynx.

Ipecacuanha and **Chamomilla** have been recommended, especially by Hartmann and Rapon, but though they are undoubtedly remedies for gastric fever, they have no homœopathic relation to true enteric fever.

TYPHUS FEVER.

BY THOMAS NICHOL, M.D.

Description.—A specific fever, contagious and epidemic, generated by overcrowding, together with defective ventilation and scanty supply of food. The invasion is usually sudden, though it is quite frequently gradual; repeated chills or rigors; quick and feeble pulse; pungent, burning heat of the skin; dull, flushed face with injected eyes; tongue furred at the onset, afterwards dry and brown; bowels constipated as a rule; languor, weariness, and wakefulness, gradually passing into stupor and somnolence, or low muttering delirium; deafness or ringing in the ears; tremors, subsultus, and involuntary evacuations of both bowels and bladder.

Between the fourth and seventh days a rubeoloid rash, of a dusky-reddish color, makes its appearance, at first somewhat elevated and disappearing on pressure; after the second day it is persistent, and after a week true petechiæ may be developed. Typhus is variable as to duration, some cases terminating on the tenth day, while others linger to the twenty-first, the average duration being sixteen days. Unlike enteric fever, no specific lesion is found after death; all the internal organs are congested; the muscles, including the heart, are softened; the brain is atrophied; the blood dark and grumous.

Typhus is caused by the absorption of a specific poison the precise

nature of which is still unknown. It is probable that when numbers of people are crowded into narrow and ill-ventilated quarters the typhus poison is generated in the exhalations from the bodies and from the excretions of the unfortunates. The poison surrounds the patient like an atmosphere, clinging to his clothes, bedding, and especially to his books. But a considerable impregnation of the clothing, etc., seems to be necessary, and baking the infected articles at a heat of 200° F. almost certainly destroys the poison. At times the poison acts with great rapidity, often a few minutes' exposure producing a most malignant attack. But one patient in a large, well-ventilated chamber is very unlikely to spread the disease, for the typhus-poison is rendered inert by free ventilation.

Though the poison seems to be specific, typhus fever presents considerable variety. In many cases the nervous system is chiefly implicated, in others the circulatory, in others the respiratory, but, after all, the disease varies but little in its general character. Another classification is based upon the intensity of the disease, the so-called "walking typhus" being the mildest, and the fulminant form the most severe.

Typhus has always prevailed during time of famine, as the Irish famine of 1847, or during war-time, for instance the Crimean war, when in the French army of 120,000 men 12,000 were attacked, of whom 6000 died. It rages during sieges or on board of war-vessels and transports during a great expedition, or in fact anywhere when over-crowding, deficient food, and bad ventilation unite their forces.

Typhus is a disease of adult life, and very young children are rarely attacked. The disease attacks both sexes indifferently, young men being more liable than young women, but after the age of thirty the reverse is the case.

Typhus fever is a European disease, especially haunting the British Islands, particularly Ireland, and it is perhaps never seen on this continent save when introduced by immigrants. Like typhoid, this fever is a disease of winter and spring, probably because at these seasons over-crowding, defective ventilation, and scarcity of food are more likely to prevail among the poor than during warm weather. Anxiety and overwork are powerful predisposing causes, and people who dread the disease are more likely to be attacked than those who are fearless of it. Intemperate people are more liable than the temperate, and mental depression is a most important predisposing cause. Weather has but little influence, though Hirsch considers that a damp, cold situation is not without its effect.

Typhus fever is less divisible into stages than typhoid, and the symptoms of all the cases are wonderfully similar. There is a period of incubation which varies from a few hours to six or seven days, during which the patient, though still able to attend to business, is

evidently not quite well. Suddenly he is taken with a shivering fit, followed by febrile reaction with sharp pains in the back and loins, malaise, severe frontal headache, loss of appetite, and sometimes nausea and vomiting. The rigors recur at intervals for two or three days, after which the febrile state becomes permanent. But long before this takes place the patient takes to his bed, for the prostration is much more marked than in either typhoid fever or small-pox. The muscular pains increase in severity, yet the patient is dull and apathetic to a remarkable degree. The frontal headache gets worse, with throbbing and giddiness; the hearing is dull, yet ringing in the ears is common; the eyes are injected, with contracted pupils and photophobia; the sleep is restless, disturbed, and dreamful. The tongue is coated yellowish-white, the appetite is wholly gone, and the thirst for cold water is very great. The mind wanders, though intelligence returns when the patient is spoken to sharply. Soon the wandering is replaced by delirium, generally low and muttering, but sometimes wild and violent. The frontal headache ceases with the commencement of the delirium, usually about the ninth or tenth day.

About the fourth or fifth day, sometimes as late as the seventh, the characteristic eruption appears. It consists of numerous reddish, irregular spots, at first strikingly like the rose-spots of typhoid fever, but they steadily increase in number, and finally remind one of the eruption of the severer type of measles. At first they are a very little elevated above the skin, but after the second day they are on a level with the skin and look like reddish-brown stains. They have at first well-defined margins, but after the second day they pass insensibly into the color of the skin. They are first seen on the sides of the abdomen, whence they spread all over the trunk and arms, but they are rarely seen on the face. A second rash, paler and less defined, has also been noted, and the commingling of these gives a mottled look to the skin which is highly characteristic. After the eighth day of the fully developed disease the face becomes more dusky, the eyes redder, and the expression is more stupid than ever. The prostration is very marked in the morning, and towards night a wild excitement, often followed by sleeplessness and delirium, gives a fictitious appearance of strength. The tongue becomes darker, rougher, and more tremulous; offensive sordes collect on the lips and teeth, and the breath has a fetid odor. The pulse, as well as the respiration, becomes slower and weaker, and the skin feels cooler and less dry. The characteristic smell is now very plain, though its infectious property is not fully developed till towards the close of the second week. The eruption darkens, and in the middle of the second week true petechiæ of a purplish hue are intermingled with the rubeoloid eruption. The petechial spots, however, are seldom larger than half a grain of wheat, and their edges fade gradually into the dusky red of the original eruption.

The prostration is now extreme. The patient lies on his back, moaning and muttering, and with a curious tendency to slip to the bottom of the bed. He is entirely indifferent to surrounding objects, though he can still be roused, but with difficulty. The expression of the face denotes stupidity, and it bears a close resemblance to that of a deeply intoxicated man. The color of the face, which was dusky from the first, now becomes muddy, with dark flushes on the cheek. The eyelids are partly closed, and the pupils are no larger than a pin-hole. Almost total deafness is quite common. When spoken to sharply he opens his eyes with a vacant stare; and when told to put out his tongue, he keeps it protruded till told to withdraw it. The pulse is small, irregular, and almost uncountable. But, as the writer knows from personal experience, amid all these horrors the mind is strangely awake and the imagination is in full play. The most frightful fancies, vivid beyond belief, throng the mind. Vast deserts, peopled with monsters, stretch before the mind's eye or fierce battles rage by sea and land, and the reality of the phantasms is most implicitly believed.

The coma deepens. The patient lies motionless on his back. The pulse can only be detected with considerable difficulty, and the heart's impulse and sounds are absent, or nearly so. The surface is now cool and clammy, and a marked tendency to sloughing is rapidly developed. The eruption darkens, and the petechiæ increase in number. A passive congestion of the lungs may now supervene, resulting in fatal asphyxia, or paralysis of the heart may take place, with coldness of the extremities and copious cool sweats.

Most frequently, however, an amendment takes place some time between the twelfth and fifteenth days, and this is often sudden and marked. The patient falls into a deep, quiet sleep, lasting for several hours, from which he awakes decidedly improved. The mind is confused, but he recognizes his attendants and is fully conscious of his state. The delirium disappears, the temperature falls, the pulse regains its strength, the tongue cleans, and the appetite becomes ravenous.

Typhus was at one time believed to be prone to relapses, but that was before a distinction was made between it and relapsing fever. Jenner, Stewart, Murchison, all agree that true relapses are extremely rare in typhus, and Murchison even asserts that but one single relapse, with rubeoloid eruption, occurred in the London Fever Hospital out of 18,268 cases, extending over twenty-three years. Dr. Alonzo Clark, however, insists that relapses are not uncommon in Bellevue Hospital, New York, and he quotes two instances accompanied by the characteristic eruption.

Death is generally the result of some severe complication. Probably, affections of the respiratory organs are the most frequent and, at

the same time, the most insidious. Pneumonia of a low grade, bronchitis, hypostatic engorgement are all common, while laryngitis with œdema of the glottis is occasionally seen. Other complications are erysipelas, jaundice, pyæmia, with purulent deposit in the joints, suppuration of the parotid gland, kidney disease, and paralysis.

The average duration of typhus fever is fourteen days, and it rarely runs longer than twenty; it has also a certain tendency to be shorter in the young than in the middle-aged. But complications may prolong the illness to four, five, or even six weeks.

Typhus is marked by a sudden and notable rise of temperature, often 104° or even 105° on the first evening. Next morning there is remission, but much less marked than in typhoid, say 103° to 103½°. On the second evening there is an advance of half a degree as compared with the first, and the third evening shows 105½° to 106°, or even higher. Each morning is a little higher than the preceding one, and the fourth evening is even higher than the third, but the turning point is reached on the fifth or sixth day, when a slight decrease is noted, which continues for two or three days. Then the temperature rises for one or two days to descend slowly till the twelfth day, when a decided fall takes place, and about the fourteenth or fifteenth day the temperature is normal.

As compared with typhoid, the temperature is much higher during the first three days, and much lower during the first half of the second week. A high temperature about the twelfth or thirteenth day indicates great danger.

Typhus fever differs from typhoid in that there are no essential and characteristic lesions, save perhaps the eruption, for the changes in the blood do not differ materially from those of some other diseases. The blood is of a very dark-cherry color, sometimes almost black, either quite fluid or disposed to form soft clots. It is deficient in fibrin and also in red corpuscles, and the serum is less dense than in normal blood. The white corpuscles are increased in number, and urea is often present. The coloring matter transudes and stains the walls of the bloodvessels and adjacent tissues. The heart is often softened, especially on the left side, and the endocardium is often deeply stained. The muscles are always dark in color, and softened in texture.

The red eruption disappears at death, precisely as in the case of measles and scarlatina, but the petechiæ are likely to remain, especially if death has taken place early. A greenish discoloration of the skin of the abdomen is somewhat noted, and the skin of dependent parts is often purplish in hue. The brain is sometimes congested, and effusion into the ventricles may also be present, but the organ presents nothing characteristic. The liver and spleen are, as a rule, enlarged, hyperæmic and softened, while the small intestines exhibit nothing

at all like the lesions of enteric fever. The gastric and intestinal mucous membrane, and indeed the mucous membrane of the entire body, is generally reddened. The kidneys are frequently enlarged, and nephritis is sometimes observed. The bronchial tubes show evidences of inflammation, and the lungs are almost always hyperæmic and softened.

Diagnosis.—A low form of remittent may be mistaken for typhus, when the patient is very prostrate with low muttering delirium, dark and heavy-coated tongue. But the characteristic eruption is absent in remittent fever, though I have noted true petechiæ in low remittents, and the vast enlargement of the spleen, dense and solid, is never seen in typhus. Again, typhus is eminently contagious, which cannot be said of malarial fever. Lastly, true remissions are never seen in typhus.

Purpura has often been confounded with typhus, in spite of the absence of fever long ago pointed out by Riverius. But purpura is not in the least contagious, the spots are very much larger than those of typhus, while the characteristic hæmorrhages from all the mucous surfaces are absent in the latter disease. Again, the pale face of purpura is quite unlike the dusky countenance of typhus; lastly, purpura has rarely any cerebral symptoms.

At first the eruption of typhus is very like that of measles, and both make their appearance about the fourth day of the disease. But coryza and sneezing, so characteristic of measles, are never present in typhus; the bronchitis of measles has a loud and ringing cough, while the bronchitis of typhus has usually but little cough. The rash of measles is more highly elevated and of a brighter color than that of typhus, and the typhus rash never has the crescentic arrangement of measles.

Meningitis closely resembles typhus, and great care is often needed to make a correct diagnosis. The headache of meningitis is much sharper than that of typhus and, unlike that of typhus, it persists after delirium has set in. In all forms of cerebritis a marked intolerance of light and sound is present, but in typhus both sight and hearing are remarkably obtuse. The delirium of meningitis is more violent and acute than that of typhus, and it is accompanied by shouting and screaming rarely seen in the latter disease. In both diseases the face is flushed, but the flush of typhus is dusky or livid, while that of meningitis is usually bright red. Finally, nothing like the typhus eruption is ever seen in meningitis, and the practitioner is guided by this consideration more certainly than by any other.

Epidemic meningitis (cerebro-spinal meningitis) has often been mistaken for typhus, but the diseases differ in many essential particulars. Epidemic meningitis is not contagious; typhus is eminently contagious. The eruption of epidemic meningitis is often absent, and when it does appear it is very soon after the onset of the disease; the

typhus eruption is seldom absent, and it usually appears about the fourth day. The fever of epidemic meningitis is of a lower temperature than that of almost any other inflammatory disease, but the temperature of typhus is always high. In epidemic meningitis the tongue is clean and moist, with little tendency to sordes; in typhus the tongue is dry and dark, and sordes are seldom absent. Tetaniform spasms are almost part and parcel of epidemic meningitis, but they are never seen in typhus. In epidemic meningitis squinting is common and the pupils are generally unequal, but in typhus squinting is rare, and the pupils are always equal.

Delirium tremens has often been confounded with typhus, and there certainly is a strong resemblance so far as the delirium is concerned. But the tongue in delirium tremens is moist and creamy, the skin is moist, there is no eruption, and little or no fever.

Uræmia from kidney disease resembles typhus more closely than does any other morbid state. The tongue is dry and brown, the pupil is very small, and stupor with muttering delirium is common. But no eruption is present, and the temperature, unless some local inflammation is present, is even below the normal.

A typical case of typhus is quite unlike a typical case of typhoid fever, and yet at the other end of the scale the diseases approach each other so closely that it is sometimes very difficult to distinguish them, quite a number of symptoms being common to both. Typhus is essentially an epidemic disease, and, though it is rarely endemic, certain localities are much haunted with it. Typhoid fever, on the other hand, is essentially endemic and, though often sporadic, it is rarely seen as an epidemic. Typhus is directly contagious; typhoid is only indirectly so. The onset of typhus is sudden, often without any warning whatever; the onset of typhoid is insidious. Typhus lasts from fourteen to eighteen days; typhoid from twenty-one to twenty-eight. In typhus the dulness and stupor come on suddenly and severely; in typhoid their onset is stealthy and gradual. In typhus the eruption—mottled, dull-red and irregular—comes out in one single crop, but in typhoid fever it comes out in successive crops of rose spots. In typhus the abdominal symptoms are of little moment, meteorism is hardly ever seen, and constipation is the almost invariable rule, but in typhoid fever the abdominal symptoms are of pressing importance, while meteorism and diarrhœa are the almost invariable rule. Intestinal hæmorrhage and epistaxis are rare in typhus, but very common in typhoid fever. Typhus terminates by crisis; typhoid fever by lysis. Lastly, while typhus shows, on post-mortem examination, no characteristic change in the abdominal viscera, typhoid fever constantly shows characteristic lesions of the ileum and mesenteric glands.

Prognosis.—Typhus is at all times a very serious disease, and the

prognosis is always grave. The average mortality in severe epidemics is about 20 per cent., while in milder forms it is only from 8 to 10 per cent. The mean rate of mortality is 15 per cent., as nearly as may be. Children and young people have a better chance than middle-aged people, and the mortality steadily increases with the age till in patients of the age of sixty it is 66 per cent. The mortality is somewhat greater in men than in women. Mental depression and dread of the disease add to the danger, and a presentiment of death is a very unfavorable omen. Symptoms of unfavorable import are: great rapidity of pulse, great weakness of the heart's impulse, subsultus, hiccough, and general convulsions. As a rule, the danger is best measured by the degree of prostration and by the severity of the brain symptoms. Murchison affirms, and all competent observers agree with him, that "the greater the headache, the more complete the loss of consciousness, the greater and more constant the delirium, and the more profound the stupor, the greater is the danger." The dry, hard, and black tongue is not the fatal sign it was once thought to be, but extreme contraction of the pupil of the eye is a very bad omen. Incontinence of urine is a bad sign, but retention is still worse. The danger is, as a rule, great in proportion to the extent and darkness of the eruption, and this is especially true of the petechiæ. Lebert, however, has seen fatal cases entirely without eruption. A marked rise of temperature during the second week, *or a marked fall*, are both unfavorable, and coldness of the hands and feet is a bad sign, especially if the general temperature is high. A tendency to slip down towards the foot of the bed is very unfavorable, but a voluntary turning on the side is a very good sign.

Preventive Treatment.—It is evidently impossible to prevent the first importation of the typhus poison, and yet, prevention is of the last importance. A poor immigrant, flying from his famine-smitten native land, comes to reside in a quiet village in England or, it may be, in New York State. Soon he sickens, and the awe-struck neighbors whisper that he has the much-dreaded "*spotted fever*." Clearly, the sick man must be isolated, and this can best be done in a building set apart for the purpose, that is, in a hospital. Then the house from which he has been removed must be thoroughly cleansed and ventilated, and fumigated with sulphur. Next it must remain unoccupied for some time, with doors and windows wide open. The clothes and bedding of the sick man should be burned without a moment's delay. While in the hospital, he should be kept scrupulously clean, especially in regard to the excrements, for filth is the evil soil in which the typhus germs grow. The room should be lofty and the ventilation thorough. Aitken recommends "a cool, but not a cold, atmosphere," but Lebert's directions are even better: "In the late epidemic I found it to be an excellent plan, even during the severest

cold of winter, to keep the windows open during part of the day and night; the patients bear it well during the fever, though they are very sensitive to cold after the defervescence."

As the old idea of "*starving a fever*" is thoroughly exploded, food must be given to your patient, even if he does not desire it. It should be light and easily digested, and, as in typhoid, milk is the standard food. I prefer boiled milk to raw, and it should be given while tepid. Beef-tea and light soups are excellent, but much depends upon the cook. Arrow-root or sago, made with milk and water, boiled custard, weak chocolate are all excellent, but tea and coffee should be excluded. Food should be given every three hours during the day, and, if necessary, the patient should be roused from sleep for the purpose. In bad cases food should be given once or twice during the night. Wine or brandy is often needed in severe cases, but usually not till the seventh or eighth day of the illness. It is indicated when the heart is weak, as evidenced by a feeble pulse, with tendency to syncope; when a marked typhoid state has been developed; when the eruption is both dark and extensive; when the perspirations are very profuse, with coldness of the hands and feet. Wine or brandy should be regularly given in moderate doses, and brandy always acts best when given with milk.

Therapeutics.—Bryonia alba.—There can be little doubt that, previous to the advent of Baptisia, *Bryonia* shared with Rhus the distinction of being the leading homœopathic remedy in typhus. This arose from the fact that Hahnemann found these to be the chief remedies in the epidemic of fever which he witnessed during the Napoleonic wars, which we now know was not true typhus, but relapsing or famine fever. But Bryonia is a remedy, and a leading one, for what is now styled typhus, and in many cases no other is required. The Bryonia typhus patient is anxious and irritable, with delirium at first only during sleep and on waking; later, the delirium, which only relates to business affairs, is very constant. People seem to stand round the bed, and especially at its foot, *particulary every time the eyes are closed.* Vertigo, with ringing in the ears; vertigo, especially on raising himself. The face is red, hot, and swollen, with mobile, glassy eyes. The tongue is at first moist and yellowish, later it is dry, brown, and parched. Bitter taste in the mouth, with excessive thirst. Restless sleep, with moaning and tossing about. Nausea, with tenderness of the pit of the stomach; constipation. Darting pains in the lungs, with dry cough.

Baptisia tinctoria.—Hughes offers the following remarks regarding Baptisia in typhus: "If, placed in the midst of an epidemic of typhus, you have an opportunity of seeing a case within the first few days, I would strongly advise you to try what *Baptisia* will do. The statements I shall make relative to its action in common continued fever and in typhoid seem to warrant its more extended application to similar conditions, and the first week of typhus is one of these." The headache of Baptisia is dull, heavy, and pressive, with hot flushed face and shining eyes; the hearing is dull. Vertigo is present, with sensation of weakness in the entire system, especially in the lower limbs, but the patient feels stronger in the open air. Sleep is restless, with frightful dreams; on waking, the patient feels stupid and irritable. The lips are dry and cracked; the tongue is coated at first white, with reddish papillæ here and there, followed by a yellowish-brown coating in the centre, the edges being red and shining. The taste is flat and bitter, while the thirst is excessive; the patient drinks large quantities and at long intervals. Hoarse cough is present, with increased secretion from the bronchial tubes, with expectoration of mucus. The patient is weak, exhausted, and excessively irritable.

Belladonna.—Hughes remarks that "if the headache is a marked symptom; if it does not subside when (at about the eighth day) delirium supervenes; if signs of

cerebral congestion are present, *Belladonna* is a remedy of obvious homœopathicity and tried power." Belladonna, then, is emphatically *the* remedy when congestion of the brain is present with delirium, and though it has several close analogues, yet the Belladonna group occurs more frequently than any other in what the older writers styled "cerebral typhus." The fever often commences with drowsiness, which gradually deepens into coma, with red-hot face, which, however, suddenly becomes pale and cold; cold cheeks and hot forehead; the patient has great inclination to sleep, yet is unable to sleep, or the fitful slumber is disturbed by vivid, anxious, fearful dreams, which haunt the patient's waking hours. When awake, the patient either lies stupid and indifferent, or he is a prey to anxiety, anguish, and constant restlessness. As the disease progresses, the heat of the head increases; the arteries of the forehead and temples throb violently; pressive headache, aggravated by noise, motion, and when moving the eyes. The eyes are red and flushed, sparkling and staring, with dilated pupils, often wholly insensible to light; when conscious, the patient complains of darkness, with occasional flashes of light before the eyes. Roaring in the ears or total deafness may be present; often the patient is sensitive to noise. The mouth and throat are dry and hot, and the tongue is red, hot, and parched, often white in the centre and very red at the edges. Deglutition is very difficult, even when the throat is not inflamed. The appetite is much diminished, while the thirst is unquenchable, especially for cold water. The urine is scanty and dark red, and is often passed unconsciously. The limbs twitch, and the patient is very restless and uneasy.

Hyoscyamus.—This is another important remedy in cerebral typhus when the cerebral symptoms, as Hughes observes, are more adynamic, as when wine relieves the headache. The patient is excessively wakeful, tossing from side to side, unable to sleep. When sleep does take place, it is restless and disturbed, with frightful anxious dreams, and starting as from fright. The patient is chilly; diminished temperature of the skin; shivering over the whole body, with hot face and cold hands, without thirst; profuse sweats, which disappear as soon as the patient awakes. The flushed face wears a stupid expression, while the eyes are red and shining. The delirium is low and muttering, progressing into complete loss of consciousness or violent delirium with open eyes; inclined to escape from bed. Retention of urine, or involuntary urination. Trembling of the limbs, with subsultus tendinum.

Stramonium.—Indicated when the wild, furious delirium threatens to exhaust the patient, and also when the patient is either sleepless or soporous. After the coldness of the whole body has passed away, the skin is hot, dry, and burning, with exacerbations in the afternoon and at midnight; the pulse is small, rapid, and intermitting. The face is swollen and very red, with a besotted expression or a look of great fear and terror. The eyes are wide open and staring, with occasional squinting. The tongue is dry and brown, with violent thirst, especially for cold drinks. The dark-brown stools have a cadaverous smell; at times the stools are bloody; both stool and urine may be suppressed. Constant restlessness with jerking motions of the limbs and of the whole body. Spasm of the muscles of the pharynx is often present, so that swallowing is difficult.

Opium.—Opium has always been held in reserve, to be brought into action should Belladonna, Hyoscyamus or Stramonium fail, and also when the sopor threatens to terminate in paralysis of the brain. Long ago Hahnemann pointed out that it is a specific "for acute fevers characterized by a sopor bordering upon stupor, and by absence of any complaint; snoring with the mouth open, half-jerking of the limbs, and burning heat of the perspiring body." The leading indication is *drowsiness*, often in its intensest form; the patient lies open-eyed and speechless, with dark-red, puffy face and labored, rattling respiration. The respiration is often intermittent from a threatening paralysis of the lungs. Hartmann remarks that "if this condition have lasted too long, and a slow, feeble, intermittent pulse set in, and those parts which were bloated collapse, Opium will not do any good, nor will any other remedy. Death will soon take place."

Apis mellifica.—This remedy apparently holds a position between Belladonna and Helleborus niger. The fever begins with a strange, inward trembling feeling, as after a sickness, with a kind of shudder, without coldness, or shivering, or chill, with shivering, accompanied by a terrible, racking pain all through the head, with increased prostration. The head feels dull, gloomy and confused, with vertigo and pressure in the forehead. Stupor with muttering delirium; the stupor may progress to complete loss of consciousness. The tongue is red, dry, and cracked or swollen, with redness of the entire buccal cavity. Nausea and vomiting, with eructations; soreness of the pit of the stomach when touched. The abdomen, too, is tender and bloated with foul, in-

voluntary stools. The urine is scanty or suppressed. The front of the body is covered with a whitish miliary eruption, and the patient has a general feeling of lassitude, with trembling and nervous restlessness.

Helleborus niger.—All the symptoms point to effusion on the brain, partial or complete. The patient fixes his eyes immovably upon an object, with vacant stare and dilated pupils; sopor with tossing to and fro; chewing motion of the jaws. The pulse is weak and languid, and the patient inclines to slip to the bottom of the bed. The urine is either highly albuminous or it is suppressed altogether.

Lachesis.—This, the Belladonna for the chronic state, is seldom indicated, but it is an invaluble remedy when a semi-comatose state suddenly sets in after the disease has lasted for some time. The patient lies on the back so stupid that he can only be roused by shaking and loud talking. The head is hot and the face dark, flushed, and sunken, with dry, cracked, and bleeding lips. The tongue is red, smooth, and dry, and it is often protruded with difficulty. The dropping of the lower jaw seems to be characteristic, and this, together with the want of control over the tongue, renders speech difficult and hurried. The pulse is small, quick, and irregular, with dry, burning heat at night. Nightly delirium, with restlessness and excitement. The patient is sleepy, yet cannot sleep; when at length he falls asleep, all the symptoms are aggravated on awaking.

Agaricus muscarius.—About twenty-five years ago Dr. Roth showed the close resemblance between the pathogenesis of *Agaricus muscarius* and typhus fever, and several cases treated by Drs. Drysdale and Hayward confirmed the correctness of his opinion. It is indicated when general ataxia is present, great restlessness, tremor, twitching, and a constant desire to get out of bed. The skin is hot and dry, with occasional chills, dull headache, and marked stupidity. The tongue is dry, brown, and tremulous, with constriction of the fauces. The pupils are contracted, with twitching of the eyelids, or the pupils are first dilated, then contracted. Constant delirium, with trembling and restlessness. The pulse is small and frequent, and as the disease progresses, the first sound of the heart disappears. Aching rheumatic pains throughout the body, with twitching of the gluteal muscles.

Arnica.—No recorded experience with *Arnica* exists in our school, yet we know that it produces symptoms strikingly analogous to those of typhus. The patient lies dull and stupid, but not delirious. The head is confused and the sleep is unrefreshing. The lips and tongue are dry and cracked, and the breath heavy and fetid. Chilliness, both external and internal, is mingled with general heat; the thirst at night is unquenchable. The patient desires to be constantly moved, as the bed feels too hard. Involuntary discharge of both urine and fæces.

Phosphoric acid.—According to the excellent classification of Dr. Richard Hughes, a classification of real value in practice, there is in typhus a second class of cases the symptoms of which are those of great nervous depression, with but slight febrile excitement or signs of blood poisoning. "Here," adds our eminent English colleague, "you will give Phosphoric acid, which Wurmb, Bæhr, Jousset, and Trinks unite with observers of the old school in commending." *Phosphoric acid*, then, is the leading remedy when marked nervous depression is present, especially if the patient is prone to pulmonary disease. The illness is often preceded, probably caused, by grief, chagrin, or care, and yet a gastric derangement is the almost invariable commencement; usually tenderness of the pit of the stomach with rising of hot air, nausea and vomiting. Chills are slight and unfrequent, but the heat is very great; the pulse is weak, frequent and intermittent. A red miliary eruption breaks out, with bluish-red spots on the parts upon which the patient lies; later profuse sweats appear. The patient lies sad and stupid, and muttering delirium is common.

Phosphorus.—The chief remedy when lung complications exist, especially when extreme nervous prostration is superadded. Hughes considers that Phosphorus is closely analogous to Phosphoric acid: "A lower grade of this nervous prostration calls for the still more potent Phosphorus, which may save life at the utmost extremity;" again, "the pulmonary affections of typhus call for Phosphorus, which would also oppose the typhus softening of the heart, this being an acute fatty degeneration. This medicine has the same relation to the other parenchymatous degenerations which occur in both typhus and typhoid, and constitute so much of the danger and destruction they involve." The Phosphorus-typhus commences with a series of symptoms very similar to those of general rheumatism, pains in all the limbs, aggravated by cool air, worse in bed, also in the morning and evening. The heat is continuous but not intense; small, quick pulse; profuse sweats at night, which bring no relief. The patient has difficulty in breathing, with stitches in the lungs, mucous rhonchus, cough with blood-streaked ex-

pectoration; at the same time the pit of the stomach is tender on pressure. The face is pale, with occasional flushes of heat; the lips and tongue are dry, parched, and covered with sordes. Hearing is particularly dull, and the appetite is entirely gone. Every part of the body feels painful.

Muriatic acid.—"Thirdly," writes Dr. Hughes, "the phenomena of febrile toxæmia may predominate from the first. Muriatic acid, Rhus, and Arsenicum correspond to this condition in the direct order of intensity." *Muriatic acid* is the great remedy for the advanced stage of typhus, when the muscular power is so completely lost *that the patient settles down in bed;* low delirium is always present. Still another eminently characteristic symptom is the paralytic state of the tongue, which is heavy and seems too long, so that he can scarcely move it, especially when talking, with great dryness of the mouth and fauces. Hartmann gives the additional characteristics,that the pulse intermits at every third beat, and that the patient emits a profuse quantity of watery urine. The sick man is excessively prostrate, and all the symptoms point to a deep-seated and extensive decomposition of the fluids of the body.

Rhus toxicodendron is indicated when, from the beginning of the illness, the patient complains of chilliness even when near the fire, with pains as if bruised all over the body. Great debility; marked languor of the whole body; petechial spots with great debility, even to complete loss of strength; vivid dreams of great bodily exertion; slow, irregular pulse; great thirst for cold drinks; delirium; dry, parched, red or brown tongue; involuntary, fetid stools during sleep. A priceless remedy in true typhus.

Arsenicum album is perhaps the remedy most generally indicated in typhus. Hartmann considers that "the homœopathic physician will think of Arsenic even in the commencement of typhus, if unimportant symptoms, such as a single vomiting, a diarrhœic stool, a little pain, etc., should be accompanied with great debility, obliging the patient to lie down, and with drowsiness, the sleep being nevertheless disturbed by restlessness and anxiety, with burning heat." Rapid sinking of strength; excessive debility; burning hot skin, with spots resembling petechiæ; pulse small, feeble, intermittent. The face is pale or yellowish, with sunken eyes surrounded by bluish margins. The lips are dry, parched, and blackish, and the dry and cracked tongue is red, brown or blackish. The thirst is very great, with oppression and anguish in the pit of the stomach; oppression of the chest, with labored breathing. According to Hughes, Arsenicum is the best remedy for uræmic convulsions.

Carbo vegetabilis.—The late Professor Walter Williamson, of Philadelphia, was in the habit of remarking that *Carbo vegetabilis* is the one remedy which contests the place with Arsenicum "*when the patient is close to death.*" The patient lies in a stupor, with hippocratic countenance, rattling in the throat, small and thready pulse, cold sweat over the entire body. Threatening paralysis of the lung may be present, with blueness of the face, lips, and tongue. Tremulousness of the body, attended with great failing of strength. Congestion of blood to the head, with hot forehead.

Secale cornutum, according to Hartmann, has been found efficient by several homœopaths in typhus arising from other diseases, as well as in that arising from an irritation of the spinal marrow. The patients gradually lose their appetite, desire to drink continually, especially cold water, are in a constant state of fever, which consists principally of dry heat, with hurried pulse; they are very restless, sleepless, debilitated; they complain of wandering pains in the back and small of the back, gradually assuming a spasmodic character, and flying from one part to another; those spasms are of a tonic character in the feet and hands, clonic in the facial muscles, with subsultus, tremulousness, jerks; the spasms in the muscles of the chest occasion asthma.

Veratrum album.—The pathogenesis of Veratrum album suggests it as a distinguished remedy when a sudden sinking of the vital forces takes place, hippocratic countenance, sunken eyes, pointed nose, cold sweat over the entire body, especially on the forehead, marked coldness of the hands and feet. In this state Veratrum will help, unless, indeed, the condition of the patient is hopeless.

Tartar emetic has been used as an intercurrent remedy for the bronchitis of typhus, but, while it is well indicated by the suffocative cough with profuse rattling of mucus, and also by threatening œdema of the lungs, its pathogenesis presents symptoms which prove to be a true *similimum* to the entire morbid state. Senega, too, has been recommended by Kippax in the bronchitis of typhus.

RELAPSING FEVER.

BY THOMAS NICHOL, M.D.

Relapsing fever is a form of continued fever, resulting from famine and misery, highly infectious, and rarely seen except as an epidemic. It is marked by an abrupt invasion; rigors, followed by high fever; white, moist tongue; swollen and tender epigastrium; enlarged liver and spleen; confined bowels; high-colored urine. Jaundice and vomiting are common, and severe pains are felt in the head and limbs. This febrile state lasts from five to seven days, when it suddenly terminates with free perspiration, and the patient feels well but weak, till the fourteenth day, counting from the first onset, when a relapse takes place. A febrile state commences strikingly like the primary paroxysm, and this lasts from three to seven days. A second, third, or fourth relapse may take place, and even a fifth in some few cases. Notwithstanding the apparent danger, the mortality is but small, and the disease is not marked by any specific eruption. On post-mortem examination the liver and spleen are found to be enlarged, but no specific lesion is present.

The essential nature of relapsing fever is better understood than that of any other of the continued fevers, and, unless a very great mistake has been made, we are able to put our finger upon the very *materies morbi* itself. Early in the year 1873, Dr. Otto Obermeier, of Berlin, ascertained that the blood of relapsing fever patients contained exceedingly thin spiral-shaped bacteria, which are always present during the febrile paroxysms, wholly disappearing during the intermission. If a healthy man is inoculated with blood drawn from a relapsing fever patient *during the paroxysm*, that healthy man is attacked with relapsing fever, but the same result does not follow if inoculation is performed with blood drawn during the remission. These parasites are spiral in form, twice the diameter of a blood-corpuscle in length, and never exceeding 0.001 mm. in thickness. They are in constant and lively motion, in this respect strikingly resembling spermatozoa.

Dr. Austin Flint, of New York, considers that we do not know in what relation this minute organism stands to the phenomena of the disease, but it seems to me all but certain that it constitutes the contagium. Obermeier expresses himself in a very guarded manner to the effect that he had not always been able to find them in the blood of relapsing fever patients, but Lebert, Guttmann, Weigert, Buchwald, and many other excellent observers have reached the conclusion that they are *never* absent during both primary paroxysm and the relapse. Then the fact of the disease following inoculation with blood drawn during the paroxysm or relapse appears to complete the chain of

proof, and it seems to be hardly possible to avoid the conclusion that these germs are the *materies morbi* of relapsing fever, that, in fact, the disturbance caused by their presence constitutes the disease.

Relapsing fever has probably existed from the earliest times, but till a comparatively recent date it was confounded with typhus fever on the one hand and bilious fever on the other. In 1741 it was described by Dr. Rutty, of Dublin, and it was epidemic in Ireland between 1797 and 1803. It invaded Scotland in 1817, and again in 1843, and four years later it raged in London, Liverpool, and other English cities. In 1844 Dr. Robert Spittal proved its identity with a fever treated by Hippocrates over two thousand years before, and in 1850 Dr. William Jenner greatly enlarged our knowledge of its pathology. In 1873 Obermeier discovered the parasite which now bears his name, and which seems to be the efficient cause of the disease. This fever is not indigenous to this continent, and is never observed except among immigrants or those who have been in contact with them. It was first noticed by Clymer in 1844, and its latest appearance was in New York in 1869 and 1870.

Relapsing fever is a disease of youth and adolescence, and it appears to be most common between the ages of fifteen and twenty-five. Sex has but little influence on the causation of this fever, and the mortality is greatest among the male sex simply because it furnishes the largest quota to the vagabond army.

Famine, filth, and over-crowding make up the array of predisposing causes. No wide-spread epidemic has ever appeared among a well-fed population, though minor epidemics have been noted among the poorer classes even when food was not particularly scarce. But famine, filth, and misery do not cause relapsing fever without the presence of the spirillum Obermeieri any more than they will cause scarlatina or small-pox. The contrary opinion is held by Murchison and most British observers, who all look upon the disease as being the direct product of famine and destitution; but since Obermeier's discovery we are almost shut up to Lebert's opinion, which is as follows: "Later studies have led me to abandon my earlier view of an autochthonous development, which at that time was as much justified by the facts as the view of importation. Great difficulties, indeed, are met with in accepting the view of the continuity of all cases of relapsing fever. Thus there lie between the Irish epidemics of the second, the third, and the fifth decade of this century long intervals in which no allusion is made to relapsing fever. It is much more in accordance with the general laws of organic development to accept a continuous concealed existence of the germs, than to have recourse to spontaneous generation to account for their development."

After a period of incubation, lasting from four to ten days, the disease sets in suddenly and without warning, and this abrupt attack is

eminently characteristic. Very often the first symptoms are felt on waking in the morning, a severe chill with shivering, or a mere feeling of chilliness. An intense frontal headache with giddiness attends the chills, and this headache rapidly increases in severity. The rigor is succeeded by high fever, with dry burning heat; racking pain in the back and limbs, with violent thirst. Irregular chills are intermingled with the heat, and slight sweats are common. The headache continues to increase, the temples throb, intolerance of light and sound is very marked, and the giddiness forces the patient to take to his bed. The tongue is moist and coated, the appetite is variable, the bowels are usually constipated, with dark or normal stools. Vomiting is never noted in some epidemics, while others are marked by uncontrollable vomiting of bile, with epigastric tenderness. Delirium and sopor are seldom present, except just before the crisis. By the second day the pulse is 120, full and firm, and on the following days it may be 140 or even 150, with anxious and oppressed respiration. Notwithstanding this, the surface is often bathed in sweat, which, however, brings no relief to the headache and other symptoms. The liver is swollen and tender, and jaundice is common. The spleen, too, is also enlarged, and the urine is high-colored and loaded with bile in the jaundiced cases. Sleeplessness is almost invariably present. The countenance indicates helplessness and suffering; the eyes are surrounded with dark circles, and, apparently, the patient is in great danger.

But suddenly the crisis takes place on the fifth, sixth or, more commonly, on the seventh day, and the crisis is as sudden and unexpected as the attack. In two or three hours the pulse falls from 140 to 70, the temperature from say 106° to 96°, a profuse sweat breaks out, the respiration becomes normal, and the muscular pains cease as by magic. Brief but violent delirium often precedes the crisis, and the delirium is accompanied by marked dyspnœa. Epistaxis is common, and hæmorrhage from the bowels has also been noted.

The patient is now *well but weak*. The tongue is clean and the appetite good. Both spleen and liver return to their normal size. He walks about and even tries to work, and he presents all the marks of convalescence, except that the pulse is abnormally slow, 60, 50, or even 40, to the minute. The heart, too, is feeble, the first sound being very faint, while the second is unusually loud. The characteristic parasites disappear entirely from the blood, and precisely what becomes of them is still an unsolved problem.

But an abrupt relapse takes place at the end of about a week. Unlike the first attack, this relapse is not preceded by a chill, though a mere feeling of chilliness is common. Occasionally the relapse comes on during the day, with chilliness at night. The temperature and pulse rise rapidly, the head aches, the tongue is thickly coated, vomiting

and epigastric tenderness return, and the parasites again appear in the blood as suddenly as they disappeared. The fever remits slightly during the morning and forenoon, and these remissions are more perfect than during the first attack. After lasting from three to five days a sour-smelling sweat breaks out, and the paroxysm terminates. Convalescence is now rapid, but other relapses may take place, even with the utmost care.

Death may take place during the crisis or during the interval when the pulse is exceedingly slow. Uncontrollable vomiting of greenish fluid comes on, with great thirst and restlessness. The face is dusky and livid, with cold hands and feet and a general coolness of the entire surface. The coldness increases, the skin becomes purplish, collapse takes place, and death follows in eight or ten hours.

Dr. Austin Flint remarks that "there is no tendency to important complications," but the fact is that relapsing fever has precisely the same tendency to pulmonary inflammations—bronchitis, pneumonia, broncho-pneumonia, and pleurisy—which exists in typhoid fever, and much of the danger of the disease lies in these complications. But it must be admitted that these respiratory affections are neither so frequent nor so severe as in typhoid, and that they do not interfere so much with recovery. Serious hæmorrhages often appear at the crisis, and the consequent debility adds to the danger. The most common of the sequelæ are excessive pains in the knee and ankle-joints, often accompanied by effusion into the joints. Sometimes an inflammatory state of the kidneys is present, not unlike that which attends scarlatina. Still another sequel is *typhus fever*, which often attacks immediately after convalescence. But the most characteristic of all the sequelæ is a peculiar *ophthalmia*, of which there are two tolerably distinct forms, the *amaurotic* and the *inflammatory*, and the second of these may follow the first. The dulness of vision, due to congestion of the choroid and retina, usually commences with convalescence, and the extension of the congestion to the iris constitutes the inflammatory form. Recovery is slow, and many eyes are lost from the carelessness of the patient. Œdema of the feet and legs is a frequent result of the extreme anæmia, and anæmic murmurs are common. The hair often falls off, and a fine desquamation of the cuticle, something like that of measles, is often observed about two weeks after the crisis.

Dr. Carmack, of Dublin, makes two varieties of this fever, the first styled *the ordinary or moderately congestive form*, consisting of the mild cases which almost always do well; and the second, *the highly congestive form*, consisting of those cases marked by intense congestion of the thoracic and abdominal viscera. The second form is very fatal, and it seems to be identical with the *bilious typhoid* so ably described by Lebert in von Ziemssen's *Encyclopædia*.

After the primary chill has passed away, the temperature on the

mornings of the first two days is 102°, and at night 104°, the second day being perhaps a little higher. After that the temperature rapidly ascends, till by the fifth day the morning temperature is 105° and the evening 107°. This high temperature continues for five, six, or seven days, but it is by no means regular, for, without any assignable cause, the temperature may fall 2°, or even 3°, one day, and rise again the next.

When the crisis takes place, the temperature falls all at once from, say, 107° F. to 97°, or even lower—a fall of 10°. But the temperature rises in the evening, and usually touches the normal, or near it, and towards the close of the interval both morning and evening temperatures advance.

When the relapse takes place the temperature rises to 102° in the morning, and, generally speaking, the thermometer shows the same figures, or even higher, as during the first attack. When a second crisis takes place, the fall is as rapid as at the first.

There are no constant or characteristic lesions in this fever, for even the changes in the spleen, probably the most constantly observed, are strikingly like those found in purely malarial fevers. All the lesions are those of an acute infectious fever, inducing congestion of all the viscera, especially the spleen, liver, and kidneys. The spleen is often five or six times its natural size, weighing three or four pounds. The capsule is still firm and tense, but the parenchyma is soft and pulpy, studded with irregular-shaped yellowish deposits of a pus-like-nature. The liver is congested, but not much enlarged, and it too often has similar deposits to those noted in the spleen. The kidneys are greatly enlarged, often double the normal size, and evidences of acute diffuse nephritis are not rare. The heart is pale and flabby, as might be expected after such an intense fever, and its walls are thinned if the disease has been of long duration. The other organs present nothing worthy of note.

Diagnosis.—The diagnosis is easy, especially if the thermometer is used. The invasion is abrupt, the temperature rises with unusual rapidity, slight sweats are frequent, the muscular pains are very severe; all these, with the enormous swelling of the spleen and, in a lesser degree, of the liver, make up a morbid state almost unique. Then nothing like the rapid defervescence is seen in any other disease.

Relapsing fever has often been mistaken for typhus, with which, indeed, it is often intermingled, and it is a curious fact that it is quite common for relapsing fever patients to be attacked with typhus as soon as they are convalescent. But the eruption of typhus is quite unlike anything seen in relapsing fever, and typhus has little or no tendency to relapse. Typhus, again, never has the marked and startling crisis so invariably noted in relapsing fever, and indeed the entire clinical history is different.

Typhoid fever comes on gradually; relapsing fever very suddenly. Typhoid fever has a characteristic eruption, the well-known rose spots; relapsing fever has no characteristic eruption, for the pale red efflorescence, effaceable by pressure, and followed by desquamation, which has been noted in some German epidemics, is rarely seen elsewhere. Then the thermometer shows such notable differences that it is impossible to confound the two diseases.

Relapsing fever has been regarded by some British observers as a mere variety of remittent fever, but it is difficult to trace any resemblance or relationship between them. Relapsing fever has no real remissions, and it is highly contagious; remissions give name to the other disease, which is in no sense contagious. Then the notable differences in ætiology,—the one is never seen save in time of famine, the other rarely except in malarial regions, together with the remarkable differences in the range of temperature,—make a mistake almost impossible.

Lebert writes: "Much has been said in regard to the relation of relapsing fever to intermittent—a very unfortunate, because unjustifiable, idea, not only contradicted by the temperature curve, but put entirely out of the question by the manner of attack, its duration, its remission, the length of the interval, the termination of the process with two or, at most, three attacks, and the great contagiousness of the former."

Relapsing fever, complicated with jaundice and cerebral symptoms, has been mistaken for yellow fever, and Dr. Graves styles it the "yellow fever of the British Islands." But it differs from yellow fever in the temperature curve and also in the longer duration of the first paroxysm and of the intermissions, and still more in its mildness, notwithstanding its apparent severity.

This fever is the least fatal of all the continued fevers, and this, too, in spite of the fact that it rages almost exclusively in time of famine and distress. The mortality ranges from two to nine per cent., the latter occurring very exceptionally, being caused chiefly by complications, such as pneumonia, uræmia, etc. In aged people with weak hearts death may take place during the first paroxysm. The disease is less fatal in men than in women, and weakly infants often succumb. Dangerous symptoms are jaundice when accompanied by cerebral symptoms; hæmorrhage from the stomach and bowels; and suppression of urine, or even a considerable diminution in quantity. Fatal collapse may suddenly appear at or immediately after a crisis and, even in an apparently mild case, serious symptoms may come on without any warning.

"*Relapsing fever is an appanage of poverty and destitution,*" and its most effective prophylactic is abundant food, good clothing, and a comfortable home. Drainage, too, must be seen to, and personal cleanliness must not be neglected.

Treatment.—The patient should be at once removed to a hospital, for in the well-ventilated wards the disease does not spread, notwithstanding its eminently contagious nature. Soiled clothing and bedding should be fumigated with sulphur and then washed in a one per cent. solution of carbolic acid; the straw of the mattresses should be burnt.

During the paroxysm the food should be light but nourishing, but a more substantial diet is needed as soon as the crisis takes place. Soups and broths are always in place, and broiled meat can hardly be dispensed with during convalescence. Water flavored with raspberry juice is by far the best drink, and a very weak lemonade is most grateful. Charteris recommends water charged with carbonic acid.

All authorities condemn the indiscriminate use of alcohol, and yet, when the heart is very weak, small doses of brandy do much good.

The patient should be kept in bed all through the illness, especially during the interval.

Therapeutics.—Aconite.—Our best authorities differ as to the value of Aconite in this disease. Dr. D. Dyce Brown, who attended fifty cases during an epidemic in Aberdeen, Scotland, in 1871, reports that "Aconite certainly was not of the slightest use," while the late Dr. Leadam, who saw many cases during the Irish famine of 1847, states that "very small doses of Aconite were most beneficial and successful." Dr. Joseph Kidd, too, who has probably had a larger experience in relapsing fever than any other homœopathic practitioner, gave Aconite "in almost every case at the commencement of treatment, and for some days, as long as the skin continued dry and hot, and the pulse accelerated." Aconite, then, is indicated by anxious chilliness with occasional shivering, followed by high fever, with quick, full, hard pulse; restlessness and anxiety; the entire body is stiff and sore, with pain in the forehead and temples. Of especial value in sanguine, plethoric patients.

Bryonia.—The late Dr. Rutherfurd Russell considered that the fever treated by Hahnemann, in 1813, was relapsing fever, and this opinion is supported by the authority of Dr. Richard Hughes. Hahnemann, who treated 183 cases without a single death, gave *Bryonia* when the patient complained of dizziness, *shooting* (or jerking-tearing) *pains* in the head, throat, chest, abdomen, etc., which are felt *particularly on moving the part*, in addition to other symptoms, the hæmorrhages, the vomiting, the heat, the nocturnal restlessness, etc. Kidd writes: "As soon as the inflammatory action had been in some degree subdued by Aconite, *Bryonia* was given at intervals of from three to six hours, under the action of which the heaviness over the eyes and the aching in the limbs were much ameliorated, against which symptoms it proved a perfect specific, as they almost invariably remained till after its administration, when their removal quickly followed. Bryonia was also found very useful in cases attended with symptoms of pleuritis or pleuro-pneumonia, particularly whilst inflammatory action continued in the general indications." The Bryonia-fever begins with chilliness, the whole of the first day, all over; chilliness in the bed in the evening after lying down; cold sensation and discomfort through the whole body. The chill is followed by general dry heat, especially in the head and face, with vertigo and violent throbbing headache as if the head would burst; desire to lie down during the fever; sitting up causes nausea and vomiting; vomiting first of bile, then of fluids. Internal, dry, burning heat, without previous coldness, extending over the whole body, with dryness of the tongue, lips, and palate; loss of thirst, prostration, and extraordinary weakness in the whole body, especially in the extremities; the pulse full, accelerated; the skin as dry as parchment, and rough. The tongue is coated white or yellowish, and the thirst is excessive. Sharp, transient stitches in the liver and spleen with oppression at the pit of the stomach; the epigastric region is painful on touch or pressure.

Baptisia tinctoria, according to Hughes, is to be preferred when gastric symptoms predominate, and Dyce Brown states that, if administered sufficiently early, it will lessen the duration of the paroxysm and relapse, and conduct the patient safely

and mildly through it. "When the Baptisia was given I found that the sweating almost invariably occurred not on the day following the first administration of it, but on the day but one, so that the earlier in the disease the patient was seen, the better the chance of early recovery." But it always failed to prevent the relapse. During the evening the patient is uneasy, restless, could confine himself to nothing; wanted to be moving from place to place. Frontal headache; vertigo and sensation of weakness in the entire system, especially in the lower limbs. The face is flushed and very hot, with a heavy, besotted expression. The tongue is coated yellowish-brown, the edges being red and shining, or it is slightly congested, with a whitish coating. Great languor with muscular debility; feeling as if the lower limbs were separated from the body. The patient changes his position frequently because the bed becomes too hard. The urine is not very copious, but of a dark-red color.

Arsenicum.—Kippax places Arsenicum next to Bryonia, and Dr. Rutherfurd Russell writes: "When Belladonna, Bryonia, and Rhus are insufficient to prevent the patient sinking into a lower depth, the medicine we then usually administer is Arsenicum." Dr. Dyce Brown gave this remedy in the earlier cases when the watery diarrhœa and vomiting were present, and found that it signally met those symptoms. Great restlessness and anxiety, with desire to leave the bed; death-like color of the face. The pulse is small, weak, and extremely quick. Great thirst for cold water, drinks often, but little at a time. Dislike to food. Distension of the right hypochondrium, with burning in the stomach. The tongue is dry and fissured, or swollen and furred; fuligo on the tongue and teeth. Vomiting and diarrhœa during the night. Great weakness and prostration. Dyce Brown recommends it when œdema of the limbs follows the illness.

Rhus toxicodendron is the classic remedy with which, together with Bryonia, Hahnemann treated the famine fever of 1813. He writes: "If now the amendment produced by the single dose of Bryonia goes off in the course of two, three, or four days, that is say, if the patient then complains of *shooting pains in one or other part of the body,* whilst the part is at rest; if the prostration and anorexia are greater, if there is harassing cough or such a debility of certain parts as to threaten paralysis, we give a single drop of the tincture of Rhus toxicodendron." Dr. Kidd used Rhus when the joints (knees, shoulders, etc.) were more affected than the bones or muscles of the extremities, particularly in the latter stages of fever, where much debility existed. The leading indications are dull, throbbing pain in the head at intervals, worse from opening or moving the eyes. Sunken face with sickly expression; blue rings around the eyes, or red swelling of the face in the morning. Dry, red tongue, or tongue thickly coated with brown mucus. Great thirst for cold drinks. Short cough, from severe tickling and irritation behind the upper half of the sternum, following the feeling of discouragement and apprehension; the cough is worse in the evening and before midnight.

Phosphorus.—Dr. Kidd recommends *Phosphorus* when pneumonia or pleuro-pneumonia are prominent features of the morbid state, and he states that, of the many cases attended with inflammation of the lungs and pleura, he did not observe one of pure pneumonia uncomplicated with pleuritis. Phosphorus, then, is the leading remedy when pulmonary complications are present, especially when the lungs are hepatized, with loud râles in the lower lobes. Chilliness, with increased temperature and pulse; febrile heat and sweat at night. Pale, cool face; sunken eyes with blue rings. Marked inability to concentrate thought. Heat and pain in the stomach, with feeling of coldness in the abdomen. Hard, dry cough, with oppression in the chest and difficult breathing.

Phosphoric acid is indicated by paleness of the face, which, however, is frequently dark-red for a moment, with flushes of heat. Bleeding of the nose. Great dryness of the mouth, with glutinous soapy mucus and grayish coatings of the tongue. The head is dull and confused with frequent vertigo, worse from the least noise or shaking. Heat and pressure in the stomach, with feeling of weight in the liver. Great weakness and prostration, with night sweats. Dr. Kippax remarks that Phosphorus or Phosphoric acid will be frequently needed during convalescence.

Nux vomica.—Dr. Kidd observes that "*Nux vomica* was found necessary in cases attended with gastric irritation, nausea, soreness at epigastrium, aggravated by taking food or drink, or where the tongue continued dry and furred after all traces of feverish action had been subdued; it was selected because of those particular sufferings resulting from irritating vegetable food or from coffee; in most cases of relapse from fever it was also used, and against particular bronchitic symptoms."

Gelsemium has never been used in this disease, but its pathogenesis indicates that it must take a leading place. The chilliness is especially felt along the spine, and the febrile chilliness is accompanied by cold extremities and heat of the face and head, with dull headache. Directly after the chill comes a flying heat and pricking in the skin, rapidly followed by perspiration, which at times is profuse, and lasting even from twelve to twenty-four hours. The tongue is coated white or yellow, with fetid breath and dryness of the mouth; slimy, bitter taste in the mouth. All the mental faculties are dull, with marked languor or drowsiness.

Eupatorium perf.—Hughes recommends Eupatorium perfoliatum for the relief of the characteristic pains, but in many cases it must cover the entire morbid state. It is indicated by severe rheumatoid pains; aching pains and soreness, as from having been beaten in the calves of the legs, small of the back, and in the arms, above and below the elbows; severe pains and bruised sensation in the sacrum and in the extremities; soreness and aching in the arms and forearms. Chilliness in the morning, heat throughout the rest of the day, but no perspiration; chilliness with excessive trembling and nausea; pungent heat attends the perspiration at night.

Leptandra virginica.—The skin is hot and dry, with frequent pain in the bowels. Dull aching distress in the umbilical and hypogastric regions, often with burning distress, or very sharp pains by spells. Nausea and vomiting of bile; jaundice with diarrhœa of clay-colored evacuations; very profuse, black, fetid stool. The urine is very red. A most promising remedy, as yet untried.

Mercurius solubilis.—Indicated by chills and fever with profuse and offensive perspiration, the linen being stained saffron-yellow by the imperceptible exhalations from the body. The fever is accompanied by great restlessness and anxiety, with confusion and dulness of the head; vertigo and staggering. The swollen tongue is coated yellowish, and is so soft that it takes the imprint of the teeth. The liver is swollen, heavy, and painful, and diarrhœa of greenish mucus is often present. The tearing, racking pains in the joints are worse at night and in the warmth of the bed.

Veratrum album—a close analogue of Arsenicum album—is indicated by a sudden and rapid sinking of strength; coldness of the whole body, with shivering and goose-flesh after drinking; cold perspiration over the whole body, with small, weak thready pulse. The prostration is extreme, and the convalescence is always protracted.

China.—Dr. Kidd reports that China did little good, but it seems to be adapted to very many cases when the patient is anæmic and cachectic; when extreme malaise is present, together with exhausting sweats; when both liver and spleen are enlarged, together with a certain degree of jaundice.

Argentum nitricum is indicated by dull headache, with confusion of thought; vertigo and buzzing in the ears; drawing, tearing in the right brain, shooting alike to forehead and occiput; excessive congestion of blood to the head, with throbbing of the carotid arteries; painful tension in the occiput, increased by the least motion; feverish, sick feeling the whole afternoon; general debility of the limbs, with trembling; constant weakness and exhaustion; shuddering over the whole body, which passed into a febrile chill, with goose-flesh and coldness, the head being hot and the hands cold, with nausea; the chilliness was accompanied by a pale, almost yellowish countenance, nausea, and empty risings; night sweats.

Apis mel. has chiefly been used in the urinary troubles which often accompany relapsing fever, such as difficult passage of high-colored urine, but it is certainly a remedy for the entire morbid state, especially that very characteristic group of symptoms, 945 of Allen's *Encyclopœdia of Pure Materia Medica*, vol. i., "*Chilly every afternoon at 3 o'clock; she shudders, worse in warmth; the chills run down the back: hands feel as if dead; feverishly hot after about an hour, with a hoarse cough; heat of the cheeks and hands, without thirst; ceases gradually, but she feels heavy and prostrate.*"

Arnica.—Indicated by shivering over the whole body and the head, at the same time heat in the head with redness and heat in the face, accompanied by coolness of the hands and a feeling as if the hips, the back, and the anterior surface of the arms were bruised. Dry heat in the bed, with violent thirst; heat becomes intolerable to him; he tries to uncover himself; but he feels chilly upon uncovering himself, or even when making the slightest motion in bed. Great heat in the head, with coldness of the body. Petechiæ.

Chamomilla is the principal remedy when children are attacked with severe gastric symptoms, nausea and vomiting, with pain in the stomach and right hypochondrium, yellow-coated tongue; shivering on the posterior portion of the body, of the

arms, of the thighs, and of the back, which returns by paroxysms, without external coldness, but rather with internal dry heat and external heat, especially of the forehead and face.

Camphor, the leading remedy in the severe form of influenza known as the *Siberian grippe*, must be equally valuable in relapsing fever. Chilliness and shivering, with goose-flesh; the skin of the whole body is painfully sensitive, and sore to the slightest touch. Clammy sweat breaking out over the body. Attacks of prostration, with faintness and total relaxation of all the limbs. A dreadful feeling of faintness, shivering, and numbness. The pulse is slow, small, hard, almost suppressed; with fever and sweat.

Cimicifuga is indicated by dull stitches, sometimes like a cramp, sometimes like a pressure, sometimes like a blow or jerk, sometimes like an itching, here and there in the body, now in the limbs, arms, feet, toes, now in the side or back, now in the nasal bones, but especially on the posterior portion of the crest of the ilium, on the hip; the places are painful on pressure, as if sore or bruised. Painful sensitiveness of all the limbs on motion and when touched. Shivering over the upper part of the body, extending up to the head, as if the hairs would stand up, even by the warm stove. Febrile shivering over the whole body, with hot cheeks, without heat. Violent fever, with vomiting and diarrhœa.

Dr. Kidd gave *Belladonna* to obviate the distressing sleeplessness and restlessness at night, or where much delirium existed, and also against hard dry cough at night, preventing rest. Dr. Kippax recommends *Berberis vulgaris* where there is considerable enlargement of the spleen, and the same excellent writer says that the *red Iodide of Mercury* is of use when both liver and spleen are enlarged. In the severe vomiting, Dr. Dyce Brown did not find *Ipecacuanha* of any use. *Cantharides* is indicated by constant urging to urinate, with scanty discharge of reddish urine, and *Mercurius corr.* has been recommended for albuminuria. *China* and *Sulphur* were given where all inflammatory action had ceased, and where convalescence was tedious, but without any striking result, the cause generally being the want of proper, or the use of improper, nourishment, and therefore beyond the reach of all medicine.

Hughes does not think that the relapse can be prevented by homœopathic treatment, and Dyce Brown introduced a remedy which is perhaps the only one which has that effect. "But there is one drug which I wish to bring under your notice, though I cannot claim it for homœopathy, nor can I claim any credit for the discovery of it. Mr. James Walker, one of the students who was going round with me at the time we had these cases, was himself attacked by the fever, and after the paroxysm had passed off by sweating, it occurred to him to try what effect the Hyposulphite of soda would have in the way of preventing the onset of the relapse. It was merely taken as an experiment, on account of the statements which had been made from time to time in the medical journals as to the virtues of the hyposulphites in blood-poisonings. Five grains, three times a day, was the dose he took, with the effect of entirely preventing any relapse. This was so new a result to obtain, when formerly it was thought impossible to accomplish it, that I resolved after that to put it to the test in all cases where we had the opportunity. Mr. Walker also observed the cases and the results with me. The conclusion we drew was that, although not infallible in preventing the relapse, it yet did so in a sufficient number of cases to make it a most valuable acquisition to our armamentarium. Though it is not strictly homœopathic, yet I presume no one, though practicing homœopathy, would refuse to give a patient the benefit of the only medicine which has yet been known to prevent the relapse. The epidemic was half over before Mr. Walker discovered the value of the Hyposulphite of soda, so that our opportunities of testing it were more limited than might have been had we known of it earlier; but I am not over-stating it when I say that at least twelve or fifteen cases were relieved entirely from the relapse, and were able to return to their work in a few days after the sweating of the first paroxysm was over."

YELLOW FEVER.

BY LOUIS A. FALLIGANT, M.D.

Origin.—In reviewing the theories of different writers whose observations and experience have led them to their several conclusions, concerning the possible causes of the development of the yellow-fever

poison, the student is likely to be left in a condition of dazed uncertainty. Malaria, of some possible origin, has its advocates, though those are impressed by the numerous instances in which malaria abounds without causing this devastating disease. Fermentation presents an array of disciples equally confident that in its realm will appear the essential element out of which grows this grim destroyer. Scientists appear on the scene, and with complacent confidence explain to us how some life-saving ingredient in the necessary constituents of a healthy atmosphere is found in diminished or undiscernible ratio, and that this peculiar epidemic disorder is a result of a lack of this proper atmospheric combination. Again, marsh miasm envelops the scene, and we are told how, from the commingling of salt and fresh waters over the marshes adjacent to the oceanic outlets of fresh-water rivers, there is developed that special miasm out of which springs the gaunt spectre of the yellow fever fiend. Some declare that its birth happens in the vegetable kingdom, and others assert with equal vehemence that in the animal kingdom alone appear the germs from which this poison arises.

Malaria is but a general term covering a wide range of single and combined conditions. Its composite nature may result from all sorts of odors and decompositions; and if the poison of yellow fever is the product of decomposition of any character, perhaps this sweeping term will answer the purpose as well as any other. Of late years, however, there has arisen a school of theorists who believe that the special cause of each known specific disease lies in a *germ*, organic, and *endowed with the vital properties of growth and reproduction*, and that the poison of yellow fever has its origin in a germ of this character. It is but just to myself to say that this conclusion is not sufficiently well established to receive my sanction as an established scientific truth, and for many very satisfactory reasons I doubt its correctness. My own view is that the poison of yellow fever is a product of decomposition, and not a development of growth, and that its epidemic or contagious nature finds its paternity in septicæmic, and not in healthy conditions. It is but necessary to read the varied accounts of different yellow fever epidemics, the modifications of the symptoms of the disease, the mild characteristics of one epidemic and the intense malignity of another, without reference to the sanitary conditions of afflicted localities, the trivial fatality of the disease in certain seasons and places, and its intense malignity in the same places and under apparently similar local surroundings during other seasons, to arrive at the conclusion that the original germ displayed wonderful properties of discordant development.

There are, however, certain practical conditions connected with the origin of yellow fever which are sufficiently well recognized to enable us to make certain positive declarations. These conditions are the

association of animal and vegetable substances in a state of decomposition wherever the disease is found to appear originally; in other words, in association with commercial lines where human beings congregate, as in seaport cities. Now, if this poison were of *vegetable* origin, it could originate in uninhabited localities as well as in cities, and its existence in its primitive state in such localities would be made manifest by its attack upon the animal creation in that district, whence it might spread to such unfortunate human beings as accidentally traverse its habitat. But whilst, when visiting mankind with its desolating ravages, it has been known to spread from human beings to the lower order of mammalia, I have yet to hear it asserted that in a single instance it ever assaulted primarily the lower animals, and traversed from them to mankind.

On the other hand, can this poison be of purely *animal* origin? If a ship could be constructed entirely of metal, its occupants be fed entirely on animal diet, and their garments be composed of no material of vegetable nature, and such ship should be carried into tropical regions, and be kept absolutely free from bilge water or any decomposed fluid wherein even the tenants of the sea could find place for death and decay, I conjecture that if such vessel were kept far away from any land, and still yellow fever should develop thereon, its source might reasonably be attributed to some animal substance. Who will claim, however, that a fever so developed would not prove to be typhus or ship fever, and not yellow fever? What are the practical conditions associated with the origin of yellow fever? Absolutely associated animal and vegetable decay. With these we have also a class of symptoms partly resembling typhus and partly malarial affections, modified by circumstances and seasons, dying yet decaying not (as in holding over, whether in the coffin or clothing, from season to season), active and dormant, gentle and cruel, shrinking into isolative feebleness, and swelling into widespreading devourments. And yet, when the frost comes, unlike typhus (a purely animal poison) it bends its head in death; and when its garments are ventilated and cleansed, its poison appears to dissipate into the surrounding atmosphere, and to lose its disease-breeding power. To my mind, *density* is its force, and *dilutability* its weakness.

Its Nature and Symptoms.—Dr. Loomis describes yellow fever as "a miasmatic contagious fever belonging to a class in which the poison is *developed within the body*, but in order to its reproduction it must be deposited in decomposing organic matter exterior to the body;" he does not say whether such "organic" matter shall be of animal or vegetable nature. With the statement made that the causes of this disease lie in a combination of animal and vegetable decomposition, I have heretofore exhibited my concurrence. The *reproduction* of the disease, however, involves several distinct subjects

of consideration. Its recurrence in the same epidemic, season, and locality depends directly upon exposure to the poison in its active vitality, whilst the reproduction of the poison from season to season appears to depend upon its confinement out of the reach of disinfection, ventilation, or frost, during the interim between seasons. No one questions the well-established facts of its transmission in some way from person to person during an epidemic season; but it is evident that where it makes its reappearance after dormancy, during a winter, for instance, it has either retained dormant vitality or originates "de novo." Nor is it well established that both of these conditions may not exist. Let but one case occur, however, and that so mild as to be unrecognized, or so severe as to be characteristic, there is no question whatever as to its further progress. Such a first case may be mild or severe. Should it occur early in the summer, it is less apt to display its real character, unless imported, and thus a number of cases may succeed, their intensity increasing as summer advances, until a well-marked *vomito* rouses serious attention to its alarming portent. If, however, the disease be a fresh importation from a locality in which it is prevailing in more intense degree, usually its symptoms are sufficiently well-marked to ensure its ready or suspicious recognition, and to lead at once to a more speedy and careful study of its symptoms, which I shall next describe.

I make no excuse for introducing here copious extracts from my report on the Epidemic of Yellow Fever in Savannah in 1876, since the symptomatology therein described was written after a fresh experience in a most destructive epidemic, and has received the warm endorsement of physicians of all schools of practice.

In some cases there were symptoms of warning, languor and general malaise, cerebral distress, loss of appetite, feverish flushed skin, and a gradual advance to the more positive symptoms of the disease. In others, little or no premonition existed—the attack coming on suddenly, with or without chilliness, often with a simple creeping shuddering, rapidly sweeping into the intensity of febrile irritation, and in a large proportion of cases associated with a considerable degree of mental alarm. (It is possible that this nervous condition is rather due to the general sense of fear of the disease which pervades all classes subject to its sway than to any primary lesion connected with the disease itself, since we observe a not inconsiderable number of patients in which it is by no means a well-marked condition.) Many cases were of an extremely mild character, especially during the early period of the epidemic, and would scarcely have been recognized but for the manner in which it swept through almost entire households. The face was flushed, the eyes slightly reddened, the skin hot and dry, the pulse full, quick and regular, the frontal headache moderate, the urine but little altered, little or no emesis, and the

bowels generally confined. In from twelve to thirty-six hours the fever declined, a gentle transpiration exuded through the skin, and the disease passed away with little or no consecutive prostration, leaving no after-effects. This was the simplest type of the disease. In some of these cases there appeared an efflorescence on the skin, erythematous in character, and slowly fading away; and again slight epistaxis was at times observed.

Other cases, severer in degree, were attended with delirium, bounding full pulse, throbbing and darting frontal headache, red suffused eyes, severe pains in the back and extremities, and intense general bodily aching and distress, with occasional nausea and vomiting, chiefly of biliary fluids intermingled with the contents of the stomach —mostly with high-colored urine and lethargic bowels.

Again, there were cases of a distinctly congestive type without malignant complication, in which the pulse was rapid, and at times full and hard, and at other times small and tremulous, the temperature high, the thirst intense, the redness of the eyes less marked, but the nausea and vomiting more frequent, obstinate, and of a more watery, mucous quality, the mind alarmed and anxious, with moaning, sighing, and tossing about the bed. In these cases the pulse usually rose to 130 or 140 within the first twelve hours, and began to recede or remit towards morning of the day following. The gastric irritability was severe, and easily excited by almost any liquid introduced into the stomach, the pains of the head and extremities often distressing to the sufferer, the urine more scanty and orange-colored, and the bowels confined.

Again were seen cases of a malignant, congestive type in which, in addition to many of the symptoms above described, there was a dry, red, parched, and crusted tongue; the countenance exhibited a dull and stupid look; the chin at times hung down; the eyes were deep-red, congested, sometimes crossed, and occasionally with pupils dilated; the brain was congested and comatose, with anxious, muttering delirium; the urine scanty, dark-red, and of strong odor; the skin reddish and yellow, at times burning, hot, and dry, and again covered with profuse, hot, and alternate cold sweats; the *fever-smell* intense, and the bowels lethargic, and alternately discharging flocculent watery fluids. These cases, when not reacting, passed rapidly through the condition of uræmia and black vomit, and death ensued from the third to the fifth day of the disease, and even earlier.

Again were seen numerous cases of hæmorrhagic types, in which the fever assumed a remittent, continued, or typhoid character. The eyes were at times red, and at times yellow; the skin but slightly altered, and again sallow, orange-colored, or mottled; the tongue was moist and natural, or coated with a heavy white or dirty-yellowish fur, and again rough, corrugated, parched, crusted, and bleeding; the

nose thin and pointed; the lips thin and pale, or red, cracked, and bleeding; the gums sore and congested; the mind less disturbed than seemed warranted by the general condition, but at times indifferent and dull; occasional thin, sanious discharges from the nasal, buccal, urinary, and intestinal mucous surfaces; clammy colliquative sweats were frequently present; occasional vomiting of frothy, glairy mucus, often followed by dark flocculent hæmorrhagic emesis, and, in others, a general lethargic condition of the bowels.

Still more malignant in character were the types of cases resembling petechial fever, in which the blood seemed disorganized from the very beginning of the attack; the headache less violent, but more depressive, the mind excited and anxious, and at times running into restless delirium, until the patient appeared as if suffering from delirium tremens, jumping up in bed and out of it, attempting to escape through the doors and windows; little or no pain was experienced anywhere; the urine was scanty and speedily suppressed; the vomiting frequent, spasmodic, and rapidly passing from the muco-flocculent to the coffee-grounds ejecta; the pulse and temperature, after the first febrile flush, were often approximately normal; the bowels at first lethargic, but later pouring-out fluids similar to those ejected from the stomach; clammy sweats breaking through the leadened and mottled skin, the unhappy victim rapidly sinking into coma, collapse, and death.

Again were seen many cases of the, so-called, characteristic type of yellow fever, that type which is said to be the *pure* yellow fever, awaiting the advent of which many inexperienced, and not a few experienced, physicians permit their judgment to remain subject to their doubts, and declare that up to the date of *this case* in epidemic advancement they had not seen a case of genuine yellow fever.* In this type the orange-tint of the skin was decided, the buccal membranes softened and hæmorrhagic, thick, dark-brown, and black incrustations of disorganized blood around the lips and alæ nasi, coffee-ground vomits, and similar and tarry-looking dejecta, suppression of urine, delirium, carphologia, and final collapse from exhaustion and colliquative discharges.

After the transition beyond the earlier stages of the disease, many cases of different types developed into a secondary, nervous, continued, or typhoid type of fever, which was often more troublesome and harder to manage than the earlier form of the attack, during the entire course of the disease, however, retaining such well-marked evidences of the epidemic poison as to leave no room for doubt concern-

* I remember very well how, when I reported to the municipal authorities in 1876 cases of mild, severe, and malignant yellow fever, I was informed that *the malignant cases only* were yellow fever. It did not, however, take the medical profession long to plant themselves on my descriptive platform.

ing the overwhelming saturative element which gave rise and character and duration to the morbific disturbance. In not a few instances those who had been already afflicted with the fever remained for weeks, and even during the entire season, in a state of easily excited febrile flush, which required but little imprudence to again put on the alarming conditions of *relapse.*

The great mistake made by most authors lies in their efforts to *limit* the symptoms of yellow fever; in other words, to strike out all cases as of doubtful character which do not come up to the so-called classic standard; and for this reason especially I have more carefully described the many forms in which this dire disease cloaks itself when spreading broadcast over a community. The theoretical high pulse and temperature for the first stage, with a succeeding deceitful calm, and another rise of both, or of the temperature with a slowed, compressed pulse, and these symptoms and stages accompanied with vomiting of the contents of the stomach and biliary fluids, then of white watery vomit like the washings of rice, then of a serous watery vomit with dark flocculi like bees' wings, and then of the standard coffee-grounds vomita, and all these conditions associated with the redness of the eyes, the red-tipped tongue, the characteristic pains and aches, the orange-hued skin, and the suppressed urinary secretion, present, it is very true, a classic and easily recognized picture of disease; but yellow fever, and especially *epidemic yellow fever* (and its *epidemicity* is the quality, above all others, which causes its announcement to strike terror to the human heart), is not so obliging; and the practitioner will be badly deceived who expects to find so clear a symptomatology in more than a moderate proportion of cases.

On page 91 of his excellent work on fevers (edition of 1880) Dr. Loomis says: "You may have yellow fever, remittent fever, and typhoid fever, all prevailing at the same time in a locality, yet each of these three diseases will run its individual course, and no one will lapse into another." Dr. Loomis is certainly mistaken as to localities where yellow fever is sweeping with epidemic force. The very reverse is true, and every type of fever becomes so saturated with the epidemic influence that *this alone is its recognized nature*, and *these several types its less important habiliments.*

Special Symptoms.—Whilst the most uniform symptoms in all types of the disease were redness of the eyes, frontal headache, flushed countenance, mental alarm, nausea and vomiting, thirst, pains in the head, back, and limbs, high-colored scanty urine, and lethargic bowels —an embodiment of symptoms pointing directly to the sympathy of the spinal system of nerves in the general orgy of suffering, this sympathy being especially manifest in the atony of the abdominal nervous forces, as well as in the frequent dilatation of the pupils of the eyes, I am compelled to differ with even so distinguished an authority as Dr.

Charles Belot, of Havana, as to its meaning. It is true that such dilatation in the later stages of fatal cases may indicate cerebral effusion; but in not a few cases, in the earlier stage of the disease, I held a lighted candle in front of the eye to test whether effusion or cerebral congestion existed, and was agreeably comforted with the readiness with which the pupils contracted, clearly showing that the dilatation was due to *atony* of the nerves controlling this circle. This view is in entire harmony with the general exhibition of nervous prostration so well recognized as one of the most decided characteristics of the disease.

Eruptions of urticaria, erythema, scarlatinous efflorescence, etc., have been frequently noted by observers; but these eruptions are not characteristic, and usually are seen in the less malignant cases, and, indeed, are met with in greater frequency in *dengue fever*. In fact, it was estimated that the scarlatinous efflorescence was an accompaniment of two-thirds of the cases of dengue in Savannah in the epidemic of 1880.

Taking up the symptoms in the order of their usual occurrence, we will first describe the chilly stage. This stage consists of more or less chilly feelings, sometimes confined to the spinal region, again manifest in cold shudderings over the body and down the limbs, and in not a few instances in well-defined violent chills, followed by rapid and intense febrile reaction. In my own case I was suddenly taken with a feeling of general chilliness, with immediate and intense prostration, as I was stepping out of a patient's house about 11 A.M., and almost *fell* into my buggy. In from a few minutes to an hour or two, febrile advance quickly succeeds, the pulse and temperature rising until the former reaches 110 to 130 or 140, according to the age of the patient, and the latter 103° to 105°. The temperature, in exceptional cases, has been observed as high as 106° to 107°. As the fever rises, the skin may be hot and dry, or covered with a profuse warm sweat, or the sweat may not appear excessively until the fever begins to decline, which usually occurs towards twelve to thirty-six hours after the febrile inception. It is, however, more speedily induced by the use of hot mustard foot-baths.

When the dry skin continues during and after the rise of the fever, and little or no decided transpiration follows its remission, the indications point to a typhoidal form of the fever in which the brain, bowels, and kidneys are likely to become involved. But if the remission of the fever is accompanied by a gentle transpiration, with a soft declining pulse, the succeeding stages give promise of a safe convalescence.

The pulse presents many anomalous features. Generally full, hard, bounding, and rapid, there will be seen congestive cases in which it is rapid, feeble, and tremulous, and in others compressed and slow, as if squeezed down by cerebral congestion, whilst the temperature ranges from 103° to 105°. I recall two very remarkable cases: One, an old

lady of seventy years, whose pulse descended to 36, whilst her temperature remained nearly normal, and her mind was intelligent and clear; the other is the case of a boy, eighteen years of age, whose pulse fell to 30 beats per minute, attended with hæmorrhagic discharges from the bladder, and flocculent, dark, black-vomit dejections, but with no other marked symptoms beyond a singular nightly delirium. Both of these cases recovered.

The more marked features of the pulse and temperature, however, frequently seen, are the conditions subsequent to the first stage. In what is usually designated as the second stage, usually the second or third day of the fever, the pulse falls in adults to 90 or 96 beats to the minute, and the temperature may be normal, or below or above. When below, the skin is frequently clammy and cool; when above, the surface is found moist or dry, as collapse or typhoidal symptoms threaten. In the third stage a small, feeble, thread-like pulse is an unhappy omen of hæmorrhage and black vomit; and when intermittent at this period, it usually announces deep-seated alterations.

Cephalalgia.—My observation of this symptom is that it is of a violent, throbbing, bursting frontal type, though Belot describes it as frontal, supra-orbital, sincipital, or invading the whole head. He further adds: "It is more serious in proportion to its persistence, and constitutes an alarming symptom when continuing through the second period of the disease." This persistence is evidently due to the lesions of the disease, and is of grave import when attended with delirium and subsequent coma.

The Eyes.—These are generally injected and red, though many cases do not exhibit this feature. In some, they are more or less jaundiced in the beginning; in others, this condition succeeds the engorgement of the conjunctiva; and in still others, there is no jaundice whatever. Photophobia is common in the first stage; pupils which are immobile and insensible to light in the later stages indicate cerebral effusion.

The nose presents no feature of importance in mild cases and in the earlier stages, but in congestive cases and in the second and third stages of severe cases it may become pinched. Nasal hæmorrhage is only noteworthy in the beginning, as pointing to subsequent hæmorrhagic conditions; in later stages it may become dark and encrust itself in black masses around the alæ nasi. In the earlier stages the blood may pass by the pharyngeal route into the stomach and, being ejected therefrom, may be mistaken for gastric discharges.

The Tongue.—The usually accepted description of this organ in yellow fever is a "slimy, pasty, or whitish coated tongue, with marked redness of the tip and edges." I have not found this description reliable. There are clean tongues, and white and yellow coated tongues, moist tongues and dry tongues, tongues with clean surfaces and red margins, and coated surfaces and clean margins, crusted tongues, and

red, seared, parched, cracked, bleeding, and brownish tongues; and these conditions were as common in cases which recovered as in those with a fatal termination. In a general way, I may state that the malignant and typhoid types of the fever present the worst tongues. In the purely congestive types, however, the limited alteration in the appearance of this organ is remarkable. In the typhoidal types it becomes dry, parched, cracked, and often covered with blackish secretions, and the patient loses the power of putting the tremulous, faltering organ beyond his teeth. "Finally," says Dr. Belot, "it is not unfrequent to see the disease accomplish all its periods without the tongue presenting any morbid sign."

The Gums.—Sympathizing with the mucous surfaces of the nostrils and tongue, the gums will in some cases be found reddened, swollen, dry, covered with gummy, viscid secretion and sordes, as in typhoid fever. In some cases there will be passive hæmorrhage, more or less deteriorated in the character of the outflow, as the case is simply hæmorrhagic or exhibits features of more destructive blood-poisoning. In harmony with this condition, the lips will at times crack and bleed, and black crusts form on their mucous surface and margins.

The breath, in milder cases, presents no features of interest beyond a general fever smell; but in severer cases, as can be easily understood, it partakes of the smell of meat losing its freshness, the intensity of the odor increasing with the accumulating evidences of coming decay.

Anorexia is generally present, especially during high febrile excitement. Yet I have seen cases in which *intense hunger* existed during the fever, and became *craving* immediately thereafter. Neither indication was of more favorable prognosis.

Thirst is an almost invariable symptom from beginning to end of the disease; intense, burning, unsatisfiable, a symptom which is of grave importance when holding on steadily to the last stages of the disease.

The *respiration* is somewhat accelerated during very high febrile excitement, but the symptom of note is a *sighing respiration*, as if the patient were greatly exhausted. This usually is seen in later periods of the fever, and presages black vomit or intestinal hæmorrhage.

The *stomach* is frequently the seat of intense, burning, corrosive pain, as if scalding water were being swashed about its inner surfaces. I have often had patients tell me that the burning in the stomach was like the fires of hell. The *vomita* correspond with the description of their suffering. At first it frequently consists of the contents of the stomach, with more or less biliary admixture, but when persistent beyond the first febrile advance, it often appears as a clear, whitish, watery, acid fluid, resembling the washings of rice, the fluid gradually taking on a darker hue, with interspersed dark flocculi, like broken bees' wings, and again degenerating into coffee-grounds ejecta.

The effort to vomit in the earlier stages is generally straining and severe, but later on it becomes of a spasmodic ejective character, the contents of the stomach being gathered up with force sufficient, at times, to throw them all over the bed, on the floor, and against the walls of the room. Though I have seen cases recover from even these desperate conditions, their fatal tendency cannot be gainsaid. It is not uncommon, however, for death to occur without such vomita, although they are found in the stomach after death. It is generally held that the greater the ratio of biliary admixture in the black vomit, the more room is there for hope of recovery. Stools of a character similar to the vomita are not unfrequent. A case was related to me in Mississippi, where a person, saturated with the yellow fever poison, had a few of these black stools, and got entirely well without being confined to bed with fever.

The bowels present symptoms of intense interest. Whilst in occasional cases the febrile poison appears to be rapidly eliminated by them in discharges such as I have above described, they are in nine-tenths of the cases *lethargic*, *not* constipated. I cannot insist too strongly on this fact, since out of the idea of *constipation* grows that irritative purgative treatment rapidly leading to congestion of the mucous surfaces, hæmorrhages, prostration, abortion, and collapse The inaction of the bowels is clearly due to *nervous atony*, the morbific depression paralyzing their functional peristaltic powers. The very excretion expelled by forced purgation is of a *lax or fluid consistency*, exhibiting no signs of constipation. The disease primarily attacks the circulatory system, prostrating the nervous apparatus, and rapidly extending its sphere of action to the mucous structures, which successively soften and disintegrate, and to the internal functional glandular organs, from which follow atonic and congestive conditions of the liver, kidneys, etc. I have seen uræmia and black vomit in all the severer types of the disease; but the unjaundiced hue of the skin in a large proportion of cases renders it seriously doubtful whether the *boxwood liver* could have existed without cutaneous and sclerotic pigmentary sallowness, the evident effect of atonic hepatic functional derangement.

Hiccough in the primary period of yellow fever may be entirely due to simple gastric disturbance of flatulency; but in the second and third stages it is of very grave import.

In connection with the symptoms of the alimentary canal, I observed that when the patient had *purple lips* from the inception of the disease, it was almost certainly a fatal premonition. This symptom appeared in a few cases of the malignant, orange-hued, congestive and petechial types.

Hæmorrhages from the uterine and cystic canals were not unfrequent. Indeed, women often called my attention to what they thought to be

an unusual appearance of the catamenia *out of time*. Abortion, however, was a rare occurrence. I did not see a single case except where the woman had been purged *secundum artem* before the case came under my care; and this only in two or three instances. It would appear to me that the different experience of some practitioners is due to the result of the purgative treatment adopted by them.

The urine is usually scanty, high-colored, and possesses a strong ammoniacal odor in the first stages, and becomes of brown, reddish-brown, or greenish-brown hue later in the disease, especially in the malignant and jaundiced types. As the disease progresses, it becomes charged with albumin, and discolored with bile, and may also contain blood in various phases of decomposition. A simple hæmaturia is not alarming, unless the case presents grave features of malignant tendency. Retention of urine is at times present, and is usually due to partial or complete paralysis of the bladder. It is readily relieved by the use of the catheter. *Suppression of urine* is, however, a most alarming condition, generally manifesting its approach by a decided set of symptoms. The patient, though at times wilder, usually becomes more quiet; complains of no pain anywhere; when asked how he feels, he will look at you for a moment before replying, giving the impression that he is studying what answer to make, or as if your query took time, like a telegram, to traverse the auricular nerve to the brain, produce its impression there, and bring back the response to his lips. At other times, particularly before uræmia is far advanced, he will answer in quick, short-spoken, monosyllabic sentences "I feel very well." "Does anything hurt you?" "No!" Gradually, however, as this condition advances, the brain becomes stupefied and comatose, the head sinks down from the pillow to the bed, or the occiput bores into the yielding pillow, and it is almost impossible to arouse him, even by vigorous shaking—scarcely at all to obtain an intelligent recognition or response, and often not even a vacant stare. In occasional cases of uræmia there will be found furious delirium, and in rare instances apparent mental quietude. I recall one case in which suppression of urine existed six days prior to death, yet the mind remained clear and intelligent.

The sweatings and jaundiced discolorations of the skin have already been sufficiently described. This jaundice becomes intensified into a dark orange or brownish hue in many malignant cases. When these cases present hæmorrhagic features, petechial ecchymoses discolor the surface until the body is as mottled as in malignant petechial fevers. I do not recollect seeing any gangrenous phlyctænæ, though these complications have been mentioned by other observers. Secondary superficial glandular swellings, especially of the parotids, have been frequently noticed, and are regarded as of favorable omen. These are mostly seen in the more continued and typhoidal types of the fever.

The duration of the febrile paroxysm varies from twelve or fifteen hours to three days; but many cases run a longer course and take on continued or typhoid features. And though the fever may decline in the first few days, and the periods of primary excitement and secondary depression be passed by, the danger will not have passed, and the period of convalescence needs the most careful watching in many cases. These indications will receive fuller mention in the section on Treatment.

Pathology.—In the Report of the State Board of Health of Louisiana for the eighteen months ending July 1, 1883, appears a very excellent paper on yellow fever, profusely illustrated with colored plates, from the pen and researches of Dr. Joseph Jones, the able President of the Board, to which I take pleasure in referring my readers. I shall quote freely from it, as well as from Belot and others.

"The peculiar phenomena of yellow fever," says Dr. Jones, "like those of acute phosphorus-poisoning, are due to the nature of the specific poison and the character of those changes which it is capable of exciting *primarily in the blood*, and secondarily in the nervous and vascular systems, and in the nutrition of the various organs. . . . . The changes of the blood appear to be continuous from the time of the introduction of the poison to the fatal termination, the intensity of the changes being increased and their character being modified, as the disease advances, not only by the direct action of the poison upon the constituents of the blood, but also by the addition of certain noxious substances, as bile, urea, carbonate of ammonia, sulphates, phosphates, and extractive matters, in consequence of the profound lesions produced in the liver and kidneys.

"Certain constituents of the blood, as the albumin and fibrin, are not only altered physically and chemically in the early stages of yellow fever, but, as the disease advances, from the causes just specified, certain excrementitious matters, which in a state of health are continuously eliminated, accumulate in the circulating fluid, and, by their direct action upon the elements of the blood and upon the nervous system, and by their disturbing action upon the processes of nutrition and digestion, still further alter the physical and chemical and vital properties of this fluid."

Dr. Belot, on the contrary, regards yellow fever as "the result of a miasmatic poison, *sui generis*, which acts *first on the great sympathetic nerve and on the abdominal ganglionic network*, the organs in relation with this nervous apparatus being more or less altered in their functions, and the blood being modified in its principal constituents. Examined carefully it presents the following characteristics: With patients cared for in the first period it is red, and coagulates more readily as the type is continued and the condition more acute. The quantity of fibrin and albumin it contains is considerably augmented.

Scarcely passed from the vein, it coagulates in the vessel, forming a compact mass, adhering on the edges, and offering great resistance to tearing. With the same individuals, twelve hours after in acute, and twenty-four hours after in ordinary cases, the blood, then of a mahogany color, has already become more liquid and coagulates less easily. With some patients it remains two entire hours without coagulating, the serum is yellowish, and the clot is easily torn.

"In the second period of the disease the blood is a deep brown, almost black, still more liquid; the coagulum, slowly formed, has the consistence of jelly; the serum is yellow or yellowish, and like sanies. In the third period the blood is very fluid and completely black. The blood, failing to receive the oxygen necessary to its coloration, passes insensibly from red to black." (It is questionable whether this discoloration is altogether due to the cause suggested by Dr. Belot.—L. A. F.)

Different investigators, as Jones, Friere (Domingo), Le Hardy, and others, claim to have discovered certain germs, variously classified as bacteria, fungi, micrococci, etc., and Professor Friere specially claims to have discovered a peculiar microbe which he designates the *cryptococcus xanthogenicus*, which he says is the true specific germ which, introduced into the blood, sets up the series of phenomena which develop yellow fever.

None of these theories meet with universal acceptation. With the lesions produced by the poison we are, however, more familiar. The *septic* character of the yellow fever poison is almost unconsciously exhibited in the following testimony of Dr. Jones: "If fresh blood from a yellow fever subject be injected into an animal, it will produce fever which, as a general rule, *is not fatal.* If, however, the blood be abstracted *from the dead subject*, or if, after abstraction from the living subject, it be allowed to stand for a short time, say two or three hours, it proves rapidly fatal to animals, even when injected under the skin." A poison of animal origin, septic in character, is thought to develop typhus; but this same poison, tempered and diluted by miasmatic poison, would necessarily be modified in its intensity, giving us the lesser malignity of the *typhus icterodes.*

The urine in yellow fever is more strongly impregnated with albumin in proportion to the gravity of the case, and contains the desquamated tubuli uriniferi, epithelial cells of the urinary tubes, oil globules, bacteria, and biliary and granular matters. Its reaction is acid, and its specific gravity varies with the proportion of albumin contained in it, ranging from 1009 to 1020. In approaching suppression, the retention of urea gives rise to uræmic convulsions and coma.

The brain and nervous centres present evidences of capillary engorgement, occasional softening, and serous effusion. The golden

hue sometimes found after death is ascribed to oily matters and diffusion of bile.

I quote again from Dr. Jones:

"*Heart.*—Pale yellow and brownish-yellow, as if undergoing fatty degeneration; structures of heart flabby and somewhat softened; numerous oil globules deposited within and around the muscular fibrillæ of the heart; obliteration or degeneration of the muscular fibrillæ of the heart, leading to a disappearance of the muscular striæ. Cavities of the heart in many cases filled with dark fluid blood; yellow fibrinous clots sometimes present; pericardium presents a congested appearance; pericardial fluid of a deep yellow color.

"*Lungs.*—Dependent portions greatly congested. In some instances circumscribed effusions of blood, and in others, supervening pneumonia.

"*Stomach.*—Mucous membrane in many cases intensely congested, softened, and eroded; stomach often contains large quantities of black vomit, often of *alkaline* reaction from presence of *ammonia* resulting from the decomposition of *urea*, eliminated by the gastro-intestinal mucous membrane (a process taking place during life, and discovered in black vomit ejected prior to death). Under the microscope black vomit is seen to contain cells of the mucous membrane of the stomach, colored blood-corpuscles, broken capillaries, and occasionally vibrios and fungi—though these latter were not always present. Irritation, desquamation, and hæmorrhage are necessarily admitted."

The intestines have been found more or less congested and softened on their mucous surfaces, and in the typhoidal types Peyer's glands have been found engorged and ulcerated. Intussusceptions of the small intestines have been occasionally discovered. The exterior surfaces of the intestines sometimes exhibit yellowish or reddish-black stains correspondent with the alterations on their inner surfaces. The ganglions of the solar, semilunar, and cœliac plexuses present evidences of congestion with diffused red and black points, and are easily crushed.

The Liver.—The late Dr. R. D. Arnold, of Savannah, Ga., in a pamphlet published in 1856 on the epidemic of 1854 in Savannah, states that in the post-mortem examinations made by him the liver was partially or wholly altered in color, being of a pale or yellowish boxwood appearance, and that this condition had been pointed out to him as long previously as 1827, by the late Dr. Waring, as being the special state presented by that organ in the epidemic of 1820. He further states that in every case which came under his notice terminating in black vomit, *the absence of bile in the excretions has been the distinctive characteristic of the disease.*

Belot says: The liver, which should be deeply modified after a disease in which it performs so great a part, often presents no alteration,

if no intercurrent inflammation complicates the disease. Ordinarily it is pale yellow, sometimes softened, at other times resistant under the knife, or again dry and brittle.

In my own pamphlet on the *Epidemic of* 1876 *in Savannah*, the following language appears: "The unjaundiced hue of the skin in the great majority of the cases renders it seriously doubtful whether the mahogany-colored liver could have existed without cutaneous and sclerotic pigmentary sallowness—the evident effect of atonic hepatic functional derangement."

Dr. Joseph Jones speaks of it as of "yellow color and bloodless, resembling this organ in fatty degeneration, but firmer and denser in structure, and its textures infiltrated with oily and granular matter" —this condition being regarded as progressive in the course of the disease.

It is evident from the autopsies made by numerous physicians that the serious changes in the liver are the results of the graver and more malignant types of the fever.

The gall-bladder is generally flaccid, and contains little or no bile. In some more malignant cases its contents appear as a thick black fluid, like a mixture of tar and molasses. The spleen is often augmented in size, and gorged with a thick black blood.

The Kidneys.—Whilst many writers state that the kidneys suffer little alteration in yellow fever, I think the investigations made by Dr. Jones into the lesions of this viscus much more careful and worthy of reproduction. He says: "These organs, as a general rule, present a brownish-yellow color, much lighter than that of health. They, in common with the heart and liver, contain much free fat. When thin sections of the kidneys are examined under the microscope, the Malpighian corpuscles and tubuli uriniferi are found to be filled with granular albuminoid and fibroid matter, excretory cells detached, and oil globules. Upon these changes apparently depends the suppression of the urinary excretion, which is an almost universally fatal symptom. These changes in the kidneys are preceded by capillary congestion.

"We have in these structural alterations of the kidney, which vary in kind and degree according to the stage of the disease, an explanation of the frequent occurrence of albumin, casts, detached cells of the epithelium of the uriniferous tubes, and oil globules and granular matter in the urine of yellow fever."

The bladder is sometimes congested and ecchymosed on its inner surface. Occasionally it is paralyzed, and retention of urine follows. This paralysis is evidently due to congestion of the spine, weakening the cystic nerve. In cases of suppression it is usually free of urine, but may contain some serum and blackish blood—the result of hæmorrhage from its eroded linings.

The brain and spine exhibit evidences of engorgement, discoloration with biliary and fatty matters, and serious alterations in the secretory fluids. It has been noted that less alteration occurs in these organs in cases which have been attended with profuse hæmorrhages from the stomach and bowels; and the general view is taken that no changes have been discovered which in any manner point to these centres as the region of primary attack.

Prognosis.—The symptoms pointing to graver conditions in individual cases are the intensity of the invasion, prolonged high temperature and pulse, early appearance of jaundice and black vomit, intensity and deep-yellow or orange color of the jaundice, intensity and obstinacy of the headache, extreme restlessness, deep sighing and moaning, early hæmorrhages with ruptured blood-corpuscles, rapid accumulation of albumin in the urine, extreme intensity of the fever smell, frequent micturition with limited secretion, great thirst, violent fiery burning in the stomach, with frequent and irresistible vomiting of watery fluids, with apathy, anxiety, dejection, and delirium.

Following these come prolonged exhausting clammy sweats, great debility, absolute anorexia, dark and livid discolorations of the tongue, scantier or suppressed urine, rapid, feeble, and tremulous, or slowed, compressed, and sinking pulse; coldness of the extremities, petechiæ, purple lips, deeply jaundiced, mahoganied and leaden hues of the skin, sudden alterations of the pulse and temperature, insatiable thirst, coldness of the tongue and difficulty in protruding it, husky whispering voice, hurried respiration, inability to articulate, tremulousness, great fear of death, boring of the head in the pillow, drooping chin, glazed eyes, and stupor or coma, or jactitation, furious delirium, convulsions, and sudden collapse—these latter symptoms associated with hiccough, complete suppression of urine, black vomit, and a total absence of bile in the excretions.

Hæmorrhages coincident with increasing debility are of very grave import.

Prolonged, obstinate, spasmodic ejections of black vomit without apparent effort, and associated with suppression of urine, almost always give warning of certain approaching dissolution.

The influences which chiefly operate to the disadvantage of the patient are the lack of acclimation, his race, previous state of health and habits, intemperance, indulgence in excessive venery and other debilitating practices, intensity of the poison, impurity of the atmosphere, aggregation of cases, period of the disease when coming under treatment, imprudences in diet, bad news brought to him by his attendants and friends, getting out of bed too soon, sudden thunderstorms and electrical conditions of the atmosphere, etc.

Miscarriage occurring during an attack of yellow fever is a very

unfavorable complication, the attendant hæmorrhage being at times uncontrollable because of the general hæmorrhagic condition.

During my description of the symptoms of yellow fever, I have frequently indicated the prognostic value of special symptoms, and I will not take up more room with their repetition. The following brief memoranda from Dr. Belot's pamphlet are deserving of recollection:

"The average of mortality increases in proportion to the progress of the disease.—(That is, the stage of the case when seen by the physician.—F.)

"The purer the air, the better the chances of cure.

"Electrical influences (storms) operate unfavorably on the sick.

"Dry weather tends to lengthen the duration of the cases.

"The intermittent type of the fever is the most favorable; the remittent next; the continued the gravest.

"When the sweat is not accompanied by remission of the other symptoms, especially the headache, the disease will be grave, especially if the pulse continues full and frequent.

"If the fever continues several days without sweats and lessening of the volume and rapidity of the pulse, the case will be serious.

"In the absence of sweat, if the headache persists, despite the diminution of heat and flagging of the pulse, the second access will be very grave.

"Cephalalgia and dry skin, attended with vomiting and jaundice, point to a fatal termination.

"When cephalalgia disappears suddenly, and the stomach continues painful, and throbbing of the cœliac trunk is observed, the remission is deceptive.

"When the symptoms continue in all their force and do not yield to treatment, the disease will be very acute and will not last three days. (The patient will, probably, die.—F.)

"When in the beginning there is vomiting, epigastric pain, with throbbing of the cœliac trunk, death is certain if jaundice makes its appearance.

"When, with jaundice, the urine is of the color of decoction of rhubarb; when there is no pain in the stomach, or it is scarcely perceptible, the case will terminate favorably.

"The more acute cases run their course in from forty to seventy-two hours; and when the fever has lasted three days without jaundice or epigastric pain, remission or intermission may be expected.

"In fever of the continued type, diminution of the symptoms and the changes are noted on the third, fifth, and seventh day, at least when the disease is not acute in its progress.

"Remission generally occurs twice in twenty-four hours. If it happens suddenly with vomiting, the patient will be in great danger, especially if the pulse becomes small and irregular, with cephalalgia

and dryness of the skin. The danger will be still greater if jaundice appears before the third day, with epigastric pain, throbbing of the cœliac trunk, and constipation.

"Vomiting in the invasion of the disease is not to be feared if it ceases when the contents of the stomach are emptied, but is of more serious import if it continues longer, and is accompanied with præcordial suffering and throbbing of the cœliac trunk. Clear vomit, with gray or brown flakes, leaving a burning sensation in the throat, presages the veritable *vomito*.

"If the intermission, manifesting itself in the invasion, is allowed to pass the second access, the patient will eject black vomit on the third day, and die in convulsions.

"Sudden pains, occurring toward the conclusion of the disease, are of very bad augury. They announce a spontaneous gangrene, which carries off the patient in less than forty-eight hours.

"Gangrene of the skin, especially that of the scrotum, requires the greatest care. It is a very unfavorable symptom.

"Hiccough is a very grave symptom when it occurs towards the termination of the disease.

"Hæmorrhages are less to be feared when occurring in the beginning of the disease and ceasing later on, with fresh red blood, especially when only buccal or nasal; but general hæmorrhage shows great gravity. Hæmatemesis, ordinarily very grave, allows some hope if the blood is not corrupt and it does not degenerate into black vomit.

"Hæmaturia, on the fifth or sixth day, should be regarded as critical, if the patient is not enfeebled. Anal hæmorrhage in the last period leaves little hope of cure. Metrorrhagia is a good symptom if manifested in the introduction and when it ceases in the second period, but in the third period it is most frequently mortal."

Dr. Belot further says that the *solar plexus* is the principal seat of the disease called yellow fever, and that all the organs so profoundly affected in the course of the disease are in direct relation with the abdominal ganglionic system and with the solar plexus, which examination of the dead body has shown to be profoundly altered.

Mortality.—In a disease regarded by so many writers as specific (?) in its nature, the variations in the mortality of different epidemics is astounding, so much so that occasionally a candid author hints that this result may be due in part to treatment. There can be no question that this statement is largely based upon truth. In the epidemic in Savannah in 1854, some of my old-school friends were almost wild over the benefits to be derived from tincture of iron; and the death ratio in their practice was appalling.

During my investigations along the Mississippi coast, in January, 1879, after the widespread epidemic of 1878, I found that in the gulf coast summer places, with the exception of Ocean Springs, the mor-

tality ranged from 8 to 10 per cent., and in these places the treatment was almost *homœopathic;* whilst at Ocean Springs a *regular* experimenter gave his patients *ice-baths*, and successfully killed nearly every one he treated, so that he had to leave the place in a hurry. The mortality at Ocean Springs was about 35 per cent. This was the average between the more deadly effects of the ice-baths and the better treatment afterwards employed.

In some epidemics (that of 1858 in Savannah, for instance) the average death ratio scarcely exceeds 5 to 7 per cent.; whilst in others, notably one in Mobile in 1819, Dr. Lewis states that "out of a population not exceeding one thousand, more than one-half of whom were acclimated, there were four hundred and thirty deaths!" In Murcia, in 1804, it is said that out of the first one hundred and thirty-four cases only three or four recovered.

The mortality is usually very great when the cases are confined within the cabins and hulls of ships, and in the aggregation of cases in hospitals and sick rooms.

On shipboard it is increased by proximity to the equator, and diminished by purification of the atmosphere and by sailing to colder regions. Epidemics in this country are most fatal in August and September, chiefly in September, whilst the ratio of deaths to cases is perhaps as great, if not greater, in the earlier part of October.

In countries where epidemic visitations occur every few years, it is noted that children offer the least immunity to the disease. This is probably due to the fact of their never having previously been inured by attacks of the fever or acclimation in a yellow fever atmosphere. In these instances it is more fatal.

The mortality is greater in the Caucasian than in the African races.

The death ratio of epidemics in the United States of recent years has varied from fifteen to thirty, or more, per cent. in different seasons and localities.

These losses were under *regular* (allopathic) treatment.

In the epidemic in Savannah in 1858, a mild epidemic, the losses under allopathic treatment were about 7 or 8 per cent., whilst under homœopathic treatment there were six deaths in about 500 cases. In the severe epidemic in Savannah, Ga., in 1876, there were about 1300 deaths in 8000 to 9000 cases; whilst I, individually, treated over 900 cases, with a loss of 32, of whom 15 had black vomit before I was called to them. The official report does not mention so many cases of death from *yellow fever*, because many certificates of death specified the *effects* of the disease, as congestion of the brain, convulsions, etc., as the cause of death. In this way, I am sorry to say, even some regular physicians' records could not be obtained, so that we could fairly compare the mortality under different treatments. It will be seen from the above figures that my loss in cases seen before black vomit occurred

was only 17 in about 900, or less than 1 in 50, and in the total of all cases treated by me 32 in over 900, or a fraction over 3 per cent. in an epidemic in which the average death ratio was about 15 per cent. I claim no merit for this result beyond that which attaches to the treatment employed, and that treatment was *homœopathic.*

Treatment.—Confused, as we are, with the many theories concerning the origin and nature of yellow fever, when we come to its treatment, homœopathy has solved the problem to an extent never dreamed of before Holcombe, Bailey, Belden, and Angell, of New Orleans, Murrell, of Mobile, Schley and Orme, of Savannah (1854), and other able physicians of our school at later periods, and in different southern cities, faced the fury of epidemic visitations and won fame for themselves and glory and honor for the school of homœopathic therapeutics. With their experience to guide me, I passed successfully through the epidemics of 1858 and 1876 in Savannah, in the latter year making that careful study of the disease in all its phases which I described in my report published in the *N. A. Journal of Homœopathy* in the February and May numbers, 1878.

In this report I described a number of types: as the simple and mildest form, the non-malignant congestive, the malignant congestive, the congestive meningeal, the malignant meningeal, the hæmorrhagic, the malignant congestive hæmorrhagic, the mild nervous typhoid, the orange-colored typhoid, the malignant orange-colored, the colliquative, and all shades and combinations of these several types. They are all seen in a severe epidemic, and are mentioned in detail as a guide to inexperienced practitioners and for reference in treatment.

In the simple cases, and generally in the first stage, I put the patient on Aconite θ, 5 drops in about 6 oz. of water, and Belladonna θ, similarly prepared, giving the solution in doses of a teaspoonful to a tablespoonful alternately every half hour until the fever declined, which generally happened in from 12 to 24 hours. At the same time hot mustard foot-baths were applied every two to six hours, according to the intensity of the fever, to assist the diaphoresis, and stopped as soon as a good remission of the fever was secured. Profuse sweating *after* the decline of the fever is exhausting, and must not be permitted to continue too long. The patients should be kept comfortably covered with bed linen, but it is unnecessary to cloak them too heavily. Blankets are often used to promote sweating, but they need not be retained after the fever subsides. Alcoholic sponging is of great service in relieving the debility attending excessive sweats. The nausea of the first stage is usually controlled by teaspoonful doses of Ipecacuanha θ, three drops to two or three ounces of water, and flatulent symptoms indicate Nux vomica. In many of these milder cases no secondary symptoms developed, and the subsequent biliary symptoms and weak stomach readily yielded to Nux

vomica θ, and Mercurius sol. $\frac{1}{200}$ in alternation every hour. The best thing I ever found for the thirst of the earlier stages is a mild lemon soda water, such as is usually sold in the saloons. It was cooled with ice, and given freely. Pounded ice in small quantities may also be freely given every few minutes to cool the mouth and quench the thirst.

If on the remission of the fever the pulse was *soft* and yielding to the touch, as if the remission were sincere, but the general symptoms did not indicate a complete subsidence of the fever, a condition usually coming on towards morning of the day after the attack, I deemed it wise to administer (to adults) 30 grains of Quinine, in doses of 5 grains every hour until the whole was taken. In such cases the pulse and temperature usually continued falling until they reached the normal standard or fell slightly below it, gradually creeping back to the figures of safety. The secondary conditions here were prostration and at times considerable irritability of the stomach, which however would yield to Ipecacuanha, Arsenicum, China, Nux vomica, etc., as indicated, assisted by small and frequent supplies of brandy-toddy, prepared with ice, and given at intervals between the doses of medicine.

If, on the decline of the fever, the pulse remained *hard and full*, 90 to 96 to the minute, and the skin became dryer, and the tongue less moist, with irritability of the stomach, the case was not one for the exhibition of quinine. Here Bryonia and Arsenicum, or Nux vomica and Arsenicum were called for. So long as the vomiting of the burning watery or flocculent fluids did not appear and suggest the approach of the more serious degenerations of the stomach and glandular organs, these remedies might continue to be used; but the moment the above mentioned vomita were expelled, I placed the patient on Arsenicum θ and Sulphuric acid (slightly sour in watery solution), giving them incessantly day and night every half hour, and using the iced brandy internally and alcoholic compresses over the stomach and abdomen so long as life gave possibility of recovery.

If, in the second stage, cerebral symptoms required it, I administered Belladonna, Bryonia, Hyoscyamus, Opium, and such other remedies as might be indicated—always bearing in mind that the cerebral symptoms are but a result of the general blood poisoning, and that the remedies for their condition must not be left off. It is amazing how often the vomita of the second stage, watery, mucous, and dark flocculent, were checked by the Sulphuric acid and Arsenic, with the iced soda and brandy stimulants; a large number of cases of the disease never progressed beyond this period. Sometimes, when the abdomen seemed distended with flatulence and retained fæces, a good enema would materially lessen the discomfort and relieve much of the attendant nausea.

In the second stage, where violent burning thirst and vomita indi-

cate the first processes of gastric distress, Dr. Belot advises the alternate use of Nux vomica and Bicarbonate of soda, and claims good results from such treatment. When these do not give relief, then administer Arsenic; and he further recommends compresses of Camphorated Alcohol and Belladonna on the pit of the stomach to diminish the beating of the cœliac trunk, the epigastric pain, and the vomiting. Hiccough, he says, may be sometimes arrested by compressing with the fingers the phrenic nerve on the level of the os hyoid—at other times by cold applications on the stomach, and ice internally. I have found pulverized ice with brandy on it more effective in the burning thirst and vomitings of the second and third stages than any other internal treatment.

In the general hæmorrhagic and colliquative conditions the Arsenic and Sulphuric acid have given me the best results.

In cystic hæmorrhage, Cantharides, Belladonna, Arsenicum.

In uterine hæmorrhage, Secale cornut. and Arsenic.

In retention of urine, use the catheter.

In suppression of urine the only preparation which I have ever known to do any good was a mixture of a teaspoonful of Nitre, a tablespoonful of gin, and a wine-glass of watermelon-seed tea mixed, and given at one dose. Three to four successive doses secured a resecretion of urine in several of my latest black vomit cases in 1876, the previous emptiness of the bladder being unquestionably proven by tests with the catheter.

In the nervous and typhoid forms of the fever, Bryonia, Arsenic, Rhus tox., China, Nux vom., Carbo veg., Mercurius sol., and other similar remedies, are most useful.

In the colliquative cases, Sulphuric acid, Arsenic, and brandy and ice, with lotions of camphorated alcohol on the abdomen.

For convulsive symptoms, Belladonna, Hyoscyamus, Opium, Stramonium, etc., with cold applications to the head when the brain is troubled.

It is possible that the Mercurius corros. will be found useful upon trial in the disorganized condition of the stomach. I regret that I did not try it myself in 1876, as its pathogenesis gives promise of its great value both as a similar and as an antiseptic.

No persons should be allowed to visit the sick-room except the nurses and attendants. All conversation should be avoided, and that which cannot be prevented ought to be cheering. No mention should be made of the sickness or death of another. The sick-bed of a serious case of yellow fever is not the place for a prayer-meeting.

As soon as the patient is taken ill, he should be required to go to bed and remain there until he is well—and in conditions when the stomach is disturbed, and in all the more serious cases, he should not be allowed to get out of bed or even raise his head from the pillow—

a violation of this precaution often being immediately followed by serious, and often grave, gastric disturbances. On no account let him get out of bed, even to use a chamber.

As soon as the condition of the stomach makes it prudent to give a little food, a light beef broth may be allowed in small quantities every two or three hours, and will be found advisable by enema in cases where great exhaustion calls for nutritive adjuvants and the stomach is not yet equal to the undertaking. Frictions with oil also aid in restoring the patient when no other method of nourishment can be adopted.

During the period of convalescence the greatest care must be taken to avoid dietetic indiscretions—the least mistake frequently causing gastric irritation, often rapidly followed by black vomit and death. Of course, there are many mild cases in which little or no secondary trouble occurs; but in all decided cases, and especially where the blood has been partly disorganized and the mucous coatings of the stomach and intestines seriously eroded, time is required to restore healthier conditions, and until this is accomplished, the danger of relapse and other critical conditions continue.

In the glandular swellings following the hæmorrhagic and typhoid types, Calcarea carb., Belladonna, Mercurius protoiod., Hepar sulph., and Iodide of arsenic will be found excellent remedies.

In the debility following the disease, Præcip. carb. ferrum $\frac{1}{100}$, Cinchon. θ, Nux vomica θ, etc.

Other remedies have been used by different practitioners, and will be included in the following résumé:

First Stage.—Aconite, Belladonna, Ipecacuanha, China, Nux vomica, etc.

Second Stage.—Belladonna, Bryonia, Arsenicum, Nux vomica, Sulphuric acid, Plumbum acet., etc.

Third Stage.—Sulphuric acid, Arsenicum, Crotalus, Lachesis, Argentum nit., Phosphorus, Carbo veg., and iced brandy internally, with alcoholic spongings of the body, and remedies for urinary suppression (among which I might mention *Ammonia*).

Convalescing Stage.—Nux vomica, Sulphur, China, Mercurius sol., Ferr. carb., etc.

Aggregation of cases in the same room should be avoided.

The best preventive against the disease is to keep away from it and from any place where it exists. When not epidemic, a person is not apt to contract it, unless by direct exposure in the sick-room or to the proximity of fomites. When epidemic, it may be contracted anywhere in the infected locality, especially by exposure to the night air.

I have known cases to recover after having the coffee-grounds vomita for a week.

DENGUE FEVER.

BY LOUIS A. FALLIGANT, M.D.

Dengue fever, more commonly called broken-bone fever, is one of a class of epidemic fevers whose causes have never been satisfactorily determined. Whether its poison is of miasmatic or special origin is, at present, mere conjecture. Its habitat, however, is in warm latitudes, such as the Southern States and the West Indies. It does not seem to resemble the fever of acclimation of these latter countries. It has many symptoms in common with yellow fever, from which occasional severe cases in the late fall season would be difficult of distinction. Such a season, for instance, as that of 1858 in Savannah, when dengue fever made its appearance by the middle of the summer (July), and yellow fever commingled with it by September, carrying off over three hundred victims before frost, may well cause us to stop and think over the conclusions of the late Dr. R. D. Arnold, of Savannah, who regarded dengue as a mild type of yellow fever.

Symptoms.—Many cases are taken suddenly without previous malaise, some with a severe chill, and others with more or less chilly shudderings, frequently referred to the spinal regions; others, with little or no chill at all. The febrile stage rapidly follows, the pulse and temperature reaching their highest point inside of twenty-four hours, usually during the day or night of febrile inception, when both rapidly decline to or below the normal standard, generally on the morning following the attack. In many cases, however, the fever assumes a remittent character, rising for one or more evenings following, and declining the succeeding mornings. The pulse usually does not run very high, not often above 110 to 115 in adults, nor is it common to see the temperature over 103½° F., though occasional cases far exceed these figures, the pulse reaching 120 to 130, and the temperature 106° to 107° F.

There is generally a boring frontal headache, with pains in the back and limbs, mostly referred to the joints, the headache frequently extending over the head to the occipito-spinal region, and having achings of a neuralgic and rheumatic character, more than throbbing or congestive.

The skin is moist and cool, peculiarly sensitive to cold, and occasionally jaundiced, whilst in numerous instances it exhibits a scarlet efflorescence remarkably like scarlet fever, and often attended with itching and desquamation. The face and eyes are often red, and the eyes watery. The tongue is usually moist and slightly furred, but in severe cases it is red on the tip and margins, and covered with a pasty white secretion as in yellow fever; in very severe and typhoidal conditions it is dry, red, and glazed; the gums are usually natural, but in low conditions hæmorrhagic, and the fauces often reddened and covered with white or yellowish pasty deposits on the pharynx, uvula,

and tonsils; the stomach is frequently disturbed, and cramps in the abdomen, with nausea, vomiting, and purging, are common as prodromal ushering features, the vomita containing the contents of the stomach and biliary matters; the bowels are not so lethargic as in yellow fever; the kidneys are not often disturbed, and *suppression of urine* is not seen; occasional cases of hæmaturia and of uterine hæmorrhagic discharges occur. I have detected albumin in the urine sufficiently often to destroy the so-called specific value of this symptom in yellow fever. Some cases are followed by prolonged debility, and weeks or months are occupied in convalescence, and others by painful glandular indurations.

The poison appears to expend its force on the nervous system, and pain of the eyes on motion, and of the whole body, muscles, and joints, as well as restlessness and insomnia, are common. The almost constant absence of thirst is a striking characteristic of this disease.

Yellow fever patients derive no protection therefrom against the dengue poison, which latter, like that of yellow fever, is portable by the air, by the person, and by fomites, and in rare cases leaves its victim subsequently greatly improved in health. The pulse of dengue fever is soft and, on its decline, tapering gently to its natural smoothness, and when falling below the natural figure as softly creeping back to its accustomed beats; the temperature in the remissions so often passes down to 95° or 96° that one is apt to get frightened at the cold clammy sweat that marks these intervals—but there is no need of fear.

Treatment.—When the chills come on, put the patient in a warm bed and keep his body well covered, giving him at the same time a warm mustard foot-bath to promote sweating and to hasten the decline of the fever. As internal remedies, Aconite and Bryonia alba are specially called for in the first stage, with Ipecacuanha to relieve vomiting, and Arsenicum album for diarrhœa. If the fever proves obstinate, and the eruption is out on the skin, Bryonia and Rhus tox. are most useful.

The disturbances of the stomach, such as flatulence, nausea, etc., call for Colocynth and Nux vomica; and the jaundice for Mercurius sol., China, and Nux vomica. Sulphuric acid, Arsenicum, Secale cornutum, and China, sometimes followed by Ferrum carb., are all needed in different hæmorrhagic conditions. Where there is a hæmorrhagic diathesis, it will be found advantageous to give internally a watery solution of Tinct. ferr. chlor. fort. every two or three hours. Renal hæmorrhage requires Cantharides, Belladonna, Arsenicum.

The drinks should be warm in all cases where the patients complain of chilliness on moving the bedding or themselves. Cool drinks are needed in certain conditions of fever and thirst, but only rarely. Sponging with alcohol diluted in warm water often gives great comfort, especially in wiping away the disagreeable sweatings; and hot brandy toddies are of excellent service in conditions of prostration.

MALARIA.

BY E. U. JONES, M.D.

Etymology.—A synthetic compound of two Italian words, *male*, evil, harm, harmful, and *aria*, air, very much in the sense in which we use the word. It was first introduced into English medical literature by Macculloch, in 1827. At the present day the word has two uses; one signifying an occult cause of definite and specific periodic forms of disease, the other signifying a cachexia, whose series of symptoms are as much due to the individual condition as to the pronounced cause. The use of the word in the latter sense is metonymic, the supposed cause being put for the real effect. This series of symptoms is not without its specific characteristics, however, and a malarial cachexia may be readily diagnosticated.

Many diseases whose cause is unknown are nosologized as malarial, rendered as such in the reports, and the reason alleged simply because their manifestations have been suppressed by quinine. Every true therapeutist will see the folly of the syllogism governing this diagnosis. Quinine cures malaria; quinine cured this case; therefore, the case was one of malaria. The adjective is very often prefixed to definite conditions of disease, partly to signify a probable remote cause, and partly, ofttimes, in compliance with a popular demand. Quinine, in many districts, is a popular remedy, and too often not only the people, but the profession, render allegiance to the above syllogism, and any and every form of disease is pronounced malarial, and the production of cinchonism is the ready proof of that fact. It is, perhaps, impossible to rigidly confine the word to its true meaning, and the statistics of malaria are very much vitiated by this false use of the term. The mortuary tables in large cities seem to suffer most, and present a mortality from diseases rendered as malarial, which cannot be possible.

Synonyms.—Marsh poison, paludal poison, etc.

Geography.—The study of the geography of this disease-cause throws but very little light upon its character, rather perplexing us by the universality of its presence, and by the diversity of the conditions under which it is found. In all conditions its characteristics remain unchanged, varying only in intensity, so that there can be no doubt that it is the same, and not another, disease which presents these diversities. The foci of its power, frequency, and virulence seem to be in those countries in which the intensity of the heat is the greatest, especially when combined with moisture,—lands that lie under a tropical sun and within the torrid zone. As we recede from the equator either way its virulence and frequency diminish, and in the temperate zone its habitat is usually only in low, damp, or marshy

places, upon the borders of lakes or ponds, and upon the banks of rivers. The rich and fertile prairies of our western country, interior lands which have recently been turned up, and land which receives the drainage of other lands, are extremely liable to its presence, and oftentimes in its most chronic and persistent forms. Upon getting still further north, lands which are normally dry are free from malaria, and its footsteps can only be found in marshy places and in those which are most exposed to the extremest vicissitudes of heat and cold, diurnally or seasonally. Heat seems to be the most important element in its production, either by its own inherent positive power, acting upon decomposable material, or by its negative qualities, as shown by its abstraction and by its consequent relations to cold as a positive quality.

The isothermal of 41° F. has been given as its extreme boundary,* but this can only be approximately true. So far northward, even to the Arctic circle, as the conditions are found, there is malaria. So far toward the Antarctic as we can trace the causes, so far can we find the expressions of this morbific agent. Nor does verticality secure immunity, for it has manifested itself 3000, 4000, and even 11,000 feet above the level of the sea. Nor is absolute safety found upon the broad ocean itself, though the burden of evidence is that the cases found on board ships are smuggled on board, and are due to the water drank or to some unknown cause.

To the casual observer, malaria has always seemed one of the most permanent of diseases, as regards locality, but it is really more or less migratory, and places which are thought never to have known it, have been visited by it, its presence becoming comparatively permanent; while other places in which it has appeared to be firmly established, have been left free from it, and from no well-known reason.† This capability of migration, though the power may be seldom exercised, must be taken as one of the factors concerned in the study of the subject. It is, perhaps, a question whether this apparent migration is not rather *undulation*, and whether one or other of the malarious factors has not been latent for a greater or less time, making its appearance or disappearance because of some as yet not understood quality, developed as much in the inhabitant of the land as in the land itself. The duration of these waves varies from the exceedingly short ones of tropical climates to those of years' duration both in their staying and absence. The epidemical action of the malaria is but an expression of this undulatory character, these epidemics rising and falling like

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* Boudin. Traité de Géographie et de Statistique Médicales.

† The epidemic which visited Mauritius in 1866-68; the development on the Island of Hong Kong; its presence and absence in Western Pennsylvania; its renewed presence in Southern New England, are among the many cases in point.

the waves in the deep ocean, without moving from the place of their birth, and marking progression only by the extension of their number.

It is a truth, however, that littoral situations, whether by the sea, the river, or the lake, are places whence these waves most commonly arise, and in which their most deadly effect is felt. But by this expression we do not mean merely those places situated upon the direct bank of a river, lake, or sea, but also the land which becomes by its moisture, marshiness, or power of receptivity and retention of water, a feeder of these larger bodies. Hence the marshes whose overflows drain into the rivers or the seas, the lowlands which retain their water till the rivers become low before they part with them, the low-lying lands which are made damp by the reflex flow of the waters of the rivers, lakes, or seas near them, present the very strongest littoral conditions. Again, we must consider a lake or sea as not necessarily presenting an *open* body of water, for the conformation of the subsoil, its impermeability, or its basin-like position, may make it a lake or sea for all the purposes of this causa morbifera. Its surface then becomes, for all the intents of malaria, as the moisture-filtrated shores of any lake or sea; and this, seemingly, with only the one other factor added —sufficient heat. Accordingly, the geographical distribution of malaria is limited only by the proper combination of these two factors, modified, perhaps, by the other combinations spoken of under ætiology. Hence, in Sweden and, to a certain extent, in Iceland, we find this disease.

The western coast of Norway has traces of this morbific agent, and its southern portion is lightly affected by it. The whole portion of Sweden lying below the 60th parallel, including the three large lakes, is a home of it. The eastern shore is but slightly affected above this parallel. From Finland to the Black Sea, and to the Adriatic Sea, the disease holds a general sway, making itself the more felt upon the low banks of the rivers and the chains of small lakes. Throughout the North German coast, Zealand and Denmark, and in a small portion of Belgium, it is steadily prevalent. In England it is but little known, comparatively, and some places which once knew it know it no more. In Ireland and Scotland it is scarcely known. The western coast of France is much infected with it, and in the southern portions it is strongly entrenched. But no large section of France is free from it, and in many places it crops out with a virulent force. Spain and Portugal are dark with this evil, especially along the southern and western coasts; but along the bottom-lands of their rivers, which extend far into its interior, it often becomes malignant. All of the islands of the Mediterranean are more or less affected, and in many of them it is very malignant. Italy, however, is the dread of all tourists, and in the fact of well-known virulence seems to hold in Europe the sad preëminence. Its western coast is particularly infected, and is

the haunt of those fevers which have given to it its bad name. But its eastern coast is not without its representation, and its entire southern portion, with the island of Sicily, is covered with the habitats of this trouble. Greece and the islands of the Archipelago, and the entire coast of Asia Minor, are scarcely less affected, and the dark line of danger runs down till it touches the northern coast of Africa.

In the whole region of the southern Mediterranean and along the northern coast of Africa, this cause of disease is a recognized fact.

Malaria is also found in Egypt, throughout the whole delta of the Nile, and, indeed, through the whole course of the river, in Tripoli and Tunis, but more especially in Algiers. In Algeria it is said to be very fatal, and to be predominant on the southern slope of the Atlas mountains. In the desert portion of Algeria, wherever there may be an oasis with springs of water, it is strongly marked. Upon the northwestern coast of Africa, through the Soudan; upon the western coast, through Senegambia; upon the southwestern coast through Guinea; upon the rivers Niger and Senegal, malaric fevers flourish to an extent and malignancy not equalled elsewhere. From the Gulf of Guinea nearly to the Cape of Good Hope, and from this same gulf to the Somal, and so down the whole eastern coast to Mozambique, so far as is now known, it has peculiar power. The rivers of Africa have long been known to possess special virulence in this direction, especially as regards the white population which has visited their shores. Concerning the interior of Africa but little is really known, but this little shows that this disease extends into its most interior recesses.

The island of Madagascar, except the tops of the middle mountain range, and all the other islands of the Indian sea, abound in malaria.

In most of the southern portion of Asia the disease is endemic, and in some places almost malignant in its power. This is true of the shores of the Caspian and Red seas, throughout Persia and Turkestan, especially upon the elevated plateau of Teheran, where it is malignant, both shores of the Persian gulf, the whole of India, it being most prevalent on the western shore of Hindostan and along the courses of the rivers forming the Ganges, and particularly at the deltas of this river, along the course of the Brahmapootra, even into the mountains. Upon the shore of the Gulf of Bengal it affects the Birman empire and Malacca. North of the Himalayan range it seems to have little power. In Ceylon, however, it is very virulent, and its ravages are very destructive. The chain of islands lying south and east, Sumatra, Java, Borneo, Celebes, New Guinea, and the Philippines, are all under its power. As the Himalayas lessen in height, and spread themselves toward the sea, they oppose no barrier to the northward spread of the disease. From Anam and Siam on the south to above the fortieth parallel, the empire of China suffers more or less from its presence. At various places on the coast it is virulent, and in the interior there

are times when it is much to be dreaded. Japan also suffers from its effects, but not to the extent of some portions of the continent. In the northern part of Australia this trouble is present in a mild form, but it does not extend far inland.

In North America this disease is mostly found in those States bordering on the Gulf of Mexico and upon the Atlantic coast. It follows the courses of the great rivers, spreading from their valleys, and dwelling in their rich bottom-lands. A large portion of the soil is alluvial, and when turned up for cultivation seems laden with its germs. The Mississippi, Arkansas, Missouri, and Ohio rivers, with their tributaries, are marked examples of this. The rich prairie lands, especially with an underlying limestone formation, are natural homes for malaria, and it is presented there in both its acute and chronic forms. On the north, the banks of the St. Lawrence are not free from it, and it has lately made its appearance in a portion of the New England States. The western coast does not escape its ravages, and California, famed for the salubrity of its climate, harbors it. The whole western coast, reaching to South America, is one of its favorite haunts. It flourishes upon the eastern coast also, from Texas through the entire length of Central America.

The northern portion of South America is undoubtedly affected by it, and probably the whole eastern coast, as low as the thirtieth parallel. The shores of the Amazon and the other large Brazilian rivers seem to be hotbeds of this disease, and it is well known that the eastern slope of the Andes nourishes it. The western coast, throughout almost its entire length, acknowledges its sway, and spots high among the Andes are locations in which it seems most malignant.

The islands lying between the two continents, and forming the northern boundary of the Caribbean sea, are more or less subject to malaria. Some of these islands are notorious for its virulence. In the Bahamas, however, the disease is comparatively rare, and in the Bermudas it is almost unknown.

Occasionally malarial diseases develop in apparently new places, the outbreak being sometimes sudden and marked, and again slow and indecisive. Convulsions of nature, as earthquakes, volcanic eruptions, inundations, etc., have been assigned as the developing cause, and from such points, as from new foci, the disease has seemed to spread. It is worthy of close study as to whether the present prevalence of such diseases in such places is really due to the sudden establishment of new foci, or whether it is the reappearance of a long undulation, determined, perhaps, by the natural occurrence. The following extract will give examples:

"A phenomenon not less interesting meets us in the fact, often observed in more recent times, of new foci of malaria being established, or of its epidemic continuance for several years, and its wide diffusion,

in localities which had previously been quite free from it, or at least practically free from it.

"One of the islands of the Indian Archipelago, Amboina, had, until the year 1835, enjoyed a remarkable immunity from malarial sickness; but in that year a severe epidemic arose, it is said in consequence of an earthquake which took place at the time, and since then the island has been the permanent seat of pernicious malarial fever, and has consequently become one of the most unhealthy places in the East Indies. The East African islands of Mauritius and Reunion experienced the same fate in 1866; they had previously been almost exempt from malarial fever, but in that year the disastrous malarial epidemic developed, and its persistence to the present time makes it probable that endemic foci of the disease have been established. In Chili, where malarial fever was formerly almost unknown, the disease showed itself in 1851 as an epidemic, and it now appears to have become domiciled at several places in that country."*

Taking a somewhat different view, and doubting the diagnosis of those who have reported these cases, is the following from Dr. Sternberg:

"While in the interest of our readers we have availed ourselves freely of the literary researches of Hirsch, we are not prepared to accept his account of epidemics and pandemics of malarial fevers as relating in all cases to fevers corresponding in their etiology with our endemic periodic fevers. The oldest writers used the word malarial in the broadest sense, and even at the present day many practitioners in the yellow-fever zone—especially in the West Indies—consider this disease as nothing more than a severe manifestation of the malarial poison. Other forms of continued fever, which we are not willing to admit into the category of malarial diseases, are also denominated 'malarial' by many practitioners in various parts of the world; and in India it is only very recently that the English physicians have come to recognize the fact that enteric fever prevails extensively side by side with malarial fevers, with which it was formerly confounded. As examples of epidemics pronounced malarial, but in which we suspect a different etiology, we may refer to the epidemic in 1835 on the island of Amboina, and to that of 1866 which invaded the East African islands of Reunion and Mauritius. We are informed with reference to Amboina that a '*pernicious* malarial fever' has taken possession of this previously healthy island, since the 'severe epidemic' of 1866, and we cannot avoid the suspicion that this pernicious malarial fever is essentially different from the endemic intermittent and remittent fevers of our own country, although we have no clinical data on which to found such a suspicion. In the case of the epidemic which

* Hirsch, Handbook of Geographical and Historical Pathology.

visited the island of Mauritius in 1866, we have, however, fuller information. The French author Pellereau informs us that endemic malarial fevers of a comparatively mild type prevailed upon this island long prior to the 'disastrous epidemic' of 1866. Hirsch's supposition, therefore, that endemic foci were established as the result of this epidemic is not required to explain the facts relating to the endemic prevalence of malaria, and, as we have pointed out on another page, the history of this violent epidemic, the evidence of the transportation of the disease to distant localities, and the clinical features as given by observers on the spot—who, however, pronounced the disease malarial—force upon us the conviction that the malaria which was the cause of this epidemic outbreak must have been essentially different from that widely distributed telluric poison which is concerned in the etiology of endemic periodic fevers."*

As has been said, there is always a tendency to consider the malaric poison, in those districts in which malaria rightfully exists, as the ultimate cause, or at least as a prominent factor, of any epidemic which may occur, and if it be one of those epidemics which are pathologically or therapeutically amenable to quinine, the culpability is considered as proven. Hence the diagnosis of certain continued fevers is made as being of malarial origin, although the evidence, as governed by the prevalence of intermittency or marked remittency in cognate and synchronous diseases, is no greater than usual. The undulation of the true malaria has not been disturbed. As the weight of evidence tends to disprove the transmissibility of the disease, so, pro rata, it disproves its migratory character, and its capability of creating vast and fatal epidemics, especially when the characteristics belong more to the continued than to the remittent type. In every case, so far as investigated, it has been found that, when new foci of development have been claimed, they are but the manifestation of conditions which have long existed. Land denuded of its forest growth will soon be covered with a new growth of different species; and the law which governs this is not absent in the conditions of disease.

Ætiology.—Malaria and marshy or swampy lands have been connected from time immemorial, and the one has emphatically been assigned as the cause for the other. Although this assignment as an absolute and sole cause cannot now be maintained, it is nevertheless true that there is an intimate relation between such soils and this disease. In a vast majority of cases there can be given no cause else than the marsh, and if it were not for the fact that many marshes exist which seem to combine all the needed elements for the production of this miasm, without the miasm being produced, and in fact being places of the utmost salubrity,† the proof would seem to be con-

* Malaria and Malarial Diseases.

† Notably the Dismal Swamp in Virginia.

clusive that marsh and malaria stand to each other in the relation of cause and effect. But the utmost that can be deduced from the facts given is, that malaria *may be* a production of marshy lands. If malaria had no other seeming mode of arisement, the question would be greatly simplified. But the disease makes itself manifest in some of the most dry and arid places; in the midst of absolute deserts;* upon the surfaces of high and barren rocks where neither vegetation nor moisture exists;† upon high and wind-swept table-lands; upon the tops of mountain ranges, 9000, 10,000, 11,000 feet above the sea level;‡ upon the slopes of mountains on which the drainage is unexceptionable; and at times in the midst of the ocean. In none of these instances can marsh—used in its widest sense—be assigned as the proximate, or even the remote, cause. Hence, we are obliged to look for some principle residing not only in the marsh but equally in every place in which we find the disease, as the determining cause.§ But again, it is not upon every arid, sun-burnt land, not upon every mountain range, not upon every ship in mid-ocean, that malaria is found, and we are once more limited to a cause which may be found in all these places, and in many other situations, but which is not necessarily a part of them, nor necessarily confined to them.

Water alone has been held to be the prima causa, as it is always present in the marsh and in lands which of themselves are not marshy, and it can explain the cases of malaria found on board ships away from the shore. The power of water as a disease-carrier is undoubted, nor can we deny its absorptive powers of almost every kind of infection, or its ability to transmit its contained contagium to the individual using it either for drink or a bath. Still, the aridity of African deserts, the absolutely waterless rock, the slopes of hills upon which running and constantly renewed water only exists, and many like considerations, compel us to assert that water alone cannot be the cause.

Is it possible that malaria is only another mode of the expression of a chill?|| Without question, chill may develop symptoms having

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* The oases in the Desert of Sahara. † Himalayas. ‡ Andes.

§ "It is evident from the preceding accounts that the marsh-miasm theory of malaria is insufficient to explain its prevalence and spread in Connecticut, and that vegetable decomposition does not play so important a part as has been usually assigned to it. Whatever influence these agencies may have in favoring the continuance and severity of malaria, and their action is by no means uniform even in these respects, the origin is due to other agencies. The old ideas of altitude too are sadly confused; high ground was formerly supposed to be malaria-proof, but, as can readily be seen by consulting the town reports, in many instances the highest land in the town was the first to be invaded; in many others the high hills have suffered more than the valleys and the lowlands, while in nearly all the high plateaus and the lofty hills were sooner or later reached." Dr. C. W. Chamberlain. Fourth Annual Report of the Conn. State Board of Health, p. 220.

|| Chill as a Cause of Malaria. C. F. Oldham.

all of the characteristics of malaria, and, as a cause, will account for many of those cases which cannot be reconciled with either of the preceding hypotheses. But how can we account for the many cases which have no seeming possible connection with a present or preceding chill, and from which the very possibility of a chill seems to be eliminated? It is true that chill necessarily has no relation to absolute temperature and is only a relative term, and that it may be produced by the slightest deviation from a given temperature, but it is absolutely impossible to prove in the vast majority of cases that there was any chill in the incipiency of a malarial attack. Indeed, the usual prodromata do not necessarily include chill as one of their first manifestations, nor are they such as in those fevers or diseased manifestations which are known positively to have chill for a procuring cause. While chill itself may be universal, it does not necessarily follow that it may express itself in certain localities differently from any of its well-known modes, and especially that it may take upon itself the exhibition of factors of disease entirely opposed to, and in antipathy with, all of its other modes of expression.*

Can electric or other telluric disturbances produce malaria? There may be good reasons for considering that these factors may have something to do in the development and spread of the disease, but there is no possible proof that they are, or can be, an ultimate cause.

In seeking a cause for this disease, it seems needful that this cause should be as wide-spread as is the malaria itself. Is this to be found in the ingestion of water impregnated with the results of vegetable decomposition?

There has been no explanation, as yet, which does not include moisture as one of the factors needed. Even the explanation of Mr. Oldham, which necessitates chill as the main factor, does not exclude moisture as a prominent factor. There can be no chill except that which abstracts and absorbs heat, viz., moisture, and even the chill which may be from heat absorbed upon the dry and barren rock must be, somehow or other, from the moisture produced from that same rock. But, allowing that moisture *per se* may be that agent, is it a necessary sequence that water-ingestion is an equally potent factor? Out of many cases there is, perhaps, but one which seems to prove definitely this hypothesis. It is the case of the ship Argo, recorded by Boudin, and quoted by Parkes and others, and it is worthy of

* Oldham is neither alone nor entirely original in his idea. Casorati, a late Italian physician of eminence, in his Treatise on Intermittent Fevers, gives it as his opinion "that miasm is the cause of an extremely small number of intermittent fevers." He says, "that there are pernicious intermittents, the origin of which is simply rheumatic." He gives numerous examples of diseases, such as menorrhagia, cephalalgia, etc., etc., all presenting an intermitting type, due, not to the toxic effect of miasm, but to other causes, such as "humidity," "cold," and the like.

study. It must be remembered, however, that all of the possible factors in the case are not presented for judgment, only those which were capable of observation in the post-study of the probable causes. Russell says: "There is strong evidence that the malarial poison exerts its effects in a much more intense and rapid form when introduced into the system in drinking water than when introduced in the air respired. The case of the Argo seems to afford conclusive proof of the introduction of the malarial poison into the system in drinking water, and of the intensity and activity of poison so introduced. In this instance the evidence on the point seems most complete and exhaustive."

The case is thus detailed by Parkes:*

"In 1834 eight hundred soldiers, in good health, embarked in three vessels to pass from Bona, in Algiers, to Marseilles. They all arrived at Marseilles the same day. In two vessels there were six hundred and eighty men, without a single sick man. In the third vessel, the Argo, there had been one hundred and twenty men; thirteen died during the short passage (time not given), and of the one hundred and seven survivors no less than ninety-eight were disembarked with all forms of paludal fevers, and, as Boudin himself saw the cases, there was no doubt about the diagnosis. The crew of the Argo had not a sick man.

"All of the soldiers had been exposed to the same influences of atmosphere before embarkation. The crew and the soldiers of the Argo were exposed to the same atmospheric condition during the voyage; the influence of air seems, therefore, excluded. There is no notice of the food, but the production of malarious fever from food has never been suggested. The water was, however, different; in the two healthy ships the water was good. The soldiers on board the Argo had been supplied with water from a marsh, which had a disagreeable taste and odor; the crew of the Argo had pure water.

"The evidence seems here nearly as complete as could be wished.

"One very important circumstance is the rapidity of the development of the malarious disease, and its fatality when introduced in water. It is the same thing as in the case of diarrhœa and dysentery. Either the fever-making cause must be in larger quantity in the water, or, what is equally probable, must be more readily taken up into the circulation and carried to the spleen than when the cause enters by the lungs."

If this famous case be cited to prove two things, viz., the possible communicability of the malarial poison by means of water, and the possible rapid action of the poison when so communicated, we must grant the proving; but these are facts which have been admitted from the very earliest knowledge of the disease. The same has been proved of atmospheric carriage thousands of times, and persons have returned from a walk near a marshy locality, and taken to their beds with a

* Sixth edition, 1883, p. 45, and pp. 44–47, for other cases.

severe intermittent. Oldham mentions two cases apparently even more rapid in their development.

"At Jhansi, in June, 1860, a young officer of the battery of artillery to which I belonged, was exposed for some time to the sun at midday; he then, in a profuse perspiration, came into the house, through which a hot wind was blowing, as all the wood-work had been burned by the rebels, and the tatties, which served for doors and windows, were almost dry. In a few minutes he complained of feeling chilly, and in a few more, he was in the cold stage of a sharp intermittent.

"This officer had never previously suffered from fever. When he went out a short time before he was in perfect health, and he had not, while away, been into any malarious locality; in fact, at that season, the whole country around was parched and perfectly dry.

"A year after this, I suffered from a severe attack of the same complaint which came on during a morning call, from sitting under a punkah in a cool room after riding through the sun and hot wind, at midday in the month of April. I went into the house perfectly well, but had not sat there ten minutes before I felt the sensation of cold water running down my back; and in a few minutes more my friends had put me to bed shivering with ague."

But there are two points in the history of the Argo which are well worthy of further examination, viz., the character of the water, "which had a disagreeable taste and odor," and the disembarkation of ninety-eight, "with *all forms* of paludal fevers."

At this time it is impossible for us to determine the character of that water, more especially the character of the peculiar poison with which it was permeated. We may well suppose, however, from the fatality which attended the drinking of it, and the very short time which elapsed from the first draught to the first death, that the cause was undoubtedly pernicious, and that the symptoms which followed showed this intense perniciousness. It is evident, also, that the ordinary marsh miasm was not the only cause involved, or that the idiosyncrasies of the various individuals took an active part in the suddenness of the onslaught and the manner of the death. "All forms of paludal fevers" were evoked, and some of them are of a rapid and pernicious character. Among these is non-malarial enteric fever, and one might judge this as the cause of the great and sudden mortality. If the *causa malariæ* be a definite entity, organic or not, it is necessary that it should produce certain characteristic manifestations, modified only by the krasis of the individual. This, however, will not prevent it from being accompanied by other more or less dangerous entities, from whose devastations its own should be severely separated. Nor must it be forgotten that the water from very many swamps may be drunk with perfect impunity.

Russell gives an experience of his own:

"The journey from the plains to the hill station of Assam commences at Gauhati (180 feet above the sea-level), and terminates at the station of Shillong, in the Khasia hills (4600 feet high). This journey of sixty-four miles is usually broken by a halt, for one night, at the mid-way dak-bungalow of Nungpho (1300 feet high). So frequently was an attack of fever acquired during the single night's halt, that such an attack used to be looked upon as a necessary and almost unavoidable accompaniment of the journey. Quinine was invariably taken on the journey as an essential prophylactic, and the approved and generally adopted custom was that the traveller should, at sunset, shut himself almost hermetically in his bedroom beneath the mosquito curtains, and, if possible, beneath the bedclothes.

"It was held that the miasm was carried up the ravine by currents of air from the malarial plains, and concentrated in the narrow valley in which Nungpho is situated. Practically, however, the currents of cool air are found to set down these elevated valleys to the plains below, to supply the rarefied currents of heated air which ascend from the hot plains to the higher regions of the atmosphere.

"The malaria at Nungpho is now admitted to be of local origin, and its mode of introduction into the system is tolerably ascertained to be through the water supply. The only water procurable at Nungpho is that of extensive swampy tracts, or small streams entirely derived from the drainage of contiguous terrais, swamps, and paddy-lands, in which are concentrated all the elements of malaria. So clearly is this now understood that the traveller of the present day absolutely avoids all use of the local water at that station, and usually travels furnished with supplies of pure liquids, or drinks no water on the journey. It is certain that now attacks of fever rarely result from this journey; and Nungpho has almost died out of memory as a fever-producing region so far as Europeans are concerned. Natives, however, suffer almost as frequently as formerly."*

In connection with the theories presented, there are two others, which, from the point of view of their authors, are not unworthy of being adduced.

Dr. Lionel Beale, never losing sight of the *vis vitalis* in all of his researches, states a possibility in these terms. "It is not improbable that the germinal matter of some of the lower, simpler plants and animals, when exposed to altered conditions, may give rise to morbid forms bearing a relation to their normal healthy germinal matter, similar to that which pus bears to the germinal matter of healthy tissues, and it is possible that in our observations upon the lower forms of life we may be sometimes examining morbid instead of normal healthy organisms. It may be that the matter of the malarial poison may

* Malaria and Injuries of the Spleen, p. 19.

thus result, in which it must be regarded as the morbid bioplasm of some low organism—not as a species of any kind whatever—but as a deteriorated form of living matter freely multiplying, but incapable of producing healthy matter, or of returning to its primitive state of health."* Taken in connection with the experiments made by some scientists, showing the results of the injection of certain living secretions into the tissues of animals, and the well-known power of certain diseased states of passing over to other forms of disease, this theory is not unworthy of deep thought and of remembrance in the future.

The other theory referred to is that of Dr. Leon Colin, who maintains that the cause of all malarial diseases is an unused power of the soil, this power being that of reproduction. United with a certain degree of moisture and heat, this power makes itself evident in the verdure which clothes our fields, in the rankness of the vegetation around the marshy lakes and swamps, and in the fact that barren plains, especially those in which malaria exists, with proper irrigation, are capable of producing comparatively large crops. He denies that vegetable decomposition is the only cause of this disease, but rather claims that it is from lack of sufficient vegetable growth. The turning-up of a virgin soil liberates this power and affects men till that soil is put to all the cultivation which it can possibly bear. Insufficient crops are as bad as no crops at all, for the whole of this power must be exhausted before the perniciousness of the soil can be destroyed.†

Dr. J. H. Salisbury is, perhaps, the best early exponent of the spore theory, though others, in other countries, have followed the same line of argument, but have patroned different plants both as to genera and species. Dr. Salisbury claims that plants belonging to the genus Palmellæ, the lowest known vegetable organism, are the true and perfect ague plants. Truly, his experiments, unchecked by other knowledge or observation, would absolutely prove his position. He finds his ague plants in the urine of persons suffering under malarial disease, and considers their elimination by the urine and sweat as essential to the cure. He appeared to produce the disease *de novo* from

* Disease Germs, p. 33.

† "Pour moi, en effet. La fièvre est causée avant tout par la puissance végétative du sol quand cette puissance n'est pas mise en action, quand elle n'est pas epuisée par une quantité de plantes suffisante pour l'absorber.

"Mais c'est principalement lors des explosions de fièvres intermittentes dans les lieux secs que cette étiologie semble imposer d'une manière absolue; maintenant que, dans les pays civilisés les marais ont tant diminué, bien que les fièvres y apparaissent encore il faudra bien abandonner l'idée de la necessité absolue de l'effluve palustre, et admettre que l'exhalaison produite par la terre elle-meme, dans certaines conditions de richesse organique, l'effluve tellurique, en un mot, est le veritable principe de la malaria."—Fièvres Intermittentes.

the presence of these little low organisms, placed in localities which had hitherto been free from all malarial troubles.* But the known universality of the disease-cause, and the very restricted localities of any of those plants to which malaria has been ascribed, is fatal to their pretensions as being the sole cause of malaria. Indeed, it is fatal to the idea that they are, at any time or in any place, even *a* cause of this disease.

Is the cause to be found in the present germ theory? Is there a bacillus malariæ? For many years the deficiencies of former theories have been felt, and observers have turned their attention to some tangible agent. In discussing this question, it must not be forgotten, nor must the fact be neglected in future observations, that this theory is only a tentative one, a refuge from other theories, and the more fascinating as it deals with imponderabilia, bordering on the infinite, and that its proof or dis-proof is necessarily relegated to a few possessing the needed time, means, and supposed faculty of correct observation. The busy physician accepts it on faith, and, having accepted it, tries to make his medicaments bring the corroborative evidence in the daily practice. That evidence has not yet been furnished, nor do the results of the daily clinical records tend to furnish it.

The studies of Professors Klebs and Tommasi-Crudeli lead them to believe that they have discovered the cause of malarial fevers in a small, rod-like, mobile body containing often a spore at each end, and sometimes one in the centre also. It grows into long curved and twisted filaments, and divides into joints. These spores do not become active except under the influence of a certain degree of humidity and the direct action of atmospheric oxygen upon all parts of the mass containing them. The spores have been discovered in the blood of those suffering from malarious diseases, and in that drawn directly from the spleen, but it seems to be in evidence that the cases examined were cases of pernicious fever, rather than the ordinary intermittent. These spores are claimed to be susceptible of cultivation, both in the body and in culture-fluids, and to reproduce the fever in rabbits into whose blood they had been injected. They may exist in soils poor in organic matters, not being necessarily confined to marshy or rich places, and are discoverable on high lands as well as low.

But this theory is open to many of the same objections which are urged against all spore theories, and to some others which are perhaps peculiar to itself. In examinations of blood taken during pure intermittents, unaccompanied by any suspicion of perniciousness, they have not yet been observed; but this observation is of the utmost importance in considering their claim as a *causa malariæ*. Observers

* American Journal of the Medical Sciences, January, 1866.

(Laveran, Richards, Sternberg, 1881–82), while closely searching the blood of malarious patients, have failed to recognize this peculiar bacillus. And all bacteria, which have hitherto been probably proven as a cause of disease, have been able to transmit that disease to other human organisms; the disease has been contagious. No such claim has ever been made for the peculiar products of malaria. Sternberg says:* "The evidence upon which Klebs and Tommasi-Crudeli have based their claim of the discovery of a bacillus malariæ cannot be accepted as sufficient: (*a*) because in their experiments and in my own the temperature curve in the rabbits experimented on has in no case exhibited a marked and distinctive paroxysmal character; (*b*) because healthy rabbits sometimes exhibit diurnal variations of temperature (resulting apparently from changes in the external temperature) as marked as those shown in the charts; (*c*) because changes in the spleen such as they describe are not evidence of death from malarial fever, inasmuch as similar changes occur in the spleens of rabbits dead from septicæmia produced by the subcutaneous injection of human saliva; (*d*) because the presence of dark-colored pigment in the spleen of a rabbit cannot be taken as evidence of death from malarial fever, inasmuch as this is frequently found in the spleens of septicæmic rabbits."†

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* "Bacteria," pp. 322, 323, 331. National Board of Health Bulletin. Supplement No. 14.

† Since the above was written, the work of Dr. Sternberg, *Malaria and Malarial Diseases*, has been published, and the delay in the present publication permits extracts from that work. The great interest which exists in the discovery of the supposed *Bacillus malariæ* by Profs. Klebs and Tommasi-Crudeli warrants the introduction here of the following extract from the *Medical News*, and its answer by Dr. Sternberg, p. 72.

"Following Klebs and Tommasi-Crudeli, Marchiafava and Cuboni, in Italy, studied the blood of men ill with malaria. In this they found spores and bacilli which they declared to be identical with those described by the former. *The spores included in the white blood-corpuscles were sometimes so numerous as to seem to fill them completely.* Similar studies on malarial patients by Lanzi, and again by Peroncito, led to the same conclusions.

"Succeeding these, Marchand published in Virchow's *Archiv* some observations really made in 1876, whence he concluded that there exist in the blood, in the cold stage of intermittent fever, mobile and flexible rods, presenting slight swellings at their ends, and sometimes also in the middle. These end-swellings he thought also might be of the nature of spores.

"More recent still are the elaborate experiments of Prof. Ceri, of Camerino, Italy, published in the *Archiv fuer experimentelle Pathologie*. These consisted of culture experiments with organisms found in malarial and other soils, of experiments on animals, and culture experiments with quinine. They resulted in proving that the spores could be cultivated—Ceri applying the term *natural germs* to those found in the atmosphere and in the soil, and *artificial germs* to those which result from their culture; that animals could be infected by their injection into the blood, though to less degree by the cultivated than by the natural germs, the former growing weaker in successive generations; and that the infecting properties could be retarded by the application of

The cause of malaria has been sought in the blood of malarious patients, and perhaps the search has not been wholly in vain. Lave-

heat to the culture-fluids, and the introduction of quinine into them, certain degrees of the former and strengths (1 to 800) of the latter making the culture of the spores impossible, and arresting the putrid fermentation induced by them. The practical application of these facts is self-evident.

"Finally, the opportunity has recently been presented to Dr. Franz Ziehl to test these results clinically in three typical cases of malaria, in all of which the spleen was enlarged. In all three the bacilli above described were found in the blood taken from any part of the body by the prick of a needle, and examined in the fresh state, or dried in a thin layer on a cover-glass by simply passing the latter over a flame. These have been preserved by Dr. Ziehl for three months without undergoing any change. The bacilli thus observed were of different lengths, but usually were from one-fourth to the entire diameter of a red corpuscle. The majority of those measured were about 4 micro-millimetres long and .7 broad. Their ends were swollen and roundish.

"We remark (*a*) that the first confirmation reported by Marchiafava and Cuboni related to the finding of bacilli and spores, *post mortem*, in the blood of patients dead from *pernicious* fever. Our observations lead us to believe that no great significance can be attached to the finding of bacterial organisms *post mortem* in the blood and tissues, especially in warm climates, unless the examination is made immediately after death. And even then we must bear in mind the possibility that they may have migrated to the blood from the intestine during the last hours of life, when the circulation is feeble and the vital resistance of cells intervening between the lumen of the intestines and its capillary vessels very much reduced.

"(*b*) The writer's observations lead him to be very cautious in accepting evidence relating to the discovery of organisms in the blood, when these are few in number and require diligent search for their demonstration; for the possibilities of accidental contamination or of mistake in observation are very great.

"(*c*) Fat-granules are found in the white corpuscles of the blood of yellow fever—which disease resembles the pernicious malarial fevers in many particulars—which bear so strong a resemblance to the spores of bacilli that a mistake might easily be made. Several of the observers mention that spores were found 'included in the white blood-corpuscles.'

"(*d*) The spores of bacilli are formed in the interior of rods and in *Bacillus malariæ*, but two or three spores are formed in a single segment. How is it then that they are so numerous in the white corpuscles, when there is no mention of rods being found in the same situation?

"(*e*) The writer has many times examined carefully the blood of malarial fever patients with a one-eighteenth inch oil-immersion objective (of Zeiss), and has not been successful in finding either rods or spores. But few of these examinations have, however, been made during the chill, and the blood has not been drawn directly from the spleen; these observations are, therefore, to be considered as incomplete, and if opportunity offers will be supplemented by more extended microscopical researches.

"(*f*) While the researches of Prof. Ceri, relating to the germicide power of quinine, are extremely interesting and important, there are many circumstances connected with its curative action in malarial diseases which cannot be reconciled with the view that this depends upon its power to destroy or arrest the development of parasitic micro-organisms in the blood—*e.g.*, the fact that it loses its curative power to a great extent in individuals who have become habituated to its physiological effects; the fact that small doses cure mild cases, and that large doses are required in the congestive forms of fever due to vaso-motor paralysis, etc."

ran has found a parasitic pigmented element, which he has named *Oscillaria malariæ;* his observations have been repeated and certified by others.

All the theories thus rapidly sketched lack the merit of universality, except, perhaps, those of Oldham and Colin. Each of these have their own defects, which are fatal to their general acceptance, and at the present we are left without a known sole cause of the diseases called malarious. Is it necessary that we should look for the single cause? If so, it cannot be found outside of the human organism itself. Two or three facts may be of service in this discussion. 1. There is no acclimatization to malaria. In other diseases which seem to have a single cause there is either perfect acclimatization or perfect immunity from the second attack. This is evidenced in all of the epidemic and exanthematic fevers. It is shown in the power with which the body can endow itself to resist the changes of the seasons. It is manifested in the adaptive power of the human organism to varieties of climates. But the *causa morbi* in question successfully overcomes each and all of these organic resistances. Were it a single cause, would it be likely thus to differ from all other single causes? 2. The relation which temperature bears to this disease is peculiar. In almost the exact ratio in which the temperature increases does the virulence of the malaric poison increase. This is true of certain other epidemic fevers, but only of those whose habitat is naturally in the tropics, and whose poison spreads by contagion, or by "epidemic influence," to the colder climates. 3. In all diseases which have seemingly been produced from a single cause, the element of contagion has always shown itself. The microbe, if such there be, to which has been assigned the causation, or the development, of a given disease, has always, and of necessity, been associated with this equality. In malaria there is no element of contagion, nor has an infection from one human organism to another ever justly been attributed to it. This argument against a single cause cannot be elaborated here, but it is a stronger one than appears on a first view. 4. No other organism is *decidedly* susceptible to the malaric poison.

While this poison may manifest itself in various manners, there is one peculiarly distinctive feature of it: periodicity. Did this periodicity always show itself in one marked form, or in one distinctive degree, the argument for a single cause would become quite strong, but its manifestation is so different in different victims without reference to localities, the same differences existing in the same localities, that it is a question whether the one cause acting upon the same or different individuals could produce these differing effects. It is true that a difference in the human organism might be an answer to this argument, but the same differences do not exist as produced by other diseases which are asserted to be produced by the single cause.

In all other diseases equally pernicious in their effects the poison becomes exhausted, and, in the large majority of cases, the system is protected from any further danger from that particular source. Not so with this cause, for its present effects having been checked, or its power apparently spent, it still lies in wait for another opportunity, and seizes it, wherever the victim may be, to reproduce the old disease in all its former virulence. Or it never lets go its hold, and for all during life the sufferer bears with him his enemy, unconquered by changes of climate, location, or medicine. These things, with the theories before considered, with their provings or disprovings, militate strongly against finding a single microbe or a single cause for this disease.

But if all these theories have failed, may there not be an individual krasis which will account for the whole train of phenomena? That such a krasis does exist will be granted by every student of ætiology. It modifies and controls all forms of disease, and, in a given patient, often determines what that form of disease shall be. How much influence does such a krasis have upon malaria? So far as the answer can at present be given, it has relation only to the degree of susceptibility to the *causa morbi* and to the mode of its attack; the same relation which it has to every other form of disease. It is true that a certain mode of inquiry has developed the fact that many diseases can be developed from within rather than from without, but it is yet to be proved that malaria is one of those diseases.

But from all of these theories, and from every research which has yet been made, but two absolute facts stand out as fully proved, or as yet fully connected with the cause of malaria, viz.: moisture and heat. It is, however, very true that in all causative history there is a trinity of elements, and in the cause of malaria, while we have the two factors—moisture and heat, there is the third and unknown factor yet to be developed and manifested. Moisture does not necessarily imply a large abundance of *visible* moisture, nor does heat imply an absolutely high thermometer, but only one relatively high. It is a fact, that as the perfectly dry (apparently) brick can hold within its interstices a pint of absolute water, so the apparently dry rock can hold within its interstices, not as water of crystallization, but as definite and clear water, a decided and definite amount; as the apparently dry and moistureless sand can yet retain within its interstices, and transmit, a large amount of actual moisture, and as each of these can readily be influenced by the action of heat, so there remains but the third factor to determine what the actual cause of this disease which we are now considering may ultimately be discovered to be. Is oxygen that third factor? It is asserted by Profs. Klebs and Crudeli that the presence of oxygen is actually needed to establish this relation; that the "germ" which they suppose they have discovered

cannot exist without an appropriate abundance of this element, and with the absence of this factor all of this especial "germ-life" must cease to be. Oxygen is well known as the supporter of all true life, of all life which can affect any other life on the face of the globe. This fact, once proved, will supply all elements necessary to the third factor; yet against it the experiments of Dr. Sternberg seem conclusive.

The relations of the seasons to malaria are by no means constant, not even that one which would bring the disease mostly into any constant relation to heat and moisture. General observation in our northern climate would seem to show that a dry autumn following a wet spring and summer, or a dry summer following a wet spring, or a spring having alternations of rain and unusual heat, favors the production of this disease; but even such conditions as these have their variableness. In many tropical climates this variableness of results following conditions theoretically favorable is still greater. "Fevers are most prevalent in Senegambia and on the Guinea coast in June, September, and October; in Zanzibar from March to May, and from October to December; in the Bay of Delagoa, from the beginning of September to the end of April; in the West Indies, during the entire summer and fall; in Central America, from November to May; in Brazil, from April till June." In restricted portions of these same regions the theoretical law does not hold good, and one place may be suffering earlier or later than others. But the influence of climatic changes cannot be denied, although the influence of a supposed cause may.

Individual cachexia has a potent influence, if, indeed, it be not the third factor in the trinity in the production of all forms of malaric disease. Hence, everything which destroys the equipoise of the individual functions becomes a predisposing cause. Prominent among these must be reckoned chill, or variations of temperature which are marked as to the individual body. Hence, the supposed influence of the night and morning air; the power of moisture when the instrumental temperature is not low; the abstraction of the body moisture by dry heat; the change of location from one in which the malaria is supposed to reside to a higher one; the nocuous effects of fogs and mists; the neighborhood of rivers and bodies of still water; the results of the presence or absence of winds, etc. Anæmic conditions are extremely favorable as affording a predisposition. While there is no real acclimatization to the malarious countries, yet strangers therein are more liable to be attacked than residents, especially so when they do not assume the habits and foods of the inhabitants. The influence of dyscrasia is as plainly marked in this as in other diseases, in that one person may be attacked, and another, under precisely the same conditions, never may feel the poison. Men are more frequently attacked than women, per-

haps from their grosser habits and from their more frequent and wider-ranged exposures. No age can claim exemption, from the infant of days to the man of fourscore and ten.

In summing up the ætiology of malaria we can only say:

That it is a pathological condition marked by a greater or less degree of periodicity, produced by various and unlike causes, and under diversified circumstances.*

It is very evident from the foregoing discussion that every theory at present is but a tentative one; and either that the one element most concerned, or the combination of the elements already known, has not yet been discovered. The sudden appearance of the various malarious diseases, their equally rapid disappearance, and their constantly changing virulence without known or visible changes of soil or climatic conditions, should have much force in this discussion. It is easy to assign an apparently local cause, but the test of its value is in its universality; it is easier, at present, to acknowledge a multiplicity of extraneous exciting causes, and to consider that the power of these excitants can only be exercised upon a condition already, and always, existing in the organism itself. This will become more evident as we study the pathology and treatment of these various expressions of what we call malaria.

Sanitation.—Although we may not be able to discover the missing factor in the combination which represents the morbific action of malaria, yet the fact remains that that action cannot take place so long as one of the elements is prevented from expressing its influence. Upon this fact may be grounded any mode of prevention, and all modes of circumvention, of the malaric power. But two elements of this combination are certainly known,—moisture and heat. Only one of them, moisture, is practically controllable by man, and this in only two ways, —evaporation and drainage.

The opinion is gaining ground that the water causing malaria is not necessarily that proceeding from swamps or marsh, but may be that water lying beneath the ordinary soil, not necessarily visible at any

* "Indeed, we have no evidence that the various types of disease which are recognized as malarial, for example, are all due to a single poison. If we look at the matter from the point of view of the germ theory, it would rather seem as if these diseases constituted a genus, and that several allied species of micro-organisms are concerned in their ætiology rather than that all are due to a single species."

"The highest medical authorities in all parts of the world, while recognizing the fact that there is such a thing as malaria, generally concur in the statement that we know nothing definite as to its chemical and physical characters. This is the verdict of the older authors—Wood, Bartlett, Watson, Aitken, and McCullough, and also of the more recent authorities—Hertz, Colin, Fayrer, and others."

"The present writer regrets that he does not find himself in a position to give a more definite answer to the question, What is malaria?"—*Malaria and Malarial Diseases*, pp. 4, 63, Sternberg.

one time, or making itself known as greater or less bodies of water. Under favorable conditions a certain portion of this water is absorbed in plant-growth, the residue either passing off by evaporation or through natural channels by percolation and drainage. Whatever prevents this motion of the subsoil water, or whatever confines it within limits too narrow for its elimination by evaporation, renders it stagnant, and from that moment a possible cause of disease. The depth of this apparently stagnant water may vary from a few inches to a hundred feet, and the character of the overlying soil may vary from a heavy solid humus to a moistureless sand. In all cases this water is constantly passing upward, lifting with it those elements which it finds in its way, and which are either capable of solution in it or of being controlled by it. All experience and deduction from the evidences presented seem to prove that this water of percolation or evaporation is either the *causa delicta*, or the means by which that cause is made manifest. It seems also satisfactorily settled that growing vegetation, whether in a marsh or elsewhere, is not a cause or carrier of malaria, as witness the many proofs which Leon Colin* brings in favor of his theory, and the correlated theory of Dr. Smart, which, "viewing malaria as an element in the nutrition of plant-life, exhaled from the soil and absorbed by the myriad pores (stomata) which leaves present, mostly on their under surface,"† explains the prevalence of this *causa morbi* in the absence of sunlight, and its disappearance under cultivation. So strong is the belief in the water-carriage of malarial germs, as before cited, that many writers consider the drinking of water thus supposed to be infected as the sole mode of the introduction of this disease.

All evidence goes to prove more and more conclusively that this is a powerful means of developing and carrying the malarial germ, if not of actually producing it. Malaria has been found in connection with shallow wells, and has seemed to infect the persons drinking from such wells, although situated in a country not usually considered malarious. Whether it is drinking the water, or whether it may be that the high level of the ground water produces such wells, cannot as yet be decided, but the necessity of getting rid of such water is at once evident. Nearly all shallow wells are supplied from "surface water" which slowly percolates through the earth, and which seems only to move as the water is taken from the wells into which it filters. The remedy for all this is drainage in some thorough form, or cultivation to such extent that the crops can absorb and utilize all the superfluous moisture, for, it is to be repeated again, it is not deep or moving water which is the cause of infection. Ordinary farm cultivation is not always sufficient to remove this great mass of water which may exist

* Traité des Fièvres Intermittentes.

† Hygiene of Camps. Hygiene and Public Health, vol. ii., pp. 91, 145.

over a large extent, as it often must be removed by absorption and evaporation, but it becomes necessary that trees and plants which require a large amount of water, as the willow, eucalyptus, sunflower, etc., should be planted. This is one method of supplementary drainage, when other methods are unattainable, by which one portion of a farm, or country even, may be made inhabitable, and the remaining portion be enabled to be utilized for the practical purposes of life. It is by no means certain that the denudation of the country of trees has not produced malaria, and many cases are adduced which seem to prove this position.* The relation of vegetation, and especially of forests, to malaria has not been fully established, but that there is a direct relation, either as to causation or prevention, no one can well doubt.†

In case there is proper facility for perfect drainage into some natural stream having a proper outlet, or into some land sufficiently lower than the surface to be drained, there is no question but that some system of drainage, so constructed, will afford complete and efficient relief from the effects of malaria. It is to be fully remembered that it is the movement of subsoil water which is to be attained, not the mere movement of surface water.

In those localities in which drainage is not practicable, entire relief from malaria has been obtained by flowing the marsh or swamp, thus controlling the emanations from the underground water, or by preventing the decomposition of organic matter alternately exposed to moisture and the heat of the sun. If such flowing can be so regulated as to keep the surface of the water at a uniform level, and if, especially, the banks of the marsh or swamp are reasonably high, success can certainly be assured. But if the level of the water is constantly varying during the summer and fall seasons, or if the borders of the ponds are only slightly above the water level, success will be problematical.

The question of filling such places with earth has often been raised,

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* See paper by J. S. Calkins, M.D., in Michigan State Board of Health Report, 1881, p. 64.

† Prof. Tommasi-Crudeli, the author of the *Bacillus malariæ* theory, says: "The object of sanitary work as it regards malaria is to modify the physical conditions or the chemical composition of the soil in such manner that it shall no longer be capable of producing it. If all malarial soils were alike, we might be certain, or nearly certain, that we could make them healthy by a system of drainage, which has certainly succeeded in some cases. Unfortunately malaria may be produced in the most diverse soils, and that which perfectly succeeds in abolishing it in one place may have little or no effect in another. Plantations of eucalyptus appear to have a good effect in some cases, yet Prof. Livesedge, of the University of Sidney, states that he has seen malaria very prevalent in a Eucalyptus forest. As yet we are working blindly; sometimes we obtain good results, sometimes it seems as if we made matters worse. We need careful study of the natural history of malaria, of the effect upon it of the change of character or condition of soils, etc., etc."

but unless there be some drainage, so that the filling can be several feet above the water level, the prevalence of malaria may be lessened, but its complete removal must be considered as doubtful. This is often manifested in "made land" in cities, the inhabitants of such sections suffering more or less from malaria, until the streets are paved and the cellars of all the residences thoroughly cemented.

It has been long observed that the interposition of belts of trees between the marsh, swamp, or other supposed origin of malaria, has prevented the manifestation of that particular poison. This observation is true, as, by the way, are nearly all of the "observations" of practical but ignorant men, who only observe results without scientifically connecting them with causes; but the query may arise as to the method of this action. Much proof has been presented, and many cases cited, in which a road or other opening in such a belt has seemed to allow the passage of the malarial miasm, and in which only those families living in the line of the opening received the disease, all others living near them, and to the leeward of the trees, escaping. This may be true upon very many of the theories offered for the solution of this vexed question, but, of itself, only offers one more collateral fact to be accounted for in the chain. If the miasmata are sensible material products, a mechanical obstruction can be understood. If the wings of the wind are their carriers, the upward slant given by the leafy wall can be conceived as carrying them too high for the noxious influence to be felt by the neighboring residents, and the roadway a draftway for their passage. If the trees take the miasm for their nourishment, the open places will not receive it. If the trees are but a form of needed drainage, or if they break the force of the chill night air, or temper the climatic influence of dampness, their absence will afford a solution of the sicknesses following. But, whatever the solution, there is no doubt of the protective influence of a wall of trees surrounding a marsh or swamp.

It is found, however, that certain trees exert this power more than others. These are such as have their natural habitat near marshes and in damp places; they die if the soil becomes too dry for them. As examples may be taken the eucalyptus globulus, the willow, osier, tamarack, and others. But these trees are noted as having some pathological relation to malaria, and as also being greedy of water. The eucalyptus leaves yield an oil which has some reputation for its antiseptic properties, and generally as an antimalarial; and salicine is a common ingredient in some anti-ague remedies. The sunflower, and some other herbs, are not without their reputation, and marked antiseptic qualities have been observed in many of them. They are all comparatively rapid growers.

It is universally conceded that the life-giving sun is the deadly enemy of malaria; hence, the diseases connected with it are always

considered concomitant with its absence. One great point in sanitary precaution is, therefore, to take especial care not to expose one's self during its absence. It is yet a question what its peculiar relations to malaria may be, calorific or actinic, but in its presence no malaric influence dares appear. Within narrow bounds, heat from an ordinary fire answers the same purpose, and even a large smoke, without a special amount of actual heat, seems to have the same effect. This may be accounted for in various ways, according to the theory adopted. It may be determined by the ascentional force of the heated atmospheric current, as well as by its antiseptic power; by the entangling and antiseptic nature of the smoke; by the more rapid movement of the subsoil water; by the uniformity of temperature maintained, thus lessening the influence of chill; or, merely by the general power exerted on the surrounding vegetation. During a temporary open-air stay in a malarious situation this may well be observed.

So long as the influence of decaying vegetation is acknowledged as a promoter or cause of malaria, so long will the householder need be careful to remove all such conditions.

A medicinal prophylactic against malaria has not yet been found. Even the vaunted Quinine does not seem to possess that power, unless by establishing a more pernicious condition of the system, and hence it can scarcely be called a *sanitary* prophylactic. Evidence proves that, even during its administration, the sequential diseases of the miasm may seize the seeker for protection. Livingstone remarks: "For a number of months all of our men, except two, took Quinine regularly every morning. The fever sometimes attacked the believers in Quinine, while the unbelievers in its prophylactic power escaped. Whether we took it daily, or omitted it altogether for months, made no difference; the fever was impartial, and seized upon us on the days of Quinine as regularly and as severely as when it remained undisturbed in the medicine chest."* The experiments made by Baxa, in Pola, and those by Colin, in Italy and Algiers, failed to prove the prophylactic power of Quinine, especially in preventing relapses. The varying doses, from two grains to thirty, in which it has been given, are collateral evidence to the same end, and sometimes one suffers both from the "quinine cachexia" and from the malarial element.†

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* Expedition to the Zambesi, vol. iii., p. 72.

† Sternberg, in his recent work, *Malaria and Malarial Diseases*, devotes Chapter 5 to the consideration of the antidotal powers of Quinine, and decides as follows:

The question, then, is whether this remedy is an antidote to malaria or a physiological antidote to the effects of malaria upon the individual?

The latter view is probably the correct one, and, as we shall presently see, it has the support of many of the highest clinical authorities of the present day. But it is possible that this expresses only a part of the truth, and that Quinia also prevents the

But, though there may be no general prophylaxis, there may be individual. This will consist in surrounding one's self with every hygienic form of safety, especially with reference to the home. Its location; the dryness of the house inhabited; the movement of the subsoil water around it; the character of the vegetation; the number and character of the trees in the immediate neighborhood, and their being so placed as to intercept the winds from malarious places; the amount of sunlight; and the capacity of receiving both external and internal heat, are of real considerative value. The avoidance of all known and common causes of disease other than malaria; the food best adapted to individual constitutions; avoidance of overwork; indoor life from sunset to sunrise; non-exposure to chill in any form; and mental quietude, are personal means of prophylaxis. Is it kismet; and the disease comes through some unnoticed, open door? With these precautions, it is more easily controlled, and that without serious general detriment.

It is still an open question as to the distance from a supposed malarial locality that the real cause of malaria can act, or how far aerial currents can waft it. Whether or not it is an atmospheric resident or condition is doubted, but many facts seem to assert its carriage by the winds and its deposition on the earth. It is by this carriage that those who believe most strongly in the "marsh theory" think that the inhabitants of elevated places become attacked by it. Dr. Parkes limits the elevation to which it can be borne in temperate climates to 500 feet, and to 1500 feet in tropical countries. It is thought to be carried by the currents of heated air up the ravines, and so deposited at the different heights; but, if borne in this way, it must be the reverse, as the currents of air more generally set downward to regain the plains from which they had arisen. But it is more probable that unsuspected malarial localities exist in the higher regions than that the cause is thus borne and deposited. Yet, the apparent deposition of this influence, by the rain-fall and the snow-fall, and its capability of separation from the air by filtration, will not allow us to neglect all possible sanitary measures to have these carriage-modes as pure as can be.

Water, especially salt water, is known to be a great absorbent of malaria, and a body of such undefiled water, situated between a supposed malarial locality and a residence, will usually prove prophylactic. It is probable that the even temperature of such sufficient

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development of malaria in the body by its power to destroy or prevent the development of malarial germs. This would make it an antidote to malaria if these germs are directly the cause of the phenomena of malarial poisoning. But this supposition is opposed by so many clinical facts, and is so far from being established by microscopical researches, that we cannot give it further consideration at present.—Page 109.

This matter will be discussed later in this article, when speaking of the therapeutic application of Quinine in intermittent fever.

amount of water may have its influence as well as the absorbent quality.

Malaria is far less prevalent in well-kept cities than it is in the country, which is, perhaps, partly owing to the impermeability of the paving and the walks. In many cases in which it has made its presence felt in cities, it has apparently come through uncemented cellars, or from the upturning of streets, or the overturning of contiguous unprotected soil. These causes may be taken into account in selecting a city residence, or in the conduct of a case. Why one side of a street should be affected and not the other, cannot yet be decided; that this is the case, is a well-known fact.

Periodicity.—There are two characteristics belonging to malarial diseases which, though not exclusively their own, yet are sufficiently so as to become a decided factor in their diagnosis—periodicity and persistency. Many septic diseases have these same manifestations, and thus serve to classify those which we may consider. For if we do not acknowledge the germ theory of disease except in a modified form, the products of decomposition are known to give rise to a class of diseases which may manifest symptoms similar to certain forms of malaric disease. In the first stage of enteric fever the symptoms are often markedly periodic, especially in those cases in which there are decided septic occurrings. In pyæmia, from whatever cause, and more especially where there has been no known external cause, periodicity may be present in a marked degree. In ulcerative phthisis the periodical exacerbation can be rigidly calculated upon. But in no other acute disease, except in certain pathological forms, can periodicity be regarded as a constant, prominent, and determinative factor. In the most marked and typical form of these affections—intermittent fever—the return of the paroxysm can be determined to a moment, and its length, progress, and force estimated. These qualities are only modified by medicines, and time, and exhaustion of neurotic force. In other diseases these modifications do not present themselves in the same manner, being only from the exhaustion of the disease, either by resolution or death.

This typical form, however, may be greatly varied, and the sharpness of its presentation may be shaded till the continued form is attained. This happens with some forms of malarial remittent, and with the chronic developments, to such an extent that it is sometimes difficult to diagnosticate the case in hand as a remittent or as typhoid. In these doubtful cases it will be safe to hold the diagnosis in abeyance till the second week of the disease, when, usually, all doubt will be solved. The question then will be between sepsis and malaria.

In malaria-infested districts, the tendency will be to consider the case one of malaria for the reasons before given, and if death occur, it will likely be returned as from a malaric cause. This gives to malaria

as a disease-cause a greater importance than it really should have, and every diagnostician should be on his guard against this fallacy. Notwithstanding that it has been strongly urged that every disease must have but one exciting cause, it is still to be considered that even an epidemic may have a concomitant cause, whose power may be manifested in the expression of the manner as well as in the fatality of the disease. Those diseases which are nosologized as typhoid (enteric), may yet be modified by the "constitution" of the district in which they occur, and hence the name "typho-malarial"—more properly "malario-typhoid"—can hardly be called a misnomer. The fatality in such cases is not from the malarial, but from the typhoid, constituent of the case.

There are many diseases which are classed otherwise than malarial, rheumatisms, neuralgias, cephalalgias, dysenteries, and diarrhœas, simple forms of fevers, etc., which are impressed with this same characteristic. Even "hay-fever" is claimed by Dr. Wood to possess it. "In two cases I have studied, the symptoms come on at about the time malarial fevers are to be expected; are more or less regularly intermittent, the patients having their 'well and sick days;' and the disease is immediately arrested by frost. One case ended each year with well-marked intermittent."* This marked periodicity is absolute, and is manifested by few other causes of disease. Other diseases may be slightly or irregularly undulatory in their mode of expression, but a true malarial intermittent fever completes its paroxysm, and leaves the patient for hours in a state of comparative health. Why this is so, cannot at present be explained.

The forms of this periodicity, however, differ, the most common and well-known forms being called quotidian, the paroxysm occurring daily; tertian, having a paroxysm every other day; and the quartan, with its paroxysm upon every third day. These types occasionally become intermixed, so that it is difficult to decide which type is predominant. Hence, we have double quotidians, etc. "Ebn Sina saw that rare type in which the fever occurs every sixth or seventh day, and Valescus, of Taranta, refers to a fever recurring every thirtieth day."† At present we have to do with only the first three named types, and with that less pronounced type in which the intermission becomes only a remission; and with that form which becomes chronic in its action, and is called the malarial cachexia.

The persistency of this cause is, however, not less remarkable than its periodicity. Once having entered the system, its tendency is to remain for life; and though for a time it may be checked in its manifestations, either by medication, change of season, or location, it is

* American Journal of the Medical Sciences, Oct., 1868.

† Hertz. Ziemssen. Vol. ii., p. 558.

sure, under favorable conditions, again to make itself felt, even after a great length of time. This persistency of force enters into every consideration of its character, and is an ætiological factor in every discussion of its nature. Hence the instances which are given to prove the *contagiousness* of malaria are rendered nugatory, unless proof also is furnished that the supposed recipient of malaria from another either never had had the disease in a former time, or had never been in a malarious locality. Years after the original attack, and in a place where malaria is unknown, has a sudden attack warned the sufferer that he carries within himself the seeds of the disease. A sudden chill, an undue exposure to night air, a continued intemperance in eating, a low condition of the system, brought on by privation or overwork, or by other disease-producing causes, may be the immediate cause of a paroxysm. Or, without any original seizure, the germ (for that is the most convenient term to use) may become vivified, and may make itself felt in sickness and in the form which that sickness may take. After the return of the soldiers from the "late war," I had occasion for several years to treat forms of remittent and imperfect intermittent in them, in this locality in which no malaria *then* existed. It is true that within the past five years we have had malarious diseases in all their forms, but the cases I speak of were only among those who had returned from the war, and had been located in malarious regions. These cases were amenable to treatment, and all of them fully recovered, and, so far as I am aware, have not had a second attack. These cases alone, of which there must have been hundreds in the non-malarial states, are sufficient to establish the persistency of this cause. In this, all truly malarious forms of disease differ from all other forms, and may be recognized as having this origin. Hence the difficulty of recognizing malarious causes alone in "chill," or as having been originated only on dry and earthless rocks. Other causes of acute disease may be latent for a period of from a few hours to as many days, but in malaria alone does the period extend from days to years. Sporadic cases of malarial disease are constantly occurring for which no known local origin can be assigned, and no recent exposure.

If the malarial element does not show itself in one of the usual forms of intermittent fever, it may yet show itself in a marked periodicity of other forms of disease from which one may suffer, and thus manifest its never-dying presence.

Intermittent Fever.

Synonyms.—Febris intermittens, Paludal fever, Fever and ague, Chills and fever, Paroxysmal fever.

Characterization.—Each attack consists of three marked periods: the prodroma; the pyrexia—divided into the cold stage, the hot stage, the sweating stage; and the apyrexia.

Each of these periods may be lengthened or shortened; they may be decidedly distinct, or may imperceptibly run into each other; or the stages of the second may succeed each other in varying order.

Whatever may be the nature of the miasm causing this fever, it follows no law but its own. It has no definite period of incubation; nor are the causes of this indefiniteness understood, though they seem to have more connection with the individual organism affected than with the special virulence of the miasm itself. While Salisbury,* walking over the half-dried marshes, studying the ague palmellæ, and Hertz † seated by the ditch-side, felt the prodroma of the disease within half an hour, there are well-authenticated cases on record in which the disease did not develop for intervals varying from ten days to ten months, and these in persons who had left the infected localities and were living, at the time of the attack, in malaria-free situations. Undoubtedly, the climate in which the disease is contracted may have something to do with the length of this period, being presumably shorter in tropical climates than in temperate ones. The more common period is from seven to fourteen days.

The prodromal symptoms are not different from those preceding the ordinary acute fevers, having in themselves nothing characteristic.

A loss of muscular tone, so that the muscles do not readily or promptly obey the will; a general lassitude, seeking rest rather than motion; a mental inertness, which predisposes to avoid rather than to seek labor; a torpor of the will; not an entire loss of appetite, but rather a disinclination for the business of eating; there may be a little frontal headache, but in many constitutions this symptom never comes on; a backache, running from a simple tired feeling to a severe dull pain; the tongue somewhat coated, and the mouth tasting flat and pasty; the skin possessing a dull, almost yellowish, hue; constipation or diarrhœa; urine may be scanty and high-colored, or it may be unchanged; the limbs feel heavy and leaden; and possibly there may be nausea. Other symptoms may accompany these, but they usually do not belong to the disease, but rather to the individual krasis. No one will possess them all in the same degree, but many variations will be found. They may continue for a few hours in each day, usually in the former part of the day, or they may remain in greater or less degree during the whole twenty-four hours; in either case they increase in power till the full paroxysm makes its appearance.

The time of this appearance, after the first premonitory symptoms have been felt, may likewise vary. The first noticeable symptom may be a sudden chill, from which the disease develops itself rapidly, or

* Am. Jour. Med. Sciences, 1868. † Malarial Diseases.

the chill may not ensue till a week or fortnight after the first vague feeling of being unwell.

During the pyrexia there are three stages, the cold, the hot, and the sweating, generally easily distinguished from each other. The first is the cold stage, or the "chill." The previous prodromal symptoms having increased in intensity, on the day of the attack the patient experiences an exceedingly uncomfortable feeling, with an indescribable sense of weariness which induces a strong desire for rest. A dull, full feeling in the head supervenes, with heavy dragging pain in the whole body, but especially in the back, loins, and extremities. A sensation of coldness is soon felt, commencing at one point, usually in the back or extremities, and radiating till the whole body is involved. All of the previous symptoms are now intensified, and the pains become almost unbearable; the pulse is small, frequent, and hard, and the axillary temperature is decidedly above the normal; the whole frame shivers with the cold; the teeth chatter violently; the voice loses its steadiness from the convulsive motion of the jaws and lips; the same convulsive action is found in the trunk and extremities, and the attack is in full vigor. All of the symptoms now are those of an internal congestion; the skin is dry, bloodless, and contracted; the face is pale, with a pinched expression, the eyes sunken and the lips blue; the fingers are cold, and the nails purple; all moisture seems to have left the mouth, and with this dryness there is very often nausea; and the urine is commonly frequent and clear.*

This describes a typical, but severe, chill. Its duration may be only for a few minutes to two hours, or more, shortening as the power of the disease wanes, and lessening in intensity as it passes to the second stage. External warmth appears to have no remedial effect, though the clinical thermometer usually shows a regular heat increment.

A perception of warmth is recognized, sometimes alternating with the rigors, and the hot stage is beginning. The reaction may commence at the point at which the chill was first felt, but more commonly at the extremities. The skin loses its paleness, coldness, and contraction, and color, warmth, and fulness take their place. Muscular quiet succeeds the shiverings, and the superabundant clothing is removed. There is a lull in all the pains, and the feeling of internal congestion is relieved. Examination, however, will show some tenderness of the spleen and liver. For a short time there is comparative comfort. Then the pulse is full and bounding; the face red; the

* "There is often urinary irritation, the patient passing at short intervals considerable quantities of highly acid urine almost devoid of pigment. This symptom, although not commonly mentioned by authors, I have very often experienced in my own person, and have frequently noticed it in others."—W. C. Maclean.

eyes have a congested look; the skin is red and hot and dry; the mouth parched, with great thirst, and the speech is indistinct from this very dryness; the respiration, which before was hurried, irregular, and labored, now becomes more full and regular, but still quick; the thermometrical declaration is from 105° to perhaps 107.5°; restlessness and tossing from side to side take the place of the former quiet endeavor to get warm; the nervous excitement is often intense, and the aural noises, the optic sensations, and sometimes the delirium, show the brain pressure; the urine is red and scanty; and the new discomfort is as great as the old.

The duration of this stage is, like everything else connected with this disease, variable, but may be placed at from two to three hours. Sometimes it may not exceed an hour, or it may extend to four, six, or eight. It is, equally with the first stage, unrelievable by ordinary means, and physically is its exact opposite.

The restlessness abates; the skin begins to lose its harshness; the headache is less; the skin loses its fiery flush; the thirst lessens; a general softness of the skin ensues; and the second stage glides into the third, the sweating stage. The perspiration is at first very copious, acid, and unpleasant. It is, however, the return to normality. The pulse slows; the skin resumes its natural color; the respiration is regular; the pain has all gone; and nature more commonly recuperates itself by sleep. The urine is passed freely, is loaded with urates which it deposits on cooling, and this finishes the crisis.

It is impossible to determine the duration of this stage, as a gentle perspiration often continues for a long time after the patient feels that he is well of the present attack.

The whole series of phenomena may last from four to eight hours, and even much longer, but at its close the patient goes about his avocation and calls himself well. It would, however, be impossible for such a contest to take place in his system without leaving some marks of its power. A sense of weakness with easy fatigue; a tenderness of the liver and spleen on pressure; anorexia; hepatic disturbances resulting in an abnormal condition of the stomach and bowels; or an elimination of the bile by the kidneys, with concomitant indigestion and easy perspiration are some of the results of repeated paroxysms. The cessation of the paroxysm does not imply the elimination of the morbific agent from the system, but only to cessation of its present activity. Nor does the cessation of the series of paroxysms prove this elimination, as a renewal of the series often takes place at the end of a lunar month, and the continued presence of the miasm is shown by the fact that the new series will commence on a day which would have been a "regular" day in the old series. Hence, after the return of comparative health every precaution should be taken, both individual and local, to prevent a return.

The pyrexia is subject to various modifications, the reasons for which we do not understand. Their kind and character will be gathered from the different works on Therapeutics.

"Masked Intermittents," "Dumb Agues," are but imperfect manifestations of the type presented. There is but little fever with them, but they affect the system through the nervous tracts mostly. Their origin is undoubtedly malarial, but the reason for them must be left for the future to determine. In malarial regions every disease may partake of a periodic character, and often the remedy chosen will necessarily have relation thereto; hence many remedies which will act well on a given disease in such localities will utterly fail in non-malarial regions. Even provings of remedies may be varied from this cause.

In some countries the disease becomes pernicious, and is then correspondingly fatal. In our own Southern States, if the reaction from the chill does not well come on, the congestion of internal organs remains, and the patient rapidly succumbs. In these cases the presence of a powerful hot stage is looked for with anxiety, as its coming is a sure forerunner of successful treatment. This is the Congestive Fever, and it was very fatal to the Northern army during the war.

Pathology.—Since simple intermittent is seldom fatal, little opportunity has ever been given for examination into the morbid changes caused by the disease. When it has existed for some length of time, or when death has occurred in the midst of a paroxysm, marked hyperæmia of the liver and spleen have been found. The spleen is gorged with blood to an extent making it two or three times as large as natural, the elastic capsule giving way, and showing the evident purpose of the spleen as a diverticulum for the blood during the chill. It is evident, also, that the liver partakes of this same hyperæmia, for it is found enlarged and congested. In the rapidly fatal cases from "pernicious" or "congestive" types the substance of these organs is friable, soft, and full of dark, semi-fluid blood, with an infirm coagulum and easily undergoing decomposition. The stomach is one of the organs whose functions are most quickly affected by the disease, and in fatal cases sufficient organic changes have been found to account for the persistent nausea and pain, even to the extent of complete ulceration. It is usually hyperæmic, and the same condition is sometimes found in the duodenum. The heart and lungs show proof of like affection, and in pernicious forms the brain, spinal cord, and whole intestinal tract evince it likewise. But these cases can scarcely come under the present nosological head.

There is one morbid formation, however, which is constantly present, —the black pigment formation which is found in the organs named. Its origin is unknown. It has been ascribed to changes of the hæma-

tine, produced solely by the action of the spleen, but there is good evidence that the liver has a large place in this production. When the disease has been long existing, this coloration makes itself evident in the integuments, and the dweller in malarial regions becomes known by it.

Prognosis.—The prognosis in a simple intermittent is always favorable, as it is very seldom that death occurs from it. In the more pernicious forms the prognosis varies with the irregularity of the different stages of the paroxysms; if these be regular and well-marked in the same degree, the prognosis is favorable; and in proportion as they depart from a full development, the prognosis is doubtful. In these cases, moreover, the season of the year has a decided influence, and the character of other diseases prevalent will aid in the decision.

Treatment.—There is scarcely any disease which more requires complete individualization for its successful treatment than intermittent fever. It is not self-limited, for though the paroxysms in their active manifestation may subside, and for a time show no appearance of recurrence, yet, the morbid tendency exists, and will repeat itself in the same, or some different, manifestation at the expiration of an irregular period. The great majority of thoughtful physicians do not pretend to *cure* intermittent fever, only to stop its immediate acute expression. This being done, time, and the recuperative efforts of nature, are left supposably to do that which the physician cannot. It is the province of our Law, however, to seek a real *cure*, which shall result in the complete elimination of the *materies morbi* from the system. In this quest there is work both to the individual physician and to the individual sufferer, for the one in the right expression of his morbid state, and for the other in the perfect adaptation of that expression to the remedy chosen. As an individual krasis may prevent a cure in any disease, so may it in this; but a cure, though absolute in itself, is comparative as between individuals, and it is in this light that we must seek it.

The great remedy of the present day among the majority of practitioners is Quinine. Its modus operandi is not pretended to be known, though it is a matter of theory and speculation. Its effects in "breaking the chill" or paroxysm are known and acknowledged, and this is now all there is claimed for it. In many cases it undoubtedly cures, but in these cases it seems to act in accordance with the Law, and is most effectual in the smaller doses. That it is not a "specific" is evidenced by the facts. In a very large proportion of cases it must be pushed to "cinchonism," which simply means the supplanting of one disease by a certain overwhelming power of medicinal action; even then a large minority of the cases are not conquered; that this minority is cured by other medicaments; secret remedies dispute the preëminence of Quinine, even with reputable physicians; and chemists

are constantly employed in seeking a substitute. There is a corollary to this,—That the routine practice of using Quinine for every case of periodical expression of fever, or other disease, falsifies the true ethical relation of the physician to his patient.

The remedy thoroughly appropriate to the individual case is better selected during the apyrexia, as then the totality of the symptoms can best be covered by the narrative of the patient and by the observation of the physician; it is, perhaps, needless to add that only then the particular dyscrasia of the sufferer can be ascertained. This dyscrasia is of more importance to the cure, as well as to the rapid relief of the active symptoms, than a perfect picture of the pyrexia itself. During the activity of the attack medicines have been found to be of but little avail, and the apyrexia has therefore been chosen for their administration. For the reason given above, this is the only proper time for their selection as well as administration. If the succeeding paroxysm is lighter than the preceding, there is no good reason for changing the remedy, and its use should be persisted in to complete recovery, or until it is evident that it has no longer curative effect. It is not always that the one remedy will cover both the fever and the dyscrasia, and then an alternation of remedies becomes imperative. The time may come when medicine, reduced to a perfect science, will enable one remedy to cover the whole case, but now,—if one horse will not draw the load, use two.

It has been said that the liver shares almost equally with the spleen the odium of the chill, and to them may be added the pulmona. The right remedy will not ignore the effects of the congestion upon these organs; indeed, the condition of the latter two may present the key-note for the medicine. The hour of the commencement of the chill is important as a concomitant symptom, and so is the relative force of the three stages, but the decisive point will most frequently be found in the apyrexia.

The following remedies are those most commonly called for by the *conditions of this fever*, leaving the choice of the dyscratic medicament to the general knowledge of the practitioner, only noting that they are each of them "constitutional" remedies, and may therefore cover the whole case. Sporadic cases are usually easily cured, and as surely by the necessary hygienic measures as by medicines. Endemic cases can hardly be reached by a general treatise, unless it comprises the whole materia medica, for the endemic remedy will vary with different seasons and, once found, will probably cover nearly every case. Epidemics very frequently follow the same law, and while the armamentarium of the practitioner must contain the whole known materia medica, the remedies commonly used are few and marked.

The prodromus being common to all cases of acute disease, and its variations belonging to the observations of the attending physician, its symptoms will be omitted.

Arsenicum.—*Apyretic symptoms:* General debility, with progressive emaciation preceding the attack for some definite time; burning sensations in different parts of the body, but chiefly in the chest and abdomen; weakness of the knees; an easily satisfiable, but frequent, thirst; choleraic diarrhœa, generally attributed to "biliousness"; hypochondriasm, or some form of mental depression; anorexia, with, perhaps, nausea. *Pyrexia:* All of the actions of the three stages incline to be intense, though sometimes not well defined. The *cold stage* may not be long, but it is usually marked, and before its close there may be decided pain in the hepatic region; the urine becomes either very frequent or very scanty, and there is a feeling of bloatedness in the abdomen; the prodroma are still existing, but aggravated; and the appearance of weakness is sometimes pitiable. The *hot stage* comes on with equal force, but is not necessarily of long duration; the pain in the liver is still felt; there is usually thirst, though but small quantities are commonly drank at a time, and "even in fever cause chilliness"; the face swells, and has the appearance of being discolored; headache, vertigo; possibly delirium; clean, but somewhat red, tongue. The *sweating stage* partakes of the same character of intensity; the duration is of no account; the relief from sweating is not so marked as in China; the thirst is likely to continue, and the head still feels oppressed. The intermission is marked by weakness. Tertian fevers, "such as are caught at the seashore." *

Analogues.—Lachesis, Veratrum album, Carbo vegetabilis.

Boletus laricis.—*Apyrexia:* There is a class of quotidian intermittents, sometimes tertians, which very strongly demands this remedy, viz., those in which the force of the prodroma is thrown upon the digestive tract, and especially upon the liver. Anorexia, with nausea; headache, flushed face; furred tongue; general depressed condition of the nerve force; constipation: dull aching in the extremities; somnolence, or sleeplessness; sallowness of the skin, occasionally true jaundice, and highly colored urine of high specific gravity. Such a train of symptoms is frequently seen in the late spring, or in the approach of warm weather, almost like an epidemic, and, if periodicity follows, this remedy may be strongly thought of. The *chill* is comparatively light, and of short duration; but the *hot stage* is long and comparatively severe, often made so by the presence of the prodromal symptoms in an aggravated form. The *sweat* is light, and affords but slight relief; if it be profuse, the medicine is not indicated. (Burt.) Without regard to epidemic influence, it is valuable in chronic cachectic cases, cinchonism, and medicinally poisoned constitutions.

Analogues.—Alstonia, Bryonia, Chamomilla, Cornus, Hydrastis, Plantago.

China.—*Apyrexia:* Some particular feature in the history of the patient may aid in deciding the homœopathicity of this remedy. Gradual loss of vital force; chronic hepatic functional conditions; a slowly-proceeding blood-devitalization, from drainage by frequent diarrhœas, hæmoptyses, catarrhs in all their multitudinous forms, or from innutrition, exposure to insanitary conditions, and the form of indigestion peculiar to this drug. After the first paroxysm, the apyrexia will show debility hardly in accordance with the severity of the attack; not full relief of the cephalic congestion, as manifested by noises in the ears, headache with an increased feeling of fulness in the head; "sense of constriction from ear to ear over vertex;" appetite easily satisfied; and, usually, swollen liver. During the *chill*, which may not recur at the same hour each day, and is usually short, though it may be violent, there is not much thirst, but the cerebral pressure is marked by nervous sensitiveness and irritability; the hands and feet are very cold: the respiration is hurried, though the lungs do not show much congestion. The *hot stage* is general and long, but there is not much thirst; the hands and feet become warm; the veins swell; the patient, still sensitive, is intolerant of covering; and the general condition is one of extreme nervous excitement, the face being red and flushed, and the brain still pressed. Profuse, weakening *sweat* follows, the thirst now making its appearance to supply the loss; tenderness of the spleen and sleepiness.

Analogues.—Quinine; perhaps, Cedron, Pulsatilla, Nux vomica.

The low potencies seem best adapted to acute attacks, the higher to old and mismanaged cases.

Ipecacuanha.—Best suited to the milder forms of the disease, and to those marked by a mucous character. Previous mucous conditions are its best indications, and the *apyrexia* is often characterized by pulmonary engorgement. It is to the condition of the lungs what China is to the brain, and under these circumstances is of fre-

* For a discussion of the relation of Arsenicum to intermittents, see Teste, Hom. Mat. Med., 1854, p. 204.

quent value as an intercurrent, if not a primary, medicine. It will sometimes be found to be the true expression of the "genius epidemicus." The *pyrexia* may, or may not, be well-marked in its several stages, but those stages are never intense. The *chill* is not of long duration; without thirst; and without general coldness; there is no particular sensitiveness or irritability, rather a condition of quietude and depression. The *hot stage* is marked by general heat; intense thirst; cough; dyspnœa; and perhaps nausea; "alternate coldness and paleness of face." The *sweating stage* is not sufficient to relieve the congestion, and the patient is apt to feel worse during it; sometimes this stage is almost absent. Tertians.

Analogues.—Chamomilla, Ignatia, Pulsatilla, Tartarus emeticus.

Nux vomica.—Especially for persons addicted to stimulating food or drink, and who have received an attack immediately after undue dietetic errors. *Apyrexia:* General gastric derangement, with anorexia; sallow or flushed appearance of the countenance: constipation; irritability; spinal neurosis. *Pyrexia:* Irregularity of occurrence, both of the time and manifestation of the pyrexia, is a distinguishing feature. Each of the stages may be severe, but more commonly they are not so, but the pains and aches of a gastro-bilious condition persist. The Nux temperament, as well as the conditions, must be studied.

Analogues.—Arsenicum, Bryonia, Lycopodium, Pulsatilla, Sulphur, Veratrum.

Natrum muriaticum.—The general symptoms of the patient show cachexia. He is dejected, apprehensive of the future; easily chilled, and takes cold easily; comparatively emaciated; of a sallow complexion; feeble heart-action, and consequently easily excited and sometimes intermittent pulse. The *apyrexia* is characterized by debility, is imperfect; aching in the liver; tenderness of the spleen; an increase of turbid urine, with deposit of urates; sallowness of the complexion. It may last from twelve to thirty-six hours, but the attack is usually quotidian. During the *pyrexia*, there is almost constant headache; the chilliness commences near noon (11 o'clock, as has been constantly verified in my own experience), and is not entirely absent through the succeeding stages, as is the thirst, which commences with the chill; vomiting, with bitter taste in the mouth; even cold water is quickly ejected. The *hot stage* is moderate, and is not always free from a suspicion of chilliness; the headache, which seems to have connection with the disorders of the nutritive system, increases; the oscillations of sensational temperature give greater palpitation of the heart; and "blisters form on the lips like pearls." The *sweat* varies in its force and duration, but generally relieves the headache and bone-pains. Natrum is better adapted to old and mismanaged cases, or to cases in which the cachectic symptoms are prominent, but has been very successfully used in recent cases.

Analogues.—Lycopodium, Muriatic acid, Nux vomica, Eucalyptus.

Quinine.—A remedy which is so universally used as is Quinine can scarcely have defined indications that will cover all of its apparent range. The most diverse symptomatic series have been "cured" by it, and in doses varying from the truly infinitesimal to twenty-grain doses of the crude drug, and occasionally very much larger. Its tonic influence has been largely depended upon, and, in malarial regions, it is the *primum et ultimatum* of prescriptions. Thousands of pages have been written upon its mode of action and manner and time of administration, but its symptomatic indications are so mingled with its pathological effects in this fever that it is difficult to define them satisfactorily. The *apyretic* symptoms are not essentially different from those of China, and seem to present all phases of condition. The *pyrexia* commences towards evening: the chill is short, and may be slight or violent: but there is usually much thirst; dysecoia; dimness of vision, and nervous depression. The *hot stage* is more or less intense, with the usual concomitants of pain, restlessness, and lassitude, reaching its acme before midnight. The *sweating stage* decidedly succeeds, but leaves a feeling of prostration. Continuance in the use of Quinine has been known to cause cardiac weakness and vesical catarrh, in both of which conditions, pre-existing, it is said to act the most curatively, and in them minimum doses are indicated. It is advised that two grains of the crude salt be the maximum dose.

In pernicious intermittents the treatment should be the same as for similar conditions without the periodicity, as it is not a specific poison to be combated, but the malignancy of generic disease-poison. It is not hereby argued that the cause of pernicious intermittent is not a specific one, but rather that the dyscrasia, or, for the time being,

dyscratic condition, of the individual compels that poison to assume a malignant character, which character and condition it is more necessary to combat than the assumed cause. All remedies have an element of periodicity, or of succession, in them, and such remedies as Apis, Arnica, Arsenicum, Baptisia, Carbo veg., Belladonna, Ignatia, Lachesis, Mercurius, Nitric acid, Sulphuric acid, Veratrum, etc., will be found efficient according to their indications. In Northern latitudes the pernicious fever is seldom seen; in the South, the congestive fever is its expression. It seems to be born of a prolonged high temperature.

Remittent Fever.

Synonyms.—Gastric fever; Bilious fever; Bilious remittent; "Jungle fever."

Characterization.—A paroxysmal fever, quotidian or tertian, with a more or less clearly marked hot stage, preceded or followed by a comparatively mild chill and sweating stage, succeeded by a definite remission of the symptoms, but with no true apyrexia.

Variability of force characterizes the true remittent as well as the intermittent fever, arising, perhaps, not from the intensity of the morbific poison (Fayrer, Morehead, and others), but from the conditions of climate or temperature to which the patient may be submitted. "My own opinion, founded on much observation and thought, is that they (intermittent and remittent) are cognate, but perfectly distinct maladies, caused by different kinds, degrees, or forces of malaria, not always prevailing in the same district, and generally appearing at different seasons of the year; the intermittent being a disease of the swamps and marshes, the typical remittent a malady of jungles and terais. . . . I believe, almost to a certainty, that intermittents and remittents are not degrees of development of the same malady, or the results of one and the same cause." (Dr. Chevers, *Practical Notes on the Ordinary Diseases of India.*) In the hotter climates the fever may assume a pernicious character, adynamic, and prove fatal in a few days; or the malarial poison,—for it is seldom found except in regions which either are, or may be, malarious,—may seem to end life by the destruction of the blood vitality, so that death ensues from what may be called inanition. In the northern climate it becomes milder, more amenable to remedies, and, to a certain degree, self-limited, and is scarcely ever fatal. Its habitat is anywhere on the globe in which malaria may exist, only it is more likely to cling to the lower levels, and in the neighborhood of humid conditions. Hence, seasons exercise a decided influence upon its development and spread, as well as upon its force, wet seasons increasing them, and dry seasons lessening their exhibition.

The prodromal stage does not differ from that of common gastric and bilious fevers. A commencing lassitude, gradually increasing in inten-

sity, may exist for a fortnight previous to the severer symptoms. The appetite becomes capricious, and the taste of food flat, demanding higher spicing to render it desirable. There is not usually much thirst, and water seems tasteless. The tongue is covered quite thickly with a white coating, with its edges rather pale than red. A dull, heavy headache supervenes, not always sufficient to preclude labor, but with the increasing lassitude rendering it exceedingly irksome. A lack of the usual warmth, scarcely to be called a coldness, accompanies, with an undefined aching of all parts of the body. A backache may be complained of, but the principal pain is found in the region of the spleen, which is tender on pressure. The urine is normal in quantity, but is inclined to be high-colored, and usually a greater or less degree of constipation exists. After five to fourteen days of these symptoms the sufferer gives up, and the fever begins. This is the ordinary course of the attack, especially in the Northern States. But sometimes the attack begins with symptoms more like those of a continued fever, and may be much more sudden and pronounced. The premonitory symptoms are but few, and rapidly run their course. The fever then assumes a severer character, and its treatment must vary accordingly. It may even be adynamic from the outset, and the patient begin rapidly to sink. In these cases it requires careful attention to distinguish it from a continued fever, or even yellow fever, especially when the countenance assumes the icteric hue accompanying that disease. The remission is scarcely marked, the chill and sweat disappearing entirely, but often a tertian aggravation may be distinctly made out. This will often decide the diagnosis, especially after the fifth day, when a diarrhœa may set in.

Irregularities in the commencement of this fever, and also in its course, not unfrequently occur, but they are always due to idiosyncrasies of the individual, of the season, or of the locality. Marked gastric disturbances may show themselves early, as in persistent gastralgia, or vomiting, or evident jaundice; diarrhœa may come instead of constipation; and even hæmorrhages may announce it.

The **duration** may be from seven to fourteen days, but under unfavorable conditions of locality or treatment may extend to twenty days, or even longer. Under the Quinine treatment its manifestations are usually cut short, but if the real recovery is reckoned to the time of return of perfect health, with ability to work, the disease may be said to continue longer under that treatment than when the fever runs its common course, but with a correspondingly rapid recovery.

The ordinary remittent should terminate directly in complete health, but, owing to its malarious origin, may take on an intermittent form, and slowly proceed to the tertian or quartan type. It then must be considered as an intermittent, and the remedies must be chosen to meet such condition. It is sometimes intercurrent in a badly man-

aged intermittent. It seldom terminates fatally. It is dangerous only in proportion as it loses its distinct type and inclines to the continued; even then it is seldom before the ninth day. Its prognomic fatal symptoms are commonly observable by the third or fifth day, and measures must be taken accordingly. These symptoms usually present themselves in the form of an adynamia, and need to be treated without regard to the malarious origin *per se*, but with close consideration of the peculiar dyscrasia in which they offer themselves. Hygienic considerations then become all-important, especially as they regard pure air, light, and food, the removal of the patient from a lower to an upper room, or, at any rate, from directly over a damp cellar; and in the cooler weather, the *warmth of the room beneath that which the patient occupies*, as well as that in which he is.

Pyrexis.—After a varying time the prodromic symptoms develop into the true attack. This may commence in the morning, or may delay till past noon. It is commonly ushered in with a sensation of chilliness, which sometimes is as marked as in the intermittent, but more frequently a feeling of cold alternates with flushes of heat, which is more pronounced and longer on the first day than on the succeeding ones. After an hour, or later in the disease a few minutes, a commencing restlessness marks the access of the fever; the strength, though stimulated by the fever, grows less, and the patient is glad to seek his bed; thirst is nearly always present, the desire being for cold and acid drinks; nausea, or gastric distress follows, and in the severer cases is accompanied by vomiting of the food which may have been taken, or of a watery, ropy matter, or of a yellowish-green, or brown, thick, bitter tasting substance; the spleen is tender, and pressure over the hepatic region excites pain; the face is more or less flushed; the eyes injected; there is a heavy pressing frontal headache; the tongue is furred, white, or yellowish; the skin hot, dry, and burning, according to the violence of the fever; the pulse ranges from ninety to one hundred and twenty, and the thermometer from 99° to 105°. The height of the fever is usually reached in an hour, continues its intensity from four to six hours, and then rapidly declines. A softness of the skin succeeds, with a gentle perspiration, and the sufferer sinks into a not unpleasant sleep. Occasionally the perspiration is lacking, being replaced by an almost imperceptible moisture. From this time to the period of the next attack, the "exacerbation," which normally succeeds from three o'clock in the afternoon to six, there is a "remission" of the intensity of all the symptoms constituting the characteristic of this disease. The more nearly this disease resembles the continued fevers, the less distinctly marked is this remission, and it will usually be found greatest in the morning. The conditions of tenderness of the spleen, the absence of tenderness in the right iliac fossa, and the non-supervention of the customary diarrhœa, or, if diarrhœa

be present, consisting of dark-brown, bilious stools, will serve to aid in the differential diagnosis.

The **pathology** of remittent does not vary from that of intermittent fever. The supposed cause of the two fevers is the same, and it is not unusual for them to exist side by side, often in the same family; they may interchange, or may take on the mode of expression of the other; the organs attacked are the same; and the microscopic blood-appearances are the same.

Treatment.—Watchful nursing and intelligent care are exceedingly important adjuvants in the treatment of remittent fever. There is no appetite, and in ordinary cases the usual "sick diet" will be all that will be required. Sometimes, however, the fancies of the patient take possession of him, and one of them is, that if he does not eat, he cannot possibly get well; the friends consider this as a craving of nature, feed him during the remission, and the result is a violent "exacerbation." The thirst is not usually very great, but the desire is for ice-cold water or acidulated drinks, and these may be given quite freely. Hot sponge-baths are very grateful during the fever, serving to allay the intense burning and irritability; the bath should be as hot as the skin will bear, and consist of water only, without the addition of alcohol or soda, and may be administered once, or even thrice, during the febrile paroxysm. The severity of the vomiting should be taken into account in the selection of the remedy, but it may be necessary to aid by the application of sinapisms to the epigastrium, the swallowing of small pieces of ice, or by small draughts of very hot water. Hot water may be used with safety at any time during the fever as a fomentation to tender places; it is effectual sometimes in allaying the severity of the headache.

This fever is often classed with the gastric and bilious fevers, as the gastric or bilious symptoms may predominate. In malarious regions, in which all the diseases are prone to take on a paroxysmal character, no peculiar distinction between them exists; in regions free from common malaria close observation will often detect a remission in the symptoms of those fevers popularly named bilious or gastric. Hence, the medicinal treatment of remittent fever in malarious localities will always be like that of the various analogous forms of intermittent, and in non-malarious regions like that of the gastric and bilious fevers. But in no disease is it more necessary for the most successful and "scientific" treatment that the "genus epidemicus" be thoroughly studied and applied.

Therapeutics.—For the *gastric form:* Antimonium, Arsenicum, Bryonia, Gelsemium, Ipecacuanha, Iris, Nux vom., Podophyllum, Pulsatilla.

For the *bilious form:* Aconitum, Arsenicum, Chamomilla, China, Chininum sulph., Iris ver., Leptandra, Nux vom., Podophyllum, Pulsatilla.

For the *pneumonic form:* Aconitum, Bryonia, Ipecacuanha, Gelsemium, Phosphorus, Sticta, Veratum v.

For the particular indications, see the special works on Therapeutics: Articles—Intermittent Fever, Gastric Fever, Bilious Fever, Remittent Fever.

Malarial Cachexia.

If malaria is a "modern Proteus," the manifestations of its protean character are nowhere more markedly found than in that manifestation called malarial cachexia. It has individualization, but hardly such permanency of definite succession of symptoms as to have characterization. It may, however, be divided into three forms, according as the toxic effects fall upon the liver, stomach, or the general nutritive system. Each one of these necessarily involves the other.

In the *bilious* form we have in the earlier stages all the train of symptoms which belongs to functional inactivity of the liver. A gradual loss of appetite, furred tongue, constipation, or stools showing a deficiency of bile, though the process of defecation may be regular; icteric hue of the skin; scanty and highly-colored urine, inertia, and despondency. These symptoms may not be ascribed to a malarial origin at first, and they generally disappear as the season advances or under the influence of a change of climate or medication. The return to health is, however, only comparative, and there is left an undefined feeling of incomplete recovery, and a lack of the former energy. As the malarial season again returns, a similar condition of the system again ensues, perhaps modified by a diarrhœa instead of clay-colored stools, affecting the individual for a longer time, and with a more incomplete recovery. Finally, the skin assumes a persistently sallow hue, and the cachexia becomes complete.

The *gastric* form is equally gradual in its access. There is a furred tongue; anorexia; more or less disgust for food, sometimes amounting to actual vomiting; constipation, or in some cases diarrhœa; urine but little changed; the dejection of ill-health, but not melancholia; and slowly progressive emaciation. The skin, at first inclined to pallor, assumes a sallow color, and the patient is inert from the lack of physical strength, rather than from that of the will. Unassisted recovery is slow and puzzling, and is not perfect, but may be greatly hastened by medication and climate.

The form of *innutrition* takes more the features of debility. No particular organ seems more affected than the rest, and the fault may be charged, first to one, then to another. The appetite may not be greatly disturbed, nor is the constipation severe. Certain symptoms may be uppermost and pressing during one period, and soon give place to others; but through the whole this undertone of debility runs. Nasal hæmorrhages are likely to ensue, with a correspond-

ing dirty pallor of the skin. A dull pain in the splenic region is usually complained of under the ill-defined title of "backache." The blood shows signs of impoverishment, and the fecal discharges evidence it.

As these different forms progress, they manifest more clearly their malarial origin and consanguinity. They have their home in malarious regions, or, in a minor degree, in localities which have malarious capabilities. There is tenderness of the spleen, with evident enlargement, becoming sometimes enormous "ague-cakes." Abnormalities of vision and audition are apt to supervene; the cachectic hue becomes marked and comparatively permanent; sleep is unrefreshing, and oftentimes absent; diarrhœa may become the usual intestinal condition; dragging loin-pains, joint-pains, muscular pains simulating rheumatism; easy perspiration upon the slightest exertion; fatigue quickly following every physical endeavor; palpitation of heart, and shortness of breath. In the severer forms, which tend to terminate fatally, the liver may partake of the increased size and hardness of the spleen; anasarca may follow, and even portions of the body become gangrenous. The pulse may vary in frequency, but the temperature is never above normal. Attacks of intermittent or remittent fever may be intercurrent, but usually the cachexia is in those who are not easily affected by these fevers.

This cachexia may be primary or secondary, but more commonly the latter, and is apt to follow frequent and long-continued intermittents. I think it may also succeed the abuse of Quinine, especially when taken in large doses daily, to ward off feared danger from infection, producing a "Quinine cachexia" which is scarcely distinguishable from the chronic malarial infection, except by the previous history.

Morbid Anatomy.—Aside from the visible morbid results of the disease, the liver, spleen, and kidneys show organic changes. The same pigment matter which is found in the intermittent and remittent fevers is also found in the same organs and places in this cachexia. The spleen consists of "firm, tough, and slaty tumors, presenting a smooth surface on section, rich in pigment matter, of enormous size, often of fifteen or sixteen times the size of the natural organ, of the shape of a cake, usually provided with a thickened capsule, and attached by adhesions to the surrounding parts or organs." The liver never attains the size of the spleen, but it often presents the same degenerations, and may be full of large, tough tumors. It is often cirrhotic, of firm consistence, and presenting a granular appearance on its surface. The color recalls the appearance of granite or porphyry. "The hyperplasia of the connective tissue, both inter- and intra-lobular, preserves the embryonic character, and the gland cells contain numerous pigment

granules" (Lancereaux). In the kidneys amyloid degeneration is not rare, and the tubuli are often filled with molecular masses.

Treatment.—The same hygienic measures which have been recommended in previous pages are imperatively demanded in this disease. After it has become well established, it is almost absolutely impossible that a cure should be effected without them. A permanent removal from the infected locality and residence is necessary, and even then the cure may not be assured, but decided improvement and a comparatively comfortable existence is almost certain. Great attention should be paid to the clothing and diet, that the one should always be warm and woollen, and that the other should be nutritious and easily digested. No diet rules can be laid down, for such rules must be decided for each individual case.

Therapeutics.—The more acute forms of this disease will probably have been treated by Arsenicum, China, Quinine, Lycopodium, Natrum muriaticum, and Nux v., but I would also call attention to Ferrum, Mercurius biniodat., and Sulphur. These remedies are too much neglected in all the forms of malarial disease, the fevers as well as the chronic states.

Ferrum.—The assignment of this remedy to the mist-bounded rank of "tonics" has hidden its real and distinctive qualities. All of its pathological symptoms are not due to anæmia, but they are the first indication of that condition of the system which ultimately results in blood-poverty. There is at first absolute repugnance to food, and everything eaten tastes bitter, and even putrid; nausea occurs, even while eating; the matters vomited are bitter or sour; full feeling of the stomach, as if nothing could be eaten; tenderness of the gastric region on pressure; diarrhœa. Later these symptoms distinctly remit at night; the face is of a livid color, alternating with red; hæmorrhages are liable to occur: the diarrhœa may become a lientery; the least exertion exhausts the strength; palpitation of the heart, even bellows-sound, is produced; ulcerations of the skin, extending possibly to sloughing of the parts; easily excited dyspnœa; joint-pains and muscular-pains; glandular engorgements with tendency to destructive degeneration. It must never be forgotten in enlargements of the liver and spleen.

Mercurius biniodatus.—This remedy has its best effects upon those constitutions predisposed to glandular diseases, and markedly controls glandular growth. In chronic cases of malarial liver and of persistent tumefaction of the spleen it becomes an excellent adjuvant, seeming not only to reduce the swelling, but also to excite the normal secretions and bring about the normal functions of the organ. Constant chilliness, or chilliness with alternations of heat, followed by easy and copious perspiration, taking place most generally during sleep, is one of its best indications in this disease. It is best given in a low potency, or used as an adjuvant by inunction. It is prepared as an ointment, and caused to be thoroughly absorbed by the influence of applied heat.

Sulphur is a remedy whose very richness, in its proper sphere, has often led to its neglect. It is not often a remedy for the acute forms of the disease, but is applicable in the more chronic forms. To give its specific indications would require almost a reproduction of its entire pathogenesy. Its protective power is well known. Elephant hunters in Ethiopia brave with impunity the most malarial airs by simply fumigating their bodies with sulphur. And in the district of Catania, Sicily, known for its sulphur mines, and in the midst of intensely malarial regions, intermittent fever never becomes pernicious, and the malarial cachexia is unknown. "In the surrounding villages 90 per cent of the inhabitants were attacked by the fever, but in the sulphur-producing districts the proportion was only from 8 to 9 per cent."

THE PLAGUE.

BY GEORGE WILLIAM WINTERBURN, M.D.

Synonyms.—This is the Λοιμός of Hippocrates and Galen; Λοιμώδης πυρετός, Anct. Græc.; Λοιμόςσηπτικός; the Pestilentia of Celsus, Pliny, and Cicero; Pestilitas; Pestilentia septica; Pestis (from *pasco, pastum, quod depascatur artus;* or from *pessum, quod pessum det*); Pestis acutissima; Pestis inguinaria; Pestis orientalis; Pestis septica; Pestis glandulosa; Pestis adeno-septica (from σήπω, putrefacio; σηπτός, σηπτικός, septic, putrid, liquescent); Febris pestilentialis; Febris adeno-nervosa; Exanthema pestis; Anthracia pestis; Ephemera pestilentialis; Ephemera mortifera; Typhus pestis; Typhus pestilentialis; Typhus gravissimus; Typhus anthracicus; Typhus bubonicus; Typhus d'Orient; Peste orientalis; Pestilential fever; Levant plague; Septic pestilence; Glandular pestilence; the Black death; Pestilence; Pest.

Definition.—The plague is an essential fever, of the infectious-miasmatic type, formerly endemic throughout Europe, Asia, and Northern Africa, with widespread epidemic exacerbations, at uncertain but frequent periods, but now altogether epidemic. The plague in many particulars resembles typhus, and has by many of the elder writers been claimed to be but a more malignant form of that disorder. Like typhus, it is accompanied by petechiæ, but these are in the plague larger, more significant of the putrescent changes within, and always associated with buboes and carbuncles, these latter forming the diagnostic and essential characteristic of the disorder. It is dependent for its origin on putrefactive changes in animal products, and, like typhoid, is usually transmitted in an indirect manner, through clothing and other articles of use, and not, as in small-pox, directly from person to person. It may be spread by inoculation, or by breathing the respired air of the sick, but owing to the ability of the virus to retain its vitality undiminished for years outside of the human body, if the articles impregnated with this miasm are kept confined in trunks or boxes, away from the influence of fresh air, it may break out in any locality and at any time when the conditions favorable for its development occur. These are a humid, hot atmosphere, with only moderate winds or a complete calm; the crowding together of many unclean individuals into a small space; the absence of sanitary regulations, and the deficiency of ventilation caused by narrow streets and badly constructed dwellings. And there are the best reasons for the assertion that these conditions, when consonant, are sufficient to engender the plague miasm without an extraneous cause or any relation to the disease elsewhere. Sporadic cases are often thus caused, and the disease fails to become epidemic simply because the influences which set it in motion are not sufficiently widespread.

The plague cannot exist where even moderately good sanitary regulations are enforced, and even in plague-infected districts is confined to the ground floors and underground rooms; it never goes upstairs.

The disorder consists of three stages, not counting incubation and convalescence, and death can occur in any one of them; but the fearful mortality with which the memory of this disorder is associated was due mainly to the neglect of patients, and to the efforts made to prevent the spread of the infection. It is probable that the natural death-rate is no larger than that of small-pox, diphtheria, and scarlatina, that is one in every four to six attacked; and like these, it is completely preventable under a wise system of personal hygiene and communal sanitation.

History.—The history of the plague extends back into the most remote past, and its march down the centuries is one long era of misery, terrorism, and misdirected effort, until the advancing ideas of sanitation crossed its path and marked the epoch of its decline. Prior to the dawn of the eighteenth century it was endemic throughout all Europe, including Britain, Ireland, and the Mediterranean isles, and extended its annual ravages eastward to the shores of the Pacific, bursting out every few years in epidemic violence, and decimating long stretches of territory. While thus universal in its ravages wherever population was gathered together in dense masses, its real home was in the cities of the Nile, where it was truly perennial, lighting up its deadly flame in the second or third week in February, reaching its acme in April, dying down in July, and smouldering through the dry, hot season, only to again arouse in its fury when, the rainy period of the following winter having passed, the earth and air in general moisture formed the twin conditions upon which its virulence depended. At Cairo it never continued, it has been said, beyond St. John's Day, that is June 24th; at Hermopolis and Alexandria it continued two weeks, or so, later. The rise of the Nile was an important factor. If at Memphis, at the height of the tide, the nilometer showed a rise of twenty-four to twenty-seven feet, the following season would be comparatively healthy, but if it went even to twenty-nine feet great sickness followed. Thus a few feet in the depth of the river, in the early autumn, made a vast difference in the plague-rate of the following spring throughout the land.

The plague has never crossed the Atlantic, and in all probability it never will. It has never been able to attain a foothold on shipboard. Persons sick with it have indeed died on vessels, but these had in all cases been exposed to the pestilence on shore. During the virulent epidemic in Egypt which prevailed throughout the last years of the eighteenth and the beginning of the current century, the English and French fleets were exempt from attack, while the land forces were ravaged. During the memorable Great Plague in London more than

ten thousand persons fled from the city, and took refuge in ships and barges moored in the Thames, where they lived securely for many weeks; and although the epidemic raged violently in the city, there were no cases in the fleet on the river.

In attempting to trace the history of the plague, it is impossible to carry our researches beyond the sixth century of the Christian era without becoming involved in uncertainty, as there is good reason for the belief that the terms λοιμός and *pestis* were previously employed in the generic sense, to denote any epidemic disorder which occasioned a large number of deaths. That the plague, as we understand it, existed in the pre-historic period there is probably little reason to doubt, though there is accessible no absolute proof; while on the other hand various disorders were recorded as the pest which we would now otherwise classify. Thus, the famous plague of Athens, so graphically described by Thucydides, is now considered by the best authorities to have been a malignant form of typhus complicated with a peculiar exanthem, with unusual gangrenous tendency. Rufus, of Ephesus, a celebrated physician of the Trajan era, gives a wonderfully exact description of the characteristic symptoms of the plague, and refers them to an epidemic fever then raging throughout Egypt, Syria, and Libya. Mention is made of it at various times by different writers, both before and since the Christian era; thus Dioscorides, Aretæus, Hippocrates, Posidonius, Cicero, Dionysius, Strabo, Pliny, and Galen, all seem to indicate their acquaintance with malignant fevers accompanied with buboes and carbuncles.

Coming to the year A.D. 542, we find that the records of Procopius and Evagrius so fully coincide with our present knowledge of the disease as to leave no doubt that the pestilence which dominated Constantinople in that year was the same which we now call the plague. For the past fourteen hundred years then, this appellation has been restricted, as a rule, to that form of fever which is accompanied by buboes, carbuncles, and petechiæ. During the ten centuries, from the sixth to the sixteenth, the plague was endemic throughout Europe, and vast epidemics sprang up in various localities and died out without reference to the prevalence of the disease elsewhere. Especially was this true along the banks of the Danube, the Rhine, and other great rivers, and wherever there was the conjunction of marshy soil and crowded tenements. In the sixteenth century there were fourteen such epidemics in France; twelve, in Germany; eleven, in Italy; nine, in Dalmatia; six, in Turkey; five, in England; five, in Spain; two, in Portugal; two, in Belgium; and one, in Switzerland. In the seventeenth century, there were nineteen epidemics in Germany; eleven, in France; eleven, in Italy; six, in England; five, in Russia; four, in Turkey; three, in Spain; two, in Switzerland; two, in Holland; two, in Denmark; one, in Sweden; and one, in Poland. In some com-

munities there would be lapses of years between the epidemics in which no cases occurred, while other cities and towns were never free from it. Thus, in London, during the first seventy years of the century (1600–1670), not a year passed without deaths from the plague; and vast epidemics occurred in 1603, 1625, 1636, and 1665. The following table shows the number of deaths from the affection, in London, during the first half of the seventeenth century.

Mortality from Plague.—London, 1601–1650.

Year.	Deaths.	Year.	Deaths.	Year.	Deaths.	Year.	Deaths.
1601	341	1614	22	1627	4	1639	314
1602	176	1615	37	1628	3	1640	1,450
1603	36,269	1616	9	1629	9	1641	1,375
1604	896	1617	6	1630	1,317	1642	1,274
1605	444	1618	18	1631	274	1643	996
1606	2,124	1619	9	1632	8	1644	1,412
1607	2,352	1620	21	1633	10	1645	1,871
1608	2,262	1621	11	1634	1	1646	2,635
1609	4,140	1622	16	1635	5	1647	3,507
1610	1,803	1623	17	1636	10,400	1648	611
1611	617	1624	11	1637	3,082	1649	67
1612	64	1625	35,417	1638	363	1650	15
1613	16	1626	134				

In 1665, occurred the last extensive epidemic which devastated the city, and which has ever since been known as the Great Plague; 68,596 perished.* Previous to the seventeenth century, the great plague years were 1349, 1361, 1369, and 1593; but it should not be forgotten that so terrible was the unsanitary condition of the city, that even a century later, when the plague no longer added its quota to the death-rate, the annual excess of deaths over births was upwards of ten thousand. That is, for every 14 persons born, 25 died. And it was not until the present century that the birth-rate for the first time in the entire history of London exceeded the death-rate.

From 1665, probably owing to the changes wrought by the great fire, the plague declined, the number of deaths from it becoming fewer and fewer, until in 1679 it disappeared entirely. For the past two centuries there has been no plague in London, and with the growth of sanitation, and with the present enlightened ideas as to quarantine, it is not likely to ever again obtain a foothold there. Although it disappeared from London in 1679, it lingered in the more remote parts of England for many years after that date; nevertheless, it never mustered force enough to become epidemic.

Holland suffered very severely from the plague during the sixteenth and seventeenth centuries, but toward the end of the latter a decline

* The total mortality for the year was 97,306, while the births were only 9967.

in its virulence became apparent, and it shortly disappeared altogether. In fact, beginning about the time of the Great Plague in London (1665), which seemed to be the acme of its fury, there was a marked diminution in the pestilential character of the disease, and in the frequency of its outbursts. Nevertheless, many severe, widespread, and destructive epidemics occurred during the eighteenth century; namely, in Egypt, nineteen; in Turkey, seven; in Dalmatia, four; in Germany, four; in Spain, three; in Russia, three; in Poland, two; in Greece, two; in Italy, one; in Sweden, one; and, in France, one. The dates of the principal epidemics in Europe during this century were as follows: In Poland, including Dantzic, and other ports in the Baltic, in 1710; in Provence and other parts of Southern France, and especially Marseilles, in 1720–21; at Rochefort in 1741; at Messina and other towns in Sicily in 1743; in several districts of Portugal, especially along the southern coast, and in Lisbon, in 1757; in Wallachia in 1770; at Moscow and other Russian towns in 1771; and in Constantinople in 1778. In this last, one hundred and fifty thousand perished in the months of May, June, and July. At the close of the century the plague reigned epidemic throughout Lower Egypt, and all along the entire north coast of Africa. The Barbary States suffered severely, and the loss in Algiers was enormous. In the year previous (1797) there had been over this entire district an overwhelming devastation by locusts, and this was of necessity followed by an equally widespread famine. Thousands died of absolute starvation, and the universal distress was terrible. In Morocco and Mogadore the pestilence reached its height in July, 1799, and began to decline in August, and ceased altogether in October. Here, as had been noticed in many other epidemics, the disease was more malignant before the acme of the epidemic than during the decline. Not only did the number of cases become less after mid-July, but the type of the fever seemed greatly modified; this seems to be a peculiar and characteristic feature of this distemper. Nevertheless, many persons who had fled from the cities at the beginning of the epidemic, and who returned in August or September, were seized with the disorder in its most virulent form. It has been noticed of very many epidemics, and it was also true of the one under discussion, that the plague followed an epidemic of small-pox, and was itself followed in turn by an epidemic of murrain among the cattle.

The French army, under General Bonaparte, started on its expedition into Egypt, from Toulon, in May, 1798, and reached Alexandria about the beginning of July. Capturing this place, a portion of the expedition pushed on to Cairo, which they occupied before the end of the month. The season was unusually unpropitious, and there was much sickness of a diarrhœal nature. In December the plague broke out at Cairo, and in the various towns northward, attacking also the

troops in the trenches about Alexandria. During this and the succeeding months up to July there were thirteen hundred deaths from this disorder in the army, which originally numbered thirty thousand men. From that date until the following February (1800) there was an almost complete cessation of the pestilence, with an increase in the amount of bowel disorders. From February until July it was epidemic again, but not nearly so severe as in the previous year; nor was there at any subsequent time any considerable number of deaths from this disorder in the army during its occupation of Egypt; that is, up to August, 1801. It was noticed, however, that the existence of southerly winds, and of a hot and humid atmosphere, seemed to at once promote the spread of the distemper and to increase its malignancy. This variation in malignancy due to humidity of the atmosphere is one of the peculiar characteristics of this disease. For it must be remembered that the plague, like all epidemic affections, varies greatly in its death-rate according to the circumstances surrounding the case. At times the mortality is only eight or nine per cent., and again it may destroy almost every one who falls under its sway. Notwithstanding the plague, the total mortality from disease, in the French army, seems to have been under, rather than above, what it has often been in other campaigns. As is well-known, an expeditionary army is always subject to severe losses through disease, but the wonderful sagacity of Napoleon, and his appreciation of sanitation and a good commissariat, far beyond the popular opinion of his day, enabled him to carry his army through a very harassing series of campaigns, with a very moderate loss from disease. The entire mortality, from May, 1798, to August, 1801, was 8915. Of these 4157 were from disease, the principal sources of death being diarrhœa and the plague; from the latter, 1689. Desgenettes remarks that at first the mere suspicion of a fever being the plague (it was always called pestilential fever) prevented due attention being paid to the sick, but that afterwards, when the disease was better known, the hospital attendants waited upon them with much greater readiness. This probably largely accounts for the fact that while the army lost thirteen hundred from plague, during the period from December, 1798, to July, 1799, it only lost four hundred during the two following years; and this in the face of the fact that the pestilence was prevalent, among the natives, throughout the entire northern part of Africa, from Mogadore to the Red Sea. It was noticed here, as it has been many times elsewhere, that the pestilence did not spread from contiguous places, as, for instance, cholera seems always to do, but sprang up in different localities spontaneously, and without any traceable communication with infected places. It was also made evident that the infection was one of place rather than of person, as by merely crossing from one bank of the Nile to the other the epidemic was frequently gotten rid

of, and by carrying the patient from the ground floor to an upper room an immediate improvement in his condition was evident; the influence upon which the malignancy of the disorder depended seemed unable to follow the patient upstairs. Quite a number of the French surgeons declared, as the result of their three years' experience, that there was scarcely any danger from going into a sick ward, provided there was a current of air through it.

On the first of March, 1801, a British force, seventeen thousand strong, under the command of Sir Ralph Abercrombie, reached Aboukir Bay. Immediately upon landing a pitched battle was fought, in which they were successful, and they then pushed on to Cairo, passing through villages infected with the plague. At Aboukir, in the previous year, there had been a frightful massacre of the Turks by the French army, several thousand having been slain. The bodies of these had been insufficiently buried, and now lay festering in the sun, infecting the air for many miles around. The plague attacked the English army in the second week in April, with appalling malignancy. The sanitary accommodations of the army were exceedingly defective, and the medical corps seems to have been without ability to appreciate the nature of the pestilence or to grapple with the problem of its eradication. The wretched victims of the plague were crowded into the old and filthy huts which had been vacated by the French soldiery, and over these a guard was mounted to prevent the pestilence from stalking forth. The attempt to thus confine the distemper, by repression and police regulations, was followed by the natural result. The air in the huts become so impregnated with the miasm, that nearly all the medical men in attendance, as well as the hospital stewards and nurses, were seized with the pestilence and died. But very few of the patients confined in the huts recovered. When the dreadful condition of these filthy quarters made it necessary to leave the sick in the open camp, it was found that the proportional death-rate manifestly and rapidly declined.

During the current century there have been eight epidemics in Egypt; six in Turkey; three in Greece; three in Russia; two in Italy; two in Syria; one in Germany; one in Dalmatia; and one in Morocco. In 1803 there was a widespread epidemic throughout the Turkish empire, being especially fatal at Constantinople. From 1803 there was a complete lull in the plague until 1812, when it again devastated Constantinople; three thousand died in one day, and one hundred thousand in the course of five months. But Constantinople was not the only place which suffered in this year. Greece, the whole of Turkey, and the Danubian Principalities were ravaged, as well as Tunis and the whole of North Africa as far as the Barbary States.

The year 1813 was an extremely sickly year throughout Europe. Typhus and other diseases were plentiful, including the plague, but

there was no great epidemic, except in Malta and in Africa. In 1814 Egypt, Dalmatia, and the shores of the Adriatic were ravaged. In 1815 began the Great Pali Plague of India, which continued until 1820. The pestilence began in Cutch, in the summer (1815), after a season of great scarcity and distress. And during this and the following five years, it prevailed in different parts of Guzerat, in the Scinde, at Ahmedabad, and still further eastward. In 1816 the harvest failed in all parts of the European continent, and a period of great distress supervened. Many were compelled to subsist on nettles, bean-stalks, herbage, and such refuse as could be picked up along the wayside. Thousands died of starvation. This was followed by a great plague in Naples, extending through 1817. In this year, beside the Pali Plague, which was devastating India, there was the first great epidemic of cholera on the banks of the Ganges. To a certain extent this disorder has in later years replaced the plague. In the same year there appeared a great epidemic of the plague in North Africa, which continued for three years. In 1819 it was again epidemic in Constantinople. In 1824 it carried off thirty thousand of the population of Cairo. In 1828 the Russian army, while engaged in Moldavia, Wallachia, and Bulgaria, suffered terribly from a malignant epidemic of the plague. This distemper has ever seemed to spring up with more spontaneity along the borders of the Danube than in any other part of the world except on the banks of the Nile. In this same year Constantinople was again devastated by it. In 1832 it was regnant in Bagdad, Mecca, and all along the Arabian Gulf. In both 1834 and 1835 it was general throughout the East. During the spring months the deaths in Cairo alone occasionally amounted to a thousand a day. In 1836 it broke out in terrific violence in Constantinople; and at the height of the epidemic fifteen hundred died daily. In 1837, in Salonica, out of a population of twenty thousand Jews, more than four thousand fell victims to the plague. The unhealthiness and filth of the Jews' quarter was beyond belief. In this same year the Pali Plague again broke out in India. Pali was at that time a place of considerable importance (lat. 26° N. and long. 74° E.), and the centre for a large district. The pestilence spread to numerous places in Marwar, and did not die down until August, 1838. In the same year (1837) it was also epidemic at Alexandria and at various points up the Nile. In 1838 it ravaged Bulgaria, ninety thousand deaths occurring in a few weeks. In 1839 it was again epidemic in India. In 1841 it devastated Syria and Palestine. In 1843 it was again epidemic in the East. In 1858, in the month of April, it broke out fiercely among the Bedouins, as the aftermath of a wide-spread famine.* In

* In 1873, 1875, 1876, and again in 1877, it was epidemic in Persia, and along the Caspian Sea, destroying in these several years more than fifty thousand persons.

1877 it appeared in Russia, especially along the banks of the river Volga. In 1878 there was quite a widespread epidemic throughout Astrachan. The plague continuing to spread, and the mortality being excessive, the Russian government ordered, in 1879, a number of infected villages to be destroyed, and their inhabitants were carried elsewhere, and provided for at the public expense. These villages are described as having been in a most filthy state, and incapable of reclamation by any means; the only thing to do was to burn them up, and this was done. This seems to bring the history of this pestilence down to the present time, no epidemics having been reported for the past five years. Europe is not likely to be troubled with another great epidemic as long as peace is maintained; but should a general war be participated in by Russia, Austria, and Turkey, as seems now imminent, the bank of the Danube may again be found, as it has so many times during the past sixteen centuries, the home of a great plague.

Ætiology.—The cause of the plague was long a matter of doubt and contention, until, in 1835, Clot-Bey and his noble associates, amid the horrors of the terrible scourge which was then devastating Egypt, lived in daily association with its victims, observed every feature of the attack, recorded its hourly progress, and made numberless necropsies upon the bodies of its dead, and thus settled questions of the utmost importance as to its methods of propagation, until then never calmly and scientifically examined. So valuable have been the results of their observations, and the great change wrought thereby in the treatment of the plague-stricken, that almost immediately the disorder was banished or greatly mitigated in places which it had for centuries infected; and a wide-spread and long-continued epidemic, involving entire nations, seems now made almost impossible.

The epidemics previous to that of 1835, upon which the profession in general depended for its knowledge of the sources and symptoms of this distemper, were that of Nimeguen in 1635, described by Diemerbrock; that of London in 1665, described by Sydenham and Bertrand; that of Marseilles in 1720, by Chicoyneau, Verney, Deidier, and Bertrand; that of Transylvania in 1755, by Chenot; that of Moscow in 1771, by Mertens, Orrœus, and Samoilowitz; and those of Egypt in 1798, 1799, 1800, which were so graphically and fully described by Desgennettes, Larrey, Puguet, and Louis Frank. Outside of these records, and those inspired by them, the accounts of the plague are vague, unsystematic, and imaginative.

It may readily be believed that the ancients considered the plague an obcession, and its victims the objects of Divine wrath. It was, therefore, only justice, and in accord with the will of the Gods, that they should be deemed unclean, ostracised, cut off from human help and sympathy, and left to die forlorn, and like the beasts of the forest. Indeed, the elders of the present generation can look back in their own

memories to the time when the scantiest attentions were considered enough for the plague-stricken; when they were shut up like criminals, to expiate, as it were, some nameless crime, and when contact with a victim of the plague was worse than the breath of scandal.

With the progress of medical theories the evil-spirit obcession idea was banished. The plague simply became an unconscious and unorganic entity, which seized upon a man and wasted his spirit and destroyed his life. This undefined something could leap forth out of the man, and enter into any one who came in close proximity. Hence arose the idea of contagion, and the plague-victim, though no longer looked upon as paying the penalty of moral turpitude through physical suffering, was equally abhorrent on account of his supposed deadliness to every human being with whom he came in contact. In the rougher life of semi-barbarous nations he was left to die alone and neglected, no longer as an expiation, but because of the malignant influence which he was supposed to emit on all who came within his radius; while among more refined communities the treatment was less openly brutal, but imbued with the same spirit of superstitious dread. The means that were taken to prevent the spread of the contagion seem ludicrous enough now, as perhaps some of our own pet theories may appear in a decade or two. The following account of the absurd regulations enforced during the last epidemic of the plague in Marseilles, shows the lack of common sense which has pervaded the treatment of these cases: The patient suffering, or suspected to be suffering, from an attack of the plague, was put into a room by himself, and separated by an iron barrier from the attendants. These latter were dressed in oil-silk, and were not permitted to have in any way direct communication with the sick. The medicine and food were put upon a tray and pushed within the enclosure. If a bubo was to be evacuated, the patient was directed how to do it himself. The medical attendants were ordered not to approach within twelve yards of the infected persons. Even by such arbitrary quarantine the disease could not be kept from spreading, and under such depressing moral surroundings the death-rate was very high. How much more sensible was the action of Cardinal Gastaldy, in Rome, in the year 1657! He issued an order prohibiting any infected persons, or even any person whose health was suspected, to remain in the house in which they had been taken sick. All such were promptly carried to an hospital, situated on an island in the midst of the Tiber. Other persons who had been living in the same house with the sick were then removed beyond the city walls, and comfortably provided for. All of the furniture was then taken out of the house, aired, and all doors and windows left open to free access of the wind. By these means the plague, in a few weeks, was completely eradicated, although it had been epidemic in the city for two years.

But is the plague communicated by contagion? In 1841 Dr. Robertson, the general medical officer of the British troops in Syria, officially reported: "In reference to the contagiousness (transmissibility) or non-contagiousness of this, at times, frightful disease, I beg to state that the result of all my experience leads me to believe that the disease originates in local causes, and that it is not highly contagious. My firm conviction is that the plague cannot be communicated from one person to another in a pure atmosphere, even by contact; but I am not prepared to assert that, if plague-patients are crowded together in confined and ill-ventilated apartments, infection will not be produced, just as happens in typhus." Again, Mr. Brant, of Erzeroum, says: "As far as my experience goes, I have been led to doubt the contagious nature of the disease, or, if contagious, it must be in a very slight degree. I have had within the sphere of my observation many cases of the most complete and extensive contact, without the disease being communicated." Again, Mr. Sandison, of Brussa, says: "The cases are numerous in which persons escape the disease after contact with persons seized with it, even in its most malignant stage. There are frequent instances, also, of individuals being attacked by the plague, without being able to trace communication with any infected person or substance."

These testimonies from competent observers, taken in connection with the reports of Clot-Bey and his coadjutors, show that the contagious element in the plague is, at the most, very moderate. Clot-Bey, and his corps of enthusiastic French physicians, remained in hourly contact with the infected for weeks together, with but one of them taking the distemper, while others who observed every possible precaution fell victims. In August, 1844, the Royal Academy of Medicine, of France, appointed a Commission to examine all the various aspects of quarantine in relation to the plague. This Commission went to Egypt, and conducted a very thorough and exhaustive research into the causes of this distemper; they corresponded with all persons to whom they had access who could speak with authority on the question of the methods of its propagation; and their conclusions, abundantly fortified by experience from many epidemics in various countries, and under diverse conditions, were: "There is not a single fact which indisputably proves the transmissibility of the plague by mere contact with the sick."

The evidence as to the transmissibility of this disorder by means of the clothing, furniture, and other articles of use of the plague patients, are by no means conclusive. That, under certain conditions, it may be thus spread is undoubted; but, on the other hand, the exposure of these articles to the free access of pure air seems to quickly dissipate their power to infect. Thus, after the plague of 1835, at Cairo, the clothing, effects, etc., of fifty thousand plague patients, who had been

carried off by the pestilence, were sold in the public bazaars, without, as far as known, a single case arising among either the dealers or the purchasers. More than six hundred houses remained tenantless in the city for the space of several months; they were then ordered visited by the civil authorities, and an inventory was taken of their several contents. Not one of the persons engaged in this service fell sick. It is evident, therefore, from what has been stated, that neither the infected themselves, nor their belongings, are capable of conveying the disease, except in the presence of congenial atmospheric conditions; and that a free circulation of air in the sick-room, and the exposure of the fomites to like benign influences, are sufficient to stay the progress of this dreaded distemper. This fact has been recognized by intuitive minds for centuries; but so oppressive is the inertia of preconceived notions, so slow the progress in alteration in national habits, and so impotent the power of an idea which runs counter to popular thought, or want of thought, to impress itself against the prejudices of mankind, that it was not until the close of the first half of the current century that even those nations which had risen above the dangers of the plague, recognized the sources of their deliverance.

That the pestilential condition of the air is the immediate cause of the plague, and furnishes its chief means of propagation, is now recognized by all students of the subject. But whence comes this pestiferous atmosphere? How is it that certain parts of the land are affected by it, and that others are free from it? The answer must be that man is himself the cause. The student of history is aware of the terribly unsanitary condition of mediæval towns, but needs not to go back beyond the memory of those now living. Take a momentary glance at some of the places which have been scourged by the plague in our own day. The delta of the Nile, until recently, has been the endemic home of this distemper. The inhabitants of this region, once renowned under a high type of civilization as an exceptionally salubrious and healthful country, were, at the middle of the nineteenth century, as they had been for generations, filthy, destitute, and miserable, almost beyond belief. Their wretched hovels were so disgusting that language fails to be descriptive of the accumulation of horrors. They were not only surrounded by, but were the actual receptacles of, the accumulated excrements of their inhabitants, of the animals which pertained to them, of garbage and rubbish, and of other disgusting and putrid matters. As if this was not sufficient, the dead were not unfrequently buried beneath the floor of the filthy hut in which they had passed their miserable lives. Their food was of the worst possible description, and scanty at that,—rotten cheese, decayed vegetables, semi-putrid fish, stinking meats, and other articles whose only merit was their insufficiency. The water which they drank was filthy with animal and vegetable impurities. If to this we add the picture of

their moral degradation, mental brutishness, the hopeless servitude and blank unmitigated wretchedness of their lives, can we say that the plague was anything but the inevitable consequence and natural close of a horrible existence? This was the condition of the villages which cluster along the banks of the Nile. If, now, we look at Cairo, its chief city, with its quarter of a million of inhabitants, we find it to be the duplicature of the nasty village on a huge scale. Disgusting and pestiferous impurities abounded. The canal which traverses the length of the city, and which supplies the water for the use of its inhabitants, was as filthy as its vile streets; under the tropic sun, there was constantly arising from it a cloud of intolerable offensiveness, which not only evidenced its impurity, but polluted the air throughout its neighborhood. Within the city walls were twenty-five cemeteries, and in these graves were left open with the corpses festering in the sun. But this was not the worst. As in the villages, so in the cities, sub-domal burial was permitted and practiced. Under the floors of their wretched hovels they interred their wretched dead. Separated by a few boards and a few shovelsful of earth, already saturated with the vilest impurities, were a half-hundred or more, corpses and the miserable living; and it would be hard to tell from which, the living or the dead, was given forth the most pestiferous odor.

If now we ascend the Nile into Upper Egypt, we find in Nubia and Abyssinia a population of cleanlier habits, living on a dryer soil, and with a purer atmosphere; to this region the plague never came. Here we have, then, the secret of prevention; and that this is the case has been illustrated again and again. A community cannot be the nidus of an epidemic if they possess that virtue which the Sacred Word declares to be akin to godliness. Bagdad, which was formerly exempt from the plague, fell from its high estate, and has, in more recent years, been frequently ravaged as the penalty of its insanitation. Constantinople, like Cairo, the home of filth, has suffered repeatedly and disastrously in consequence. What is true of the dwellers along the banks of the Euphrates is likewise true of the inhabitants of the Danubian provinces. Both have an insalubrious climate, for marshy lands abound; but both also suffer chiefly through their own ignorance and filthiness. The Moldavians and Wallachians are even to this day miserably poor and phenomenally unclean. Any American student who has been in Vienna will recognize the dirty breed.

Another fact is worthy of record. In any town attacked by the plague, the deaths from this distemper will be, in the various classes of its inhabitants, in proportion to their approximation to correct habits in living. The most degraded will die at a high ratio, while the more refined suffer but slightly. No fact has been more clearly demonstrated than the peculiar susceptibility of the poor and degraded to fall victims to this disorder. One of its ancient and significant

names was the "poor's plague." To Dr. Aubert-Roche, who himself fell subsequently a victim to his assiduity in attention to the plague-stricken, we are indebted for the following table of the relative mortality among the different classes of inhabitants, during the Great Plague at Alexandria, in 1835.

	Deaths.	*Inhabitants.*
Negroes and Nubians lost . . .	1,528	out of 1,800 = 84 per cent.
Malays, ...	367	" 600 = 61 " "
Arabs, not soldiers, . . .	10,936	" 20,000 = 55 " "

The Negroes, Nubians, and Arabs were practically all living under the same unsanitary conditions, and were all in free communication. The deaths among the other inhabitants were as follows:

	Deaths.	*Inhabitants.*
Greeks, ...	257	in 1800 = 14 per cent.
Jews and Copts, ...	482	" 4000 = 12 " "
Turks, ...	678	" 6000 = 11 " "
Italians and others of the Latin race, .	118	" 1600 = 7 " "
French, English, Russians, and Germans, .	52	" 1000 = 5 " "

In other words, the death-rate was inversely proportionate to the cleanliness, good living, and general comfort of the several classes into which the inhabitants of the city were divisible.

While it is evident that the spread, as well as the cause, of the plague is dependent upon the habits of the population, in every country where the plague has prevailed, certain other local conditions have been found to favor its development and continuance. The outbreak of the plague has not unfrequently followed upon wars, famines, and other wasting diseases. War, by producing hardships and disease, by shutting up half-starved populations in beleaguered cities, and by interfering with the planting and harvesting of crops, has in very many countries and in all ages been the cause of epidemic plague. On the other hand, civilization and the arts of peace, and the physical comforts which proceed therefrom, are the principal means which have put a period to its progress. As showing how war indirectly causes the plague, the following instance is illustrative: In 1834, in the month of June, an insurrection broke out in Judea. The insurgents pillaged and sacked Jerusalem. A number of Roman Catholics took refuge in the convent of St. Saviour. The accommodations being insufficient, these were crowded together not only in the various rooms, but on the staircases, under the stairs, in passage-ways, and in every conceivable place. The foul air and privation caused, at the end of twelve days, cases of the plague. After twenty-five days the city was relieved. The Holy Fathers, full of alarm, drove this multitude of people, including the sick, out of the building, and shut themselves up in strict quarantine. Now mark the result. Of all those who left the convent

only three persons died; but of the sixty-three priests, who thought to save themselves by isolation, twenty-two were slain by the epidemic. This well illustrates the proposition, already formulated, that the plague is an infection of place, rather than of person.

In a general way the same climatic and telluric influences which cause typhus may also produce the plague; in fact, the two diseases are very closely allied. Residence upon a marshy, alluvial soil; long-continued drought; an excessive amount of rain, are predisposing causes of this distemper. In places where the plague is endemic, as in the Danubian provinces, and along the Euphrates and the Nile, the intermittent and typhus fevers, even in the absence of the plague, are noted for their malignancy; and they are often associated with buboes and carbuncles, so that it sometimes becomes a nicety of diagnosis to determine whether the case is an intermittent, a typhus, or the plague. And it has been noticed at many times that the telluric influences which engendered the plague in one district, would cause malignant typhus in the adjoining one. Thus, after the excessively wet autumn of 1799, plague was regnant in some parts of Europe, while in others typhus was unusually prevalent; this continued until 1802. Sydenham noted in his day, that when the plague was about, intermittents of a severe type were plentiful.

An exemption from the plague has always been the result of a residence on dry soil or on an elevated site. Thus, the village of Alem-Daghe, near Constantinople, never suffers from an attack when the disease rages in the city below, and this in spite of constant intercommunication. The higher parts of Valetta suffered very little in the Malta epidemic of 1813; the ratio of the attacked became greater and greater in descending from the higher to the lower levels of the city. (Milroy.)

Epidemics of the plague have generally supervened on an unusually sickly season—this being only an exaggeration in amount and intensity of the usual endemic disorders.

Says Milroy: "Sydenham's account of the epidemic constitution, previous to the Great Plague of London, may be taken as typical of what usually occurred in respect of the disease during the sixteenth and seventeenth centuries in England, and in other parts of Europe. In the spring of 1665 catarrhs and pulmonic disorders were very prevalent and fatal. About the same time a bad form of fever, attended with vomiting, diarrhœa, etc., began to be very common, and this was increased in severity as the season advanced. Towards midsummer, cases of this fever (which Sydenham calls pestilential) were accompanied with buboes and carbuncles on the surface; then only was it recognized and designated as the plague. The pestilence went on increasing in deadliness until the third week in September, when nearly eight thousand died in the course of a week, although two-

thirds of the inhabitants had by this time fled from the city. It had then reached its acme, and forthwith began to abate. It very nearly ceased on the approach of cold weather; a few sporadic cases only occurred during the winter and following spring. The same form of fever, however, as had preceded the first recognized cases of the plague, was again observed throughout 1666; but it was not so general as in the previous year. Sydenham expressly says that it was of the same species as the plague, only not so violent—revera enim cum ipsissima Peste specie convenit, nec ab eâ nisi ob gradum remissiorem discriminatur." It has been frequently observed that the plague thus seemed to grow out from some less malignant disorder, and after running its deadly course, to lapse back into the former, or pass into some other comparatively mild, but widespread, disorder.

The influence of season on the plague has already been dwelt upon. In whatever country it may manifest itself, it is always at its height in that part of the year when the weather is hot and moist. To cause an epidemic, heat and moisture are essential, and should the season become dry and cool, the plague is at once stayed. On the other hand, it has always been noticed that the great plagues have been coincident with unusually oppressive and debilitating weather.

The general influences then which cause the plague are:

A marshy, alluvial soil.

Badly-constructed, illy ventilated, and crowded tenements.

Filthy habits of the population.

Putrescent animal matter within, or adjacent to, the habitations.

Unwholesome foods.

Physical and moral wretchedness.

The immediate predisposing cause may be set down to be the conjunction of the above with:

An unusually warm and moist atmosphere.

The individual causes of plague are:

A lengthened stay in the atmosphere of the sick.

Intense and prolonged anxiety or fear.

Excessive bodily or mental exertion.

Previous debilitating diseases.

Predisposition toward febrile disorders.

Poverty.

Including this hasty review of the ætiology of the plague, I cannot do better than refer to the testimony of M. Villermé, who has with great ability discussed the general question as to the origin and diffusion of epidemic diseases, and who has very satisfactorily shown that they invariably become less frequent and less destructive in proportion as countries pass from the miseries and degradation of barbarism to the social comforts of civilized life. Dr. Aubert-Roche also has with much care examined this subject, and he enforced the same state-

ment in almost identical language; in all times, and in all places epidemics have disappeared before civilization, and have returned with the lapse of the nation into barbarism.

Pathology.—The plague-miasm decomposes the blood, so that, even during life, it is dark in color, with increased fluidity and imperfect coagulability. The clot, when formed, is friable and presents very different physical characteristics from that of good blood. If a portion of blood be drawn during life, and be allowed to stand for a short time, oily globules will be noticed upon its surface, and the whole mass soon putrefies. In this respect the plague-miasm produces pathological changes closely resembling the viper-venoms, particularly crotalus; but this poison acts more intensely on white persons than on negroes, while the plague is quite the reverse.

The most characteristic effect of the plague-miasm is upon the glandular structures. The whole lymphatic glandular system, internal as well as external, is inflamed, swollen, or softened, according to the stage of the disease or the severity of the attack. Bulard has found the entire chain of glands from the groin to the solar plexus enormously swollen, forming with the arteries, veins, and nerves a compact mass, imbedded in extravasated blood (Milroy). These changes in the lymphatics, according to Clot-Bey, begin by simple induration, and the patient may die from the toxic effects of the poison on the nervous system before the disease has made any special progress among the lymphatics; but it is said that in all necropsies, even those in which death follows within two or three hours of the attack, a manifest impairment of glandular structures is found. If death is delayed, the process of inflammation goes on rapidly with increasing hardness and tenderness, followed by dark-colored softening and putrescence. The course is somewhat similar to a gonorrhœal bubo, but much more intense. According to Rummel, in 2700 cases, 1841 had inguinal buboes; 569 had axillary buboes; 231 had maxillary buboes. Although buboes are frequent in the glands of the neck and at the angle of the jaw, the salivary glands are very rarely affected.

The viscera exhibit the usual phenomena which are observed in those who have died from any of the malignant congestive fevers. They are gorged with disorganized blood, swollen, softened in texture, and in many cases abscesses have formed; the spleen is especially implicated. The serous sacs, particularly the peritoneum, the pleura, and the cerebral ventricles, are loaded with a sanguinolent serous effusion. The stomach is frequently found to contain a dirty, offensive fluid, which has exuded from its walls. Patches of ecchymoses are found upon the skin, the various mucous surfaces, the meningeal membranes, and the peritoneum and other serous tissues.

Next in importance to the blood changes and the glandular enlargements, is the phlegmonous dermatitis, or carbuncles, found in nearly

all cases, and assuming a frightful malignancy in some. These may be limited in number to one or two, or may amount to twenty or more; their number bears no relation to the consecutive symptoms, and they do not differ pathologically from similar inflammations occurring under other circumstances.

Symptoms.—After an incubation of uncertain length, but supposed to vary from two to seven days, according to the amount of the plague-miasm absorbed, certain definite phenomena appear. These may be divided into three stages: invasion, febrile, and bubonic.

1. *Invasion.*—This begins suddenly, like a stroke, with physical and mental collapse. Then quickly follow rigors, nausea, headache, dizziness, oppression in the præcordia, and sometimes vomiting and diarrhœa. In this pre-febrile stage, the patient exhibits the ordinary phenomena of intoxication. The gait is staggering, the speech awkward, the countenance heavy, stupid, or distorted, the eyes suffused, and thought slow, uncertain, and disconnected.

2. *Febrile Stage.*—This, after a lapse of a few hours, or perhaps even a day or two, begins with a prolonged chill. Then follow most of the ordinary characteristics of typhus fever. The pulse is frequent, irregular, and weak, and respiration is accelerated; the skin is hot, the lips cyanotic, the tongue coated, dry, and cracked, and the breath is fœtid; there is great thirst, with vomiting; the vomited matters are usually black. Delirium is present, and may be mild or obstreperous. In some cases there is stupor and syncope. The bowels may be constipated or relaxed; generally the latter. The stools are dark and offensive. The urine is scanty, frequently bloody, and sometimes suppressed. Sordes gather on the teeth, crusts form in the nostrils, and hæmorrhages may occur from any of the outlets of the body. This stage may continue for two or three days, or, in the most malignant type, may pass in a few hours.

3. *Bubonic Stage.*—With the appearance of the buboes, the temperature generally declines, the pulse becomes more natural, and the cerebral symptoms disappear. A peculiar, sticky and odorous perspiration occurs, and with this usually begins a tendency towards recovery. If, however, ecchymoses or profuse hæmorrhages appear, the chances of saving the life of the patient dwindle rapidly. Carbuncles usually break out at about the same time as the buboes. They are most frequent on the lower extremities, on the nape of the neck, and on the buttocks. These buboes and carbuncles are nature's method of eliminating the poison; their suppuration is considered favorable, and this should be encouraged.

Convalescence begins about the seventh day, although, from various causes, it may be delayed until the fourteenth. It is apt to be more prolonged than in other malignant fevers, on account of the continued suppuration of the buboes and carbuncles. Sometimes the patient

passes into a low febrile state, with furuncles, abscesses, and other debilitating concomitants. Slight exposure often brings on pneumonia, to which these patients are peculiarly prone.

An attempt has been made by almost numberless authors to divide the plague into varieties. But these groups seem to represent merely variations in malignancy. The virulence of any particular epidemic seems to depend not upon any difference in the constituents of the disease, but upon the previous condition of the community, the unseasonableness of the weather, and the crowding together of the infected by a false system of quarantine.

Diagnosis.—It is one of the curiosities of this distemper that "on first breaking out the disease has never been known to be the plague." Although this doubtless has been partly due to the extreme and universal unwillingness to admit the presence of so dread a disease so long as it could be covered up, there are two very good reasons which have always existed at the beginning of the plague to furnish the basis of an honest doubt. The glandular swellings and the carbuncles, which are the significant evidences of this disorder, also occur in connection with the intermittent fevers of the same district; not to the same extent, nor with the same malignancy, but still sufficient to obscure diagnosis. Again, as it has been pointed out by many writers, the invasion of the plague is insidious. It never begins as the plague, but always as a constantly augmenting sickliness, a tendency of all diseases to become malignant, and a merging toward the typhus type; finally genuine cases of the plague appear. When the distemper has thus declared itself, all doubt is at an end, but there does not appear to be any rule by which it can be differentiated during the formative period. Some authors have endeavored to base a problematical diagnosis on the supposed extreme contagions of the plague; but, says Milroy, "to make use of so uncertain and variable an attribute as the contagiousness, or the degree of contagiousness, of an existing fever, as a diagnostic mark of the plague—as some nosologists and other medical writers have done—is obviously illogical, and must inevitably serve to mislead. In the case of the malignant Danubian fevers, several of the Russian medical officers denied their pestilential character, on the sole ground that no distinct proofs of '*contagion par attouchement*' had been observed, while they admitted that all the symptomatic characters of the true plague were present. Many similar instances might be cited where this fallacious test has been employed Indeed, most of the absurd errors in the history of the disease during the present and last century may be traced to this very source."

Prognosis.—While always a distemper to be dreaded, the plague differs greatly under varying circumstances in its proportional death-rate. Cases occurring in the early part of an epidemic are more likely to be fatal than those in the latter part. The condition of the atmos-

phere has much to do with the death-rate, this increasing in proportion to the humidity and temperature of the atmosphere. Death may occur at any stage of the disease. It has doubtless often been induced more by fright than by the malignancy of the distemper. In severe cases death is likely to occur on the third, fifth, second, and sixth days. In mild cases death may occur at the end of the third week as the result of the debility induced by suppuration of the buboes. Deaths vary under different circumstances from about nine per cent. up to ninety; the average, under fairly good surroundings, is about twenty per cent.

Treatment.—Homœopathic medication, it appears, has never had an opportunity of proving its efficiency in the treatment of this distemper. Whether we could do more than avoid the baneful effects of "over-active and meddlesome medication," which the more advanced students of epidemiology in the regnant school now admit the approved plans of treatment to be, remains unsolved. Says Milroy, certainly one of the very best authorities on the plague: "The perusal of recorded histories of cases of plague, as observed at Malta in 1813, and in Egypt in 1835, leaves the impression on the mind that the patients would have fared better had they been treated with light nourishing food and cordials frequently administered, together with simple saline or acid medicines, and without active purgation, bloodletting, and such energetic measures. The treatment which is most suitable for ordinary typhus is doubtless that which is applicable to the plague. In anticipating or in estimating results, it is always most needful to have regard to the period of an epidemic when the remedies have been employed; otherwise, the most misleading mistakes may be fallen into respecting the value of remedies or modes of treatment. I cannot better close these remarks than by quoting the words of a recent writer (J. Davy, F.R.S.), in regard to the treatment of other bad forms of fever: 'In considering this subject it should ever be kept in mind that not only in different situations and countries, but also in different years, these diseases, whatever the form of fever, may vary more or less, and if not in type and character, at least in intensity and complications; so that the remedial means which may have been found useful in one epidemic may fail in another, each, it may be, having a constitution of its own. We are told by Sydenham how difficult he found it, on the breaking out of an epidemic, to determine on the best mode of practice to be pursued, and how he came to a decision only after *ingenti adhibita cautela, intestique animi nervis*—an example this, well deserving to be followed.'" Which is not so very different from the homœopathic maxim: *Individualize your cases.*

In the August number, 1879, of the *North American Journal of Homœopathy*, page 63, Dr. Constantine Hering says: "Lorbacher proposes

as the main remedies for the plague: *Lachesis*, *Arsenicum*, *Carbo vegetabilis*, *China*, *sulph.*, and *Arsen.*, *Phosphorus*, *Secale*, *and Anthrakokali.* We may mention here our proving of *Badiaga*, which might be considered a remedy against the plague. What Lachesis will do is uncertain. Still more uncertain is Arsenicum. China arsen., not being proved, we may leave aside altogether. Secale is another drug only known by poisonings. Anthrakokali very likely will be of great importance in the plague. *Kali phos.*, proposed by Raue, we permit ourselves to mention as very promising. *Stramonium* has more similarity to the plague symptoms than *Belladonna*, and *Silicea* more than *Hepar.* Loimine, a preparation of the pus of the plague, brought here by Dr. Theuille, has cured cases of the greatest importance; one with suppurating swellings along both sides of the neck, and cured them permanently." In addition to the remedies mentioned by Hering, I would like to suggest *Crotalus*, as possessing analogically a more intimate relation to the plague than either Lachesis, Arsenicum, or Phosphorus; though here again we cannot know what is the right remedy until the patient is before us, or what a remedy will do until we have clinically tested its efficacy.

DYSENTERY.

BY F. H. ORME, M.D.

Synonyms.—Dysenteria; Inflammation of the large intestines; Colo-rectitis; Bloody flux; Tormina; Catarrhus intestinalis; Febris dysenterica; Dysenterica epidemica, etc. The term is derived from δύς, hard, difficult, and ἔντερον, an intestine.

Definition.—A constitutional febrile disease, characterized by inflammatory action in the different tissues—principally the solitary and tubular glands—of the large intestines, abdominal tenderness, with tormina and tenesmus, the frequent urging to stool being marked by difficult and scanty discharge of mucus, slime, or gelatinoid exudation, all commonly mixed with blood, at times with pus and shreds of false membrane; peculiar, sickening, and often putrid and cadaverous odor, nervous prostration, sometimes resulting in ulceration and sphacelus with corresponding dejections of great variety in color, odor, and consistency.

History.—Probably no disease is older than this. At all events, descriptions of it are contained in the works of the oldest writers on medicine. It has been found in all regions of the globe, so far as we have any account of the diseases of the different countries, and is therefore to some extent universal.

The various characters of the disease presented through the past centuries by different authors emphasize the view that an affection classifying under a certain definition, may still offer a variety of phases, account-

ing, in a measure, for the diversity of opinion as to its nature. A brief experience in medical practice usually informs the novice that diseases do not trouble themselves to conform to descriptions—do not dance to the music of the books. This fact is constantly and forcibly impressed upon the mind of the careful student of diseases, and especially in the case of dysentery, with its multiplicity of forms.

From Hippocrates down we have more or less elaborate descriptions of diseases of this nature—the symptoms varying with season, locality, and other circumstances. Occasionally an epidemic has been described which, while evidently dysentery, was of so peculiar a form as to be unlike cases commonly met with in general practice. Indeed, it may be observed that many of the most extensive treatises upon the subject have been written from the standpoint of those who have had special experience with particular epidemics; so that the descriptions given answer better to the disease as it occurs in tropical countries, in army or hospital practice, than to the cases ordinarily seen by the physician in civil and family practice.

The older English authors, especially, have drawn largely from accounts of the disease in India, and there is much in these writings that will be found of no value to the American practitioner who desires knowledge of the disease as it is likely to present itself to him.

The history of the disease in this country corresponds largely with that in other countries as regards the conflict of opinion concerning its nature and treatment. Experience with it, at least, has certainly been quite extensive.

Surgeon J. J. Woodward, in Part II., Vol. I., of the *Medical and Surgical History of the War of the Rebellion*, computes the number of *deaths* from diarrhœa and dysentery in the Federal army during the war to have been 57,265, even excluding other cases which should properly have come under these heads. "These disorders," he says, "occurred with more frequency, and produced more sickness and mortality than any other form of disease. They made their appearance at the very beginning of the war, not unfrequently prevailing in new regiments before their organization was complete, and although, as a rule, comparatively mild at first, were not long in acquiring a formidable character. Soon no army could move without leaving behind it a host of the victims. They crowded the ambulance trains, the railroad cars, the steamboats. In the general hospitals they were often more numerous than the sick from all other diseases, and rivalled the wounded in multitude. They abounded in the convalescent camps, and formed a large proportion of those discharged the service for disability. The majority of those who were so unfortunate as to fall into the hands of the enemy suffered from these affections. Finally, for many months after the cessation of the war, and after the greater portion of the troops had returned to their homes, deaths from chronic diarrhœa and

dysentery contracted in the service continued to be of frequent occurrence among them."

The number of cases of diarrhœa and dysentery actually reported by the medical authorities of the Federal army during the war—which was, of course, far short of the number of cases really occurring—was 1,739,135, the number of deaths being 44,558, a percentage of mortality of about 2½. But the cases of only one day's indisposition were included here.

Dr. Joseph Jones, who made careful investigations into the character of the diseases of the Confederate troops, and whose opportunities for personal observation were large, was convinced that diarrhœa and dysentery "destroyed and disabled more soldiers in the Confederate armies than gunshot wounds."

This is a history that exhibits the prevalence of the disease under consideration as well as its often intractable nature, and when we remember that the army experience was not far from what is observed in civil practice—when we bear in mind that it has spared no region, no race, no sex, no age or condition—that it is found during all seasons sporadically, and at times epidemically, we do not wonder that it has engaged the most earnest attention of the ablest physicians of all times, and that the discussions as to its nature and as to the best methods of its treatment have been numerous, animated, and attended with the usual amount of diversity of opinion which is due to observations made from various points of view.

Ætiology.—The synonyms for dysentery are quite numerous, Dunglison's dictionary giving twenty-eight—while, in the course of recent reviews of the literature of the disease, nearly twice that number have fallen under notice. These various terms indicate the multiform character of the disease, and show the varieties chiefly met with by different authors, as well as the different views concerning the ætiology of the disease.

It will be observed that the terms "specific" and "contagious" are not included in the definition above given, while they are often embraced by authors upon the subject. The omission is intentional, and is the result of careful consideration. The purpose of this work is to avoid speculative matter, and certainly the questions as to the specific and the contagious nature of the disease have been wrangled over enough to show that they are at least in dispute.

To hold that dysentery is always a *specific* disease, when it is known to occur from such causes as produce also other affections, is by no means logical; while to contend that such epidemics as are known to occur are independent of any specific agency, would be quite as unreasonable. Of one thousand men lost in a swamp, in a non-malarial district, and remaining through a chilly night, unprotected and poorly clad, a number will become sick—some with rheumatism, some with

pneumonia, bronchitis, etc., while others, from the same exposure, will be victims of dysentery—the atmospheric condition being the common, non-specific cause of all the cases. The reflections which will arise upon a careful consideration of such facts, will be a sufficient comment upon the "specific question."

The question of *contagion* is less readily disposed of. Were dysentery known to be always due to a specific *contagium*, as is the case with variola, scarlatina, etc., little more would need to be said upon the ætiology of the subject. But other causes are certainly known to exist, while the extensive literature of the disease abounds in discussions and diverse testimony and opinion upon this most interesting question with regard to the nature of the cause of the disease.

The older writers, and those of Europe and more distant continents, are found to sustain the view of a *contagium* to a much greater extent than the more modern authors, and especially those of the United States.

To go back no further than Cullen, we find this eminent author speaking of a *pyrexia contagiosa*—a species of dysentery always contagious. Sydenham, in treating of the subject, makes no mention of contagion. Willis, speaking of the same epidemic, expressly asserts that it was *not* contagious. Bateman regarded it as at times contagious in camps and hospitals—not in private practice in London.

A number of comparatively modern European writers have described instances of what was to their minds unquestionably a contagious dissemination of the disease in camps, hospitals, etc.; while other authors simply quote these without expressing their own opinions. It is to be noticed that nearly all, if not all, of those observers who have insisted upon a miasma or a contagion as the cause of the disease, have done so as the result of army experience; and we must remember that in times of war there is often such a crowding together of men under the most adverse hygienic conditions as is likely to produce the most intense forms of whatever diseases may exist; so that here, if anywhere, the quality of contagiousness might be expected to arise.

In some of the epidemics reported as contagious, it seems not improbable that a complication with typhus, which is contagious, may have led to the opinion, a complication with typhoid in this country being not uncommon.

Undoubtedly there are physicians of great learning and astuteness, having excellent opportunities for forming a judgment, who hold to the opinion that there have at least been contagious epidemics of the disease, and that, under similar conditions, similar epidemics may again appear; but the number of such appears to be not large.

In the hospitals, during the war of 1861–5, in both armies, cases of dysentery were generally mingled with those of other diseases, and treated through their whole course, some of them necessarily proving fatal; but the experience was not such as to lead to any general order for the separation of such cases, or a discontinuance of the usual system—the invalids from other diseases, the nurses, and the physicians feeling unconcerned as regards any fear of contagion. Many thousands of dysenteric cases were furloughed and dismissed, and went to their homes to be cured or to die; but no case has come to the knowledge of the writer of the spread of the disease from contact with these. European experience during wars generally, but not invariably, has corresponded with this.

How many hundreds of thousands of cases of the worst forms of dysentery have occurred sporadically in all countries, and resulted in death, without the extension of the disease to other individuals? Certainly, contagion is not an indispensable element, either as a cause or a result.

A number of physicians of large army and civil experience have been consulted as to their views upon this question of contagion, and all have been found to hold to the view now expressed: that, whatever may be, or whatever may have been, the experience in other lands, in the United States dysentery is rarely or never contagious, especially when the regulations of modern sanitary science are observed.

With all this inclination to the view that dysentery is at least not generally contagious, the question must still be regarded as in dispute, and all action should be taken upon the side of safety. He would be a bold man who, in the face of all the testimony upon the subject, would assert that no contamination can occur from the discharges in a form of the disease which is accompanied by the production of a pseudo-membrane which so much resembles that of the diphtheritic membrane of the throat, the infectious nature of which is scarcely, if at all, a matter of dispute. While the evidence is not complete, there is still some reason for suspecting a contagious character connected with the discharges from dysenteric patients, in some cases—especially if there should be a typhoid complication. There is enough under this head to make cautious any physician who has the care of the health of families, and to require him to see to it that there shall be no possible chance for contamination of atmosphere or water—for surely there is nothing that savors of wholesomeness about the discharges of diseased surfaces of any kind.

Dismissing the important question of contagion in the ætiology of dysentery, we find *endemic* and *epidemic* influences demanding attention. These are enigmas with which the most eminent of the profession have long wrestled, and to a great extent ineffectually. *Semina morborum* seem to exist, but who has beheld them? Who can demon-

strate them? The old humoral pathologists insisted upon their presence, but who has disclosed them to our view? That such influences do exist, at least figuratively, is undisputed, but all attempts at their explanation seem to have resulted in failure, and none will be made here.

The disease is known to be *endemic*—occurring in certain localities independently of perceptible atmospheric or other conditions—the cause of this, as in the case of many other diseases, remaining in obscurity.

Epidemic influences are quite as well known to exist, and are quite as occult and inscrutable. Certain conditions coinciding with the occurrence of one epidemic are supposed to occupy the relationship of cause and effect—while another epidemic, apparently similar, is found to prevail when those conditions are notably absent—and so theorists are overthrown—so the factors elude us.

Omnia vivum ex ovo, is an accepted doctrine as regards living beings, but may not be true as respects diseases arising from the *combination of conditions* which, in their variety, are endless. There are examples of peculiar epidemics of dysentery, as of other affections, the parallels of which have never been seen. The wave of influence which passed over this country in 1872–3, known as the epizoötic, affecting man and beast, was an illustration of such an affection. We may conjecture that as regards some of these cases, they are due to a concurrence of contingencies entirely unknown and undiscoverable to us, which might not arise again in an infinity of time; but this does not solve our problems. Why there should be an epidemic of dysentery in a place in one particular year, when the conditions of that locality are apparently the same every year, is what we may never know—but we know of such occurrences. There seem also to be periods of time during which these are more prone to occur—for example, from the year 1847 to 1856 various epidemics occurred in the United States.

Niemeyer and Heubner prominently, but, of course, some other modern authors with them, believe in a *miasm* produced by heat and moisture, as a cause of dysentery, which may become contagious; but the theory evidently fails when we recall the fact that the disease occurs in high latitudes and in cold climates—having been known, like cholera, to exist in St. Petersburg in winter.

Besides these apparently unknowable causes, many others, with which we are somewhat better acquainted, are credited with being causes, or at least factors in the causation, of dysentery. Those conditions which are generally supposed to produce what is described by the general name of *malaria*, are also supposed by some excellent observers to produce in some cases dysentery, characterized by the intermittent or remittent features of the fevers found in certain districts—and this

opinion is the more strenuously maintained on account of the success attending the treatment of the disease by the antiperiodic remedies which were used in overcoming the malarial fevers. Undoubtedly, malaria may, and does, act as a predisposing cause, and forms a complication which demands important consideration in the treatment of cases occurring in localities where malaria is known to exist; but that it has ever, by its unaided influence, produced a typical case of dysentery has probably never been proved. As well might *a scorbutic condition* be cited as a cause, because it certainly complicates and gives a formidable character to many cases of the disease.

There is ample evidence to show that typhoid, and what is called typho-malarial, fevers frequently co-exist with, and complicate in a serious way, the disease under consideration. And so it is with many other affections.

But little experience and reflection are needed to satisfy one that any of the various cachexiæ, or any conditions of circumstances or disease that lead to exhaustion—phthisis, cancer, kidney diseases, fatigue, loss of sleep, etc., by diminishing the resisting powers of the system, predispose to the disease and increase its mortality.

Those who have ascribed the disease to low forms of animal and vegetable life have not, so far, succeeded in establishing their theories. For a time the bacterists were confident of having discovered the ultimate and certain origin of the trouble—but the subsequent discovery that these various micrococci and bacteria are found in normal fæces, and that these humble forms of life are found about all putrefying nitrogenous substances, has robbed them of their fancied glory, and shown them that the search for the *materies morbi* must still be pursued. Anything more than a reference to this part of the subject would be out of place here, for the literature of this department is too large for any but the specialist.

Outside of the causes referred to the most usually assigned general cause of dysentery is the *alternation* of *hot days with cool nights*, which corresponds well with the season of the year in which the disease is most prevalent, which is the latter part of summer or autumn. But, as it is by no means confined to this or any other season, this factor will probably have to be considered a predisposing rather than a producing cause, or, at best, a limited cause.

Faulty alimentation is chargeable with a considerable proportion of cases. Bad water is a constantly suspected source of the trouble, but there is no real ground for ascribing the disease, to so great an extent as has often been done, to the water of the Mississippi River, or to that of watercourses generally. Careful investigations in this direction have shown that the supposed relationship of cause and effect in these cases does not exist. But it still appears probable that the disease is conveyed by water charged with decomposing fæcal matter. Water

tainted with decomposing *organic matter*, of either animal or vegetable nature, is to be regarded as dangerous, although there may have been exaggeration as to the extent of this.

Water charged with *inorganic matter* is found to be, at times, an excitant of dysentery when a predisposition exists—the condition of the intestines being such as not to bear the stimulation of the more active mineral waters.

Aerial effluvia are probably more potent causes of dysentery—this sort of malaria having more certainly produced the affection. That arising from battlefields where the slain were allowed to decompose appears at least to have spread the disease, and epidemics have often been assigned to such causes.

Errors in diet are a prolific source of the disease, both directly and in combination with a predisposition, or with other causes. The drinking of *cold water*, while a possible cause, has been unduly charged. In the Southern cities, where cold drinks are used with great freedom, they are not found to be deleterious to any great degree, or especially in this direction.

Putrefying substances, certain fungi, and an excessive use of certain irritating medicines, are undoubtedly direct causes of the disease.

Fruits in excess, especially in an unripe condition, are so generally feared as a cause of this trouble that their avoidance need not be urged in dysenteric seasons. The error is liable to be upon the other side. A reasonable use of ripe fruits in season, being conducive to health, is more likely to be preventive than provocative. The history of the disease and its treatment, especially during the last war, shows that improvement in cases of chronic diarrhœa and dysentery often dated from the procurement by the soldiers of fresh fruits and vegetables, either clandestinely, in spite of directions of surgeons, or when issued to the soldiers as rations. Green corn roasted, when the men had been for some time without a fair allowance of vegetables, was found to be beneficial in many cases. One surgeon reported a number of cases cured with raw Irish potatoes and vinegar. Watermelons and peaches were also found to be beneficial and curative in many cases, especially where there had been a strong craving for these articles.

Anything that causes intestinal irritation may, under some conditions, produce dysentery, many cases really commencing as gastro-enteritis. It would appear that almost anything which will produce diarrhœa may, in other cases, cause dysentery. They are certainly often found to exist contemporaneously. In the surgeons' reports of these troubles during the war many of the cases reported by some as chronic diarrhœa, and by others as chronic dysentery, were in reality of the same nature, as was disclosed by post-mortem examinations. Dysentery, then, may be feared as a result or extension of the irritation or inflammation which in the small intestines constitutes diarrhœa.

For this reason, as well as some others, much diversity of opinion is shown as to where the one affection ends and the other commences. The two are often mentioned together, occurring, as they do, under similar circumstances, and the fact that similar methods of treatment appear equally efficacious for both seems almost to negative the proposition that there can be a separate *specific* cause for each. In extreme cases of chronic dysentery and diarrhœa all had a similar appearance, being anæmic, wasted, with feeble circulation, slender powers of endurance, hard and dry skin, scanty urine, frequent dejections of varied character, and with similar complications.

Indigestible food is an indisputable factor, if not a sufficient cause in itself under some conditions—the excitement being caused in the gastro-enteric region, and continued to the lower bowels, where it becomes more intractable.

Virchow's idea that *ammoniacal compounds* set free by putrefactive changes in the nitrogenous matters of the food are liable to give rise to dysentery is an ingenious chemical speculation; but certain antiseptic chemistry of the system probably overcomes such tendencies, or we should have dysentery in proportion as we have constipation.

The abnormal secretion or excretion of *urea* vicariously by the intestines is, perhaps, the only one of which we have positive evidence as a cause of dysentery. Upon failure of the kidneys to take the urea from the blood, it is eliminated through the skin and bowels. This, converted by the fermentations constantly going on into carbonate of ammonia, forms an irritant which is mischievous.

Congestion of the portal circulation has been assigned as a cause, but is probably simply a coincident condition.

The *scybala*, of which there is such frequent mention as a cause of dysentery, have doubtless, like many other suggested causes, been over-estimated as a factor, being rather a concomitant than a cause—and certainly not always coexistent. So far from constipation being a precursor of, or an attendant upon, the disease, the opposite condition really more frequently exists; and constipation is not noticeably more frequent in dysenteric regions and times. Were constipation a cause, to any considerable extent, there should be some correspondence as to the existence of the two troubles, and dysentery should exist where we have constipation most common.

Altered and *vitiated secretions* of the sick may be a cause—but even this is questionable. *Abnormal bile* does exist, but is it not rather a result of the morbid state?

Bile is sometimes increased, at other times diminished. When free, the cases are usually more intractable, probably because there is a more profound disturbance of the secretions generally. It appears to act rather as a cause of continuance than as an excitant. The reason of the observance of bile in a free state is that it is not used in the course

of digestion—not much food being generally taken, or the action of the bowels being such as not to allow time for absorption.

There is a class of physicians who appear to suffer from "liver on the brain," and who trace almost all disorders primarily to the liver as the peccant organ—forgetting that consistency would forbid their assigning a disease to opposite conditions of that gland. Eberle remarks that "the hepatic and cutaneous functions are always inactive in this affection, the alvine discharges being invariably free from bile," an observation which certainly does not correspond with the general experience of the present day. "Bilious" dysentery is a very common term, and represents a very common form of the disease.

With children, the irritation connected with the period of *teething* is at least a common predisposing cause, and is even credited with being a sole cause in many cases. In these, the dysentery is usually preceded by more or less gastro-enteritis—the inflammation becoming more severe and obstinate as it proceeds to the lower bowels.

There are obscure causes of irritation which produce bronchial irritation in some, but cause intestinal irritation and alvifluxus in others—the election of organs being dependent upon predisposition. As no chain is without its weakest link, so is no system without its most assailable organ—and thus many of the common causes of general sickness may be the causes of dysentery. An impression upon the peripheral nerves, by reflex action through the vaso-motor nerves, may be, and probably is, one of the most prolific causes of dysentery; so that he who would be safe against attacks of the disease must keep his person well protected, look well to his diet and mode of life generally, and avoid unhealthful localities.

Pathology and Morbid Anatomy.—The most usual form of dysentery being the catarrhal, the pathological condition of the mucous membrane of the large intestines in such cases is that of a congested and inflamed membrane generally—it is thickened and red, with increased functional activity. At later stages it is darker or purplish, and softened. This form may continue for a time without complication, and recovery is the rule—but it not unfrequently happens that this leads on to a more formidable description, in which a false membrane is formed over parts of the mucous membrane which prevent the usual discharges from the glands beneath, which membrane itself eventually becomes disorganized and by degrees sloughs off, leaving an ulcerated surface—the most dangerous form of ulceration, and liable to become chronic.

Follicular ulceration is a common condition, a number of the follicles having minute ulcers at times, while at other times there is more extensive destruction, in which cases the ulceration extends through enough of them to constitute a large ulcer. The pseudo-membrane is sometimes found occupying spaces between the follicular ulcerations.

The most general state of severe dysentery is in the solitary glands, which in many cases are enlarged from the first, secreting a mucous or gelatinoid fluid, which exudes from its confinement, rupturing capillary vessels, more or less, and constituting the jelly-like discharge so frequently met with, mingled to a greater or less degree with blood. Ulceration is a common result of this inflammation of these glands, which are not only themselves destroyed, but the destruction includes the submucous connective tissue, so that the flow of the ulcer is upon the muscular tissue of the intestine. Indeed, it does not by any means always rest here, but at times cuts away through the muscular coats, through the peritoneal coat—constituting the much dreaded perforation which is generally fatal.

That definition of dysentery which classes it as simply an inflammation of the *mucous* coat of the large intestine is too superficial—for, if the muscular coat is not unfrequently found ulcerated to a considerable extent, there must more frequently, in all likelihood, be inflammation of this tissue to a degree falling short of ulceration.

At any step in the progress of the disease, there may be an arrestation of the morbid process, and recovery may take place by resolution, with a degree of rapidity proportionate to the promptness of the change; but, when it has advanced to the point of extensive ulceration, the course of cure is slow, partly from want of rest—the bowels being so frequently in a paroxysm of contraction—and from the fact that the granulation and formation of cicatricial tissue through which reparation is made is naturally a tardy process.

The seat of inflammation and ulceration in the bowels in dysentery is not so restricted or so distinctly defined as has often been thought. While, for convenience of treatment of the subject, definitions confine the disease to the large intestines, the reality of the case is that the same morbid states exist also in the small intestines to greater or less extent in many cases.

Dr. J. J. Woodward, in reviewing the reports of the surgeons during the war, with reference to diarrhœa and dysentery, in Part II., Vol. I., of the *Medical and Surgical History of the War*, and also in considering many cases of post-mortem examinations which came under his own observation—the diagnoses and histories of the cases being attached—makes the following observation: "Numerous records of post-mortem examinations show that the disease generally called chronic diarrhœa was an affection of the large intestine, which was thickened, softened, and ulcerated, or covered with pseudo-membrane, or both; in short, the lesions in the cases reported as chronic diarrhœa were identical with those reported as chronic dysentery." While it was common to find the large intestine alone involved, it was also common to find evidences of inflammation above the ileo-cæcal valve, and even far up

in the ileum. The instances in which the small intestines alone were involved were very few.

The pseudo- or diphtheritic-membrane which is found in a majority of autopsies in cases of death from acute or chronic dysenteries, appears to be a fibrinous exudation, often in a coagulated state, and resembling the membrane found in the throats of patients affected with diphtheria. At first white or yellowish, it varies with age, and with the accident of having infiltrations from hæmorrhages by which it is reddened, or darkened, and rendered of various tints by the change of the blood: or it is stained by inhibition of intestinal contents. It also varies in appearance during its progress toward disintegration, and with its softening comes the discharge of sloughs of various sizes, from an almost imperceptible mass of filaments, to fragments of membrane of considerable size—as large as several inches in length having been seen. With this is an odor of putridity, penetrating and sickening to an almost unbearable degree.

As there are no discharges from that part of the mucous membrane which is overlaid with the diphtheritic coating, the discharges which are found before the sloughing commences are from the parts of the bowels which are still in the catarrhal stage—so that there may be mucus and pus in considerable quantity before the diphtheritic membrane has softened. Subsequently softened pseudo-membranes give great variety to the character of the dejections.

Mucus, pus, gelatinoid exudation, blood, and diphtheritic membrane in a state of dissolution—these combined in different degrees and stages, come from an almost endless variety of appearances and odors.

The form of dysentery first referred to is severe and dangerous, and inclined to be chronic, but there is a form which, even when chronic, is not destructive, although it may last for an unusual length of time —unless complications supervene. It appears to be a condition of hypersecretion of the mucous glands of the intestines. Dr. J. Mason Good thus speaks of this form: "Chronic dysentery may, therefore, in its simplest and mildest state, be regarded as a *gleet* of the larger intestines, produced, as urethral gleet is, by a morbid relaxation of the mucous glands of the part affected, and accompanied with that sort of irritation which is the usual cause of increased secretion in debilitated organs." This form is sometimes spoken of as *diarrhœic dysentery* or *dysenteric diarrhœa*—but there is in such cases always danger of a change to the ulcerative form in the follicles, or to the pseudo-membranous character.

The violence of the dysenteric affection may prostrate the system so rapidly and profoundly as to cause death before morbid processes advance to a condition that can be recognized as that of dysentery. Cases have at least been observed in which death had occurred before

the diphtheritic membrane had been disorganized, or before there had been any sloughing.

Upon the disintegration and casting off of the false membrane, ulcerated surfaces are found of various dimensions and shapes—generally irregular. From these arise the continued discharges, in a great degree, varying of course in character with the stage of the ulcers. When the destruction is more than can be borne, the result is fatal; but many times the reparative processes of nature are sufficient to heal, by slow stages, even numerous and extensive ulcers, and cicatrices in numbers have been found to verify the fact. Although the ulcers may be of an excavating sort, the progress of the disease having been arrested, the overhanging edges, by contraction of the parts, are joined by the contact of the glands of Lieberkühn, and a puckered cicatrix is formed. Should the cicatrices formed by the healing of ulcers, either of the follicular or diphtheritic type, not be very extensive, no inconvenience is experienced; but, as may be inferred from the size of the pieces of membrane which have been referred to as having been discharged, these contracted cicatrices may be of such extent as to form actual stricture of the bowel; and so the apparently cured patient is again in a position of danger.

Gangrene is sometimes spoken of as occurring in dysentery, and it has probably been seen, but it is likely that a careful analysis of cases spoken of as "gangrenous," and in a state of "mortification," etc., would have shown them to be largely of the class spoken of as diphtheritic dysentery with its sloughing and ulcerations.

Perforation, as before indicated, leads to peritonitis, by reason of the introduction of fæcal matter and flatus into the peritoneum, and recovery from this condition is extremely rare. Still, post-mortem examinations have disclosed indications, in the way of cicatrices and adhesions, which would argue that such recoveries have occurred.

Pigmentary points, in patches, have been noticed in the large intestines in minute circles around the follicles, but not as extensively as in the small intestines—probably the result of some change of the blood detained by congestions, but the nature of this discoloration, which is somewhat various in tint, is not positively understood.

Every variety of tint has been found in the membrane between ulcers, whether between the commonly sharp-edged or punched-out ulcers of the follicular form (although these also extend to excavations) or the more ragged-edged and irregular shapes of the diphtheritic ulcerations.

Like every other disease which involves the general system, dysentery has complications, and the morbid anatomy shows quite a number. The condition of the liver is often changed, and abscesses, during some epidemics, have been somewhat common; but it does not appear that there is any constant relation between dysentery and any special

form of hepatic trouble. The liver, upon autopsy, has been found dark and light, indicating excessive and diminished action—healthy and diseased.

The gall-bladder has been found full and empty; containing much or little bile, and this of various qualities. Gall-stones have sometimes been found; but such appearances are doubtless simply discoveries of what existed independent of the fatal dysentery.

Tubercles in the mesentery have naturally been met with in many cases, and ulcerations of this character have quite frequently coexisted with those connected with the dysenteric process. General tuberculosis, in which the lungs have been much disorganized, has, of course, been found upon post-mortem examinations, but this is supposed to have no further bearing upon the case than to show that a wasting disease is prone to render any inflammatory disease fatal.

Typhoid fever has doubtless existed in some stage during the progress of dysentery, and has complicated it so as to cause mistaken diagnoses. Reports of post-mortem examinations have been made which showed that ulcerations of Peyer's glands have been in a healing condition when the patient was taken off by the ravages of dysenteric ulceration in the large intestines.

In the kidneys, various conditions of abnormality have been disclosed, but nothing that was necessarily connected with the dysenteric process.

Intussusceptions have occasionally been discovered, but not as frequently as has been suspected.

Pneumonia, pleurisy, and bronchitis, have all frequently joined with, and complicated, the disease. A congested condition of the lungs, probably hypostatic, has been commonly observed.

The urinary bladder has not generally been seriously involved, but occasionally it has been found vascular or congested.

The intestines are sometimes, but not always, distended with gas. The tympanitic distension sometimes found in chronic cases is due to a partially paralyzed condition of the bowels, which disables them from expelling the gas, or to contractions at points, which retain it, as is proved by the fact that free injections will often remove it.

Microscopical examination of the blood, pursued with much perseverance by specialists, has so far been without definite result.

Symptomatology.—The incipient stage of dysentery may not indicate the nature of the affection, from the fact that the symptoms are such as are common to a number of other disorders.

Acute dysentery of the most common form, that of an inflammatory catarrhal condition of the large intestines, may be ushered in by a chill or chilliness, with various feelings of discomfort, fever, nausea, and vomiting, achings in back and limbs, coated tongue, general malaise; but often it also commences without these premonitions of coming

disturbance, and proclaims itself abruptly by pain in the bowels, followed by urgent desire for their evacuation. After one or more discharges, during which the contents of the bowels are expelled, it is found that the desire for further expulsion is increased, the pain is greater and more frequent, there is a bearing-down feeling, as though one large, free action would give complete relief. There is sometimes a burning at the anus, and great straining, as if to expel some irritating or obstructing matter—the substance voided being now simply mucus or mucus mixed in various degrees with blood, and, later, with pus. Sometimes the mucus is of a jelly-like form.

Between the passages there is a period of comparative or complete repose, but soon there is a renewal of the griping pain, which has given the synonym of *tormina* to the disease. Another expulsive spasm comes on, in which there is a feeling as if the intestines were violently pressed together or drawn into knots; or there are colicky, cutting and twisting pains, again followed by straining, which is technically termed *tenesmus*, and which is the most characteristic of all the symptoms of dysentery.

The number of actions may be two or three a day, but often they amount to one every hour or half-hour, or are even so frequent as to seem to leave scarcely any interval between. No sooner has the sufferer left the stool than he is forced to return and strain again, and, whatever may be the nature or extent of the discharge, there is a sense of incompleteness, bidding him to still further exert himself toward the expulsion of some seemingly remaining fæcal matter. There is at times an aggravation of the trouble as evening comes on, and the night's rest is broken by the ever-recurring tormina and tenesmus.

This continual disturbance, with the wearing effect of the pain, soon tells upon the nervous condition of the patient; there is debility and anxious restlessness, with, at times, faintness and nausea, or even vomiting during the pain. The pulse may be considerably accelerated, and the temperature elevated, but frequently these symptoms are found with surprisingly little of such disturbance.

Cases which are not very profound in their nature may, in a few days, especially when under judicious treatment, begin to relax in severity; the discharges, which had scarcely shown any natural fæces, become more feculent, and the odor, which has been of the peculiarly offensive character incident to the disease, improves; the intervals between action lengthen, the nervous symptoms subside, and recovery gradually takes place.

The happy issue described above occurs, however, only with the milder cases, the severer forms advancing and furnishing further symptoms, and often passing on to a condition of chronic flux. The disturbances, instead of subsiding, may show that the case was from the beginning marked out as one of membranous dysentery, or that

the diphtheritic form has been superimposed as the case progressed. We have more pronounced evidences of inflammation in the bowels, and more constitutional disturbance. The pain is greater, and the discharges altered. The duration and eventual result of the case are now uncertain. There is danger of collapse even before the changes in the condition of the tissues would lead us to expect it. Extreme nausea may occur, the tongue may become brown and cracked, with great thirst, tenderness of the abdomen, increased by the presence of flatus; the countenance may become changed—icteroid or bluish—and anxious in expression, with sunken and glassy eyes—death soon following.

The sudden change above indicated not occurring, the case advances with increase of pain and aggravation of other symptoms. Digestion is disturbed, and emaciation goes on. The stools are more largely charged with pus and bloody serum, mixed with shreds of membrane in various stages of disorganization—sometimes in minute particles—giving to the whole the appearance of the scrapings of meat, and, therefore, referred to as *lotura carnium*. There is a putrid, penetrating, carrion-like odor attending this, which is peculiar, and which, to the experienced physician betokens the nature and severity of the disease. Indeed, the body sometimes exhales an odor that is cadaverous and characteristic. The sloughs may be large enough to be recognized as false membrane, being from a fraction of an inch to several inches in their longest diameter, but with these may be also portions of disintegrated mucous membrane, and there may be every variety of color in the dejections. Gray or ash-colored discharges are common when there is deficiency of the biliary secretion, as is usual, while a greenish appearance is given by unused bile, as well as by certain gangrenous states. Occasionally there is some fæcal matter, with mixtures of blood and slime of various qualities. The shreddy, membranous discharges distinguish the diphtheritic from the catarrhal form of the disease, which latter does not usually show such a variety in the nature of the matter voided. The diphtheritic coating of the bowel having sloughed away, there is left an ulcerated surface, from which come pus, blood, serum, and gelatinoid secretions, all of which constituents, commingling in the discharges, give a variety of appearances which it would be futile to attempt to describe.

Cases in this condition are at times attended by an adynamic fever, and many of the symptoms which are generally regarded as typhoid, and a diagnosis of typhoid fever has sometimes been made, while the name of *typhoid dysentery* has occasionally been attached to the affection.

During the progress of the disease, there is often a diminution, and sometimes a suppression, of urine. The urine is always dark, and there is, at times, strangury. Headache, and various cerebral disturb-

ances, are met with, and, as nervous exhaustion becomes extreme, there is delirium of a muttering character, with subsultus tendinum. The pulse is slow, or quick and small, the surface and extremities cool, and hiccough is a not uncommon attendant of the collapsing condition which now leads to death.

Chronic dysentery is distinguished from the acute form by very uncertain lines, the difference being one rather of quantity than quality. A flux that lasts beyond four weeks, with the usual features of acute dysentery, excepting as regards activity, and which appears likely to be continued indefinitely, is commonly called chronic. It is in most cases the sequel of acute dysentery or diarrhœa, for both lead to chronic dysentery. It is to be at least apprehended as a consequence of either of these; and there is really much difficulty in discriminating between chronic diarrhœa and chronic dysentery. Dysentery is known to be an extension, in some cases, of diarrhœa; and the autopsy of cases reported as chronic diarrhœa has often shown ulceration of the large intestines. The symptoms are much the same, the error having been due to the mistaken supposition that dysentery could not exist without its most general symptom, tenesmus. A sudden aggravation of the symptoms of a chronic diarrhœa or dysentery has been due to the supervention of acute diphtheritic dysentery, which has rapidly proved fatal. So the disorders evidently touch at many points.

A chronic dysentery may, however, exist independently of any very acute symptoms at the commencement. One or two rather painful actions may be had daily for a considerable length of time before the affection is distinctly recognized. The constitutional disturbance is slight, and there is no manifest threatening of serious trouble. The action of the bowels, however, eventually becomes more frequent, there is emaciation and loss of strength, the dejections are more unnatural; from being mucous and slimy, they show pus and blood; there is tenderness on pressure upon the colon; evidently the bowels are in a state of ulceration, and there must either be a curative process established or the course of the victim will be downward, with more or less of the symptoms before described.

It is chiefly in the chronic form of this disease that the wonderful variety of symptoms and conditions are shown; although, when it is remembered how many forms of endemic and epidemic dysentery there are, we can marvel at nothing in the way of variety. There is scarcely a symptom found in chronic dysentery that may not be found in some acute cases, and *vice versa*.

The discharges, which are commonly slimy or jelly-like—this jelly-like matter being often somewhat granular, looking like boiled sago—and mixed with blood, may be altered in color by food or medicines taken. The use of Calomel will sometimes give a greenish character, and the use of ferruginous preparations will, by the formation of a

sulphide of iron, darken the discharges. The gelatinoid substance, although usually a glandular product, is sometimes a form of starch, from food taken and not digested, as is shown by the application of an iodine test, which gives the characteristic blue tint. The white-of-egg appearance is one of the common forms of discharge. This may be clear, or more or less coagulated. Air or gas bubbles, churned with such in the intestines, give a frothy condition. Then there may be a creamy-looking, muco-purulent discharge—the pus in which is readily miscible with water, clearly distinguishing it. Different parts of the bowels often have different secretions at the same time—the discharges at one time being in accordance with the state of one part, while perhaps the next action may show the state of another portion. Fæcal matters, generally in the shape of hard lumps—scybala—occasionally accompany other matters, and, when these become more noticeable they may be generally regarded as harbingers of improvement, although not to be certainly relied upon.

Fatty particles are sometimes observed in the dejections in chronic dysentery. These are generally from the undigested food, especially when a milk diet is used. Nursing infants sometimes pass fat—and in many conditions of disease this occurs from the diminution or arrestation of the alkaline secretions of the liver and pancreas, which serve to emulsify and render fit for assimilation the fatty portions of the food. Excess of fats of any sort, cod-liver oil and such preparations included, will tend to increase this feature. In other cases the fat of the tissues seems to be extracted and discharged. The fat, mingling with other matter, is sometimes found in the shape of concretions or cheesy masses, which are discolored by biliary or other pigments.

Biliary calculi, being found in the gall-bladder upon post-mortem examination in some instances, may of course appear among the mingled matters of dysenteric dejections; but these need not cause perplexity, being firmer, and more easily recognized than some other materials.

That the vitiated secretions of the intestines should prove scalding and irritating to the extent of causing burning in the rectum, and even excoriation of the parts around the anus, is not surprising, and this is often one of the serious annoyances of the disease, more especially in cases of children. This feature may subside and reappear a number of times in the course of a protracted case, as the disease goes through its vicissitudes of aggravations and subsidences.

Some of the older writers use such terms as *rheumatismus intestinorum* as synonymous with dysentery; but the idea of *rheumatismus* with them corresponds with *catarrh* with us. Rheumatism of the muscular coats of the intestines may be a complication with dysentery, however, and give increased painfulness to the paroxysmal contractions of the non-striated muscular tissue—the tormina. Indeed, during

epidemic painful dysenteries, cases have been noticed in which much pain was complained of for days together, apparently indicating coming discharge, when no increase of secretion was observed.

A similar painfulness of the bladder has, in some cases, been observed during the prevalence of a dysenteric tendency, the bladder seeming to bear the brunt of the attack of the *genus epidemicus* instead of the bowels.

There appears, in some epidemics, and with some constitutions, to be a special tendency to hæmorrhage—a large amount of blood in proportion to pain, fever, mucus, etc. It is to this class of cases that the name of *bloody flux* is commonly applied. The severity of the disease is in such cases by no means in proportion to the amount of blood discharged—many of such being readily relieved, and even subsiding spontaneously in a surprisingly short space of time—while cases in which the stools are slightly mixed with streaks of blood may prove much more intractable. Blood, in the early stage of the bloody flux referred to, is a matter of very different import from that which attends a later stage in other forms. The former appears to be a discharge from the engorged capillary vessels, while the latter is often from vessels cut by ulceration. The odor which attends the former is not very decided. Generally speaking, the odor of dysentery, after once being well established, will proclaim the nature of the disease to the experienced physician who may enter the room of a patient in the act of defecation, or immediately after; and, if, in addition to this, the physician should have an opportunity to see the victim straining, with his face turgid—probably grunting, with a reluctance to leave his seat on account of a feeling that something more must be accomplished—the diagnosis will be confirmed.

The seat of pain in dysentery is not to be depended upon as indicating the locality of the inflammation or ulceration in all cases, nor is the degree of pain a trustworthy index of the extent of the morbid process. Pain has been referred to the "pit of the stomach," which is sometimes a reflex pain, or the seat of it may be in the transverse colon in an elevated position. Many cases of dysentery have run on to a fatal termination with comparatively little pain that could be called acute, and yet the bowels have been found ulcerated to a considerable degree. On the other hand, there has sometimes been found a blanched condition of the intestines, such as has been observed in cholera, when the symptoms corresponded with a case of painful dysentery.

Microscopical examination will disclose the nature of the discharges —glands of Lieberkühn and other tissues being distinctly recognizable.

It must be borne in mind that dysenteric affections may be so light as to be attended by no evidences of lesions in the discharges—and

many cases are met with in practice in which the trouble seems to be cut short very promptly by treatment, or even to subside spontaneously.

The discoloration of the dejection from blood may possibly be due to blood swallowed and allowed to pass undigested, as other substances are—merely undergoing changes from mixture with other materials, and with gases met with in the alimentary passages.

Prolapsus ani is a not uncommon attendant upon dysentery. The continued tenesmus, which is a reflex of irritation above, is aggravated by the acrid and irritating nature of the discharges, leading to a protrusion of the intestine, sometimes to a degree which renders assistance in returning it necessary, while there is, at the same time, redness and excoriation of the skin about the anus. This is a condition much more frequently found in children.

Hæmorrhoids are, of course, aggravated by the tenesmus; and owing to a peculiar anatomical arrangement of the hæmorrhoidal and vesical bloodvessels, the *bladder* may partake of the irritation in which even the *ureters* may become involved.

Fistula and *perinæal abscess* may occur in the forcible straining and ulceration which are concomitants of the disease.

Albuminous urine is not uncommon as an attendant upon diphtheritic dysentery, but is also common in other diseases.

The symptoms common to *malarial fever* are more generally met with as a complication in tropical countries, but are found in malarial districts in our own country.

When the disease has wasted the patient to a condition of anæmia and extreme debility, various complications are developed. Instead of severe pains we often find more gentle gripings and uneasiness, with flatulence, preceding the operations. Belchings, palpitations, faintness, tremors, pallor and ghastly expression are usual characteristics. *Dropsy* is not unfrequent, and *desquamation* occurs. It is not uncommon in this low state for the actions to become painless from loss of sensibility, and the tenesmus to cease from paralysis. The pulse is small and weak from the general exhaustion, and relief is found in death.

Duration.—The duration of dysentery is exceedingly indefinite; to state it at all would be to say: from a few days to a few years—for there is really this difference in cases. The third and fourth weeks number the greatest proportion of deaths. Improvement may set in at any time, and recovery may be prompt or tardy. Often the indications are flattering, with subsequent disappointments, so that the disease may be said to be capricious and uncertain both as to duration and eventual result.

Varieties.—Many varieties of dysentery have been mentioned by authors, but there are probably none which may not come under the descriptions in the foregoing paragraphs. *Epidemic* and *endemic* have

been treated of as different forms. *Contagious* forms have been supposed to occur as separate varieties, and the *acute* and *chronic* forms have been treated as though distinct. For practical purposes it is enough to know the meaning of the symptoms and to understand the pathological state.

In the present state of our knowledge in this country the most important distinction observed is that between the simple *catarrhal* and the *diphtheritic* varieties, and here we find that there is an overlapping and a blending which render this discrimination difficult excepting in pronounced cases. There are no other varieties which it is important to bear in mind; but under no circumstances must sight be lost of the fact that there is an almost endless number of complications, and that with those who are fond of discovering varieties, each case, on account of its complications, may be classed as a variety by itself.

Such terms as *sthenic*, *asthenic*, *hepatic*, *scorbutic*, *rheumatic*, *benignant*, *malignant*, *sporadic*, *red*, *white*, *bloody*, *typhoid* dysentery, etc., all of which have been used to designate what were regarded as special varieties of dysentery, upon reflection, and with frequent light upon the subject, will certainly not be insisted upon as representing really distinct varieties. It is almost a wonder that, with the propensity for forming varieties which has at times actuated the profession, we have not heard of *cold* and *hot* varieties.

That such complications or conditions exist as are characterized by the adjectival terms above referred to, is not disputed; indeed, these qualifying terms at times may not be well dispensed with, but they should be held to their proper use, as indicating a state of the system with which dysentery coexists, or a predominating feature which may be shown in the particular case or cases under consideration. *Variety*, in classification, is a term which should represent something more distinct and stable than a mere difference in the degree of this or that symptom which is common to many cases, or to the same case at different times.

Diagnosis.—Perplexity may arise in deciding whether a case in hand be dysentery or some other affection, but this state of doubt need not generally be of long duration. To distinguish between a mucous diarrhœa and a catarrhal dysentery may indeed be difficult, but fortunately it is not important; for the indications for treatment would evidently be the same. The pain of diarrhœa is not so prominent a symptom, and the more or less fæcal and free character of the stools of diarrhœa will distinguish it from the generally scanty stools of dysentery, which are usually of mucus or muco-pus, with mixture, in different degrees, of blood. The tormina, while initiated by other affections for a short while, will, if observed through a number of paroxysms, show the peculiarity in dysentery of being rather promptly followed by tenesmus, and a careful examination of the discharges

will in a short time show whether there be membranous dysentery or ulceration of the bowels. In this scrutiny of the alvine dejections they should be washed with water, after first being examined as they are discharged. A plentiful supply of cold water should be used, and time should be allowed for the dysenteric products to separate and settle. When the putridity of odor is great, the washings may be repeated, with the addition of some colorless deodorant.

Too great a reliance upon tenesmus as a proof of dysentery may mislead. This symptom is not unfrequently found in connection with *hæmorrhoids*, while there are at the same time occasional discharges of blood with some mucus. A suspicion of this difficulty, when it exists, will be confirmed by an observation of the absence of tormina and other symptoms of dysentery, and by a physical examination, which remark may also apply in the discrimination of *fissure of the anus*.

Ascarides may produce tenesmus, but only a careless observer would fail to recognize this cause.

Tumors, uterine and others, may produce the bearing-down feeling which is common to dysentery, but it is only necessary to refer to the fact, as ready means of differential diagnosis will occur to any competent physician.

Stone in the bladder may simulate the tenesmus of dysentery, but the use of the sound will disclose the nature of such a case.

Colic, from flatulence or indigestion, may give for a time a suspicion of an oncoming attack of dysentery; and so with the pains, more or less paroxysmal, connected with *biliary* or *renal calculi*, but some continued observance of such cases, with a careful attention to the general condition, will dispel any existing doubt.

Cholera morbus may present aspects quite suggestive of dysentery, and indeed may be the commencing stage of the disease, for its incipiency is attended with a great variety of disturbance, but it is usually of short duration, and by its own rapid course clears up all question.

What is commonly called a "bilious attack," in which there is vomiting and purging of bile with burning and pain in the bowels, may for a brief period induce a suspicion of dysentery as the ultimate result, and such sometimes proves to be the case, as with cholera morbus. This is especially liable to occur with children—a gastro-enteritis being the precursor of a dysentery—but in all these cases a cautious watchfulness, with a comprehensive view of all the conditions, will secure against a false diagnosis.

Prognosis.—The ordinary forms of dysentery are not attended by a high rate of mortality. Some special epidemics have shown great fatality, but these seem to have been principally in the rather remote past and in other countries, the worst of them being observed in army practice, hospitals, etc. The "heroic," or, in other words, barbarous

and abominable, treatment practiced upon the victims probably had, even in these cases, much to do with the mortality.

In this country, in general practice, under fair conditions and judicious management, it is usually a tractable disease, but conditions are often unfavorable; there are often complications of a serious nature, and we may find our best efforts unavailing in our contest with the disease.

As before intimated, it is the membranous form which is most to be apprehended, and which furnishes the largest proportion of deaths. Dr. Woodward, already cited, remarks: "In the majority of the fatal cases of acute dysentery in which autopsies were made during the war, diphtheritic inflammation of the large intestines was undoubtedly the characteristic morbid process."

A *favorable* termination is indicated in proportion as there is an abatement of the general and local symptoms; a reduction in the amount of fever and digestive disturbance, and of tormina and tenesmus. An improvement in the odor of the discharges, and a lessening of the amount of putrid matter voided, with the appearance in greater proportion of fæcal matter, are all of favorable significance. A regular and strengthening pulse, with the rallying of spirits, and the brightening of the countenance which goes with improved cardiac action, and the lessening of nervous disturbance and depression, are all of good omen. When with these indications there is a cleaning of the tongue, with a desire for food, and an increased ability to assimilate nutriment, we may reasonably look for a more or less prompt recovery.

Unfavorable indications are: The occurrence of complications; the continuance and increase of temperature, with quick pulse and debility; sudden changes, with increasing restlessness; great thirst, with nausea and vomiting; subsidense of active symptoms, as tormina and tenesmus; coldness of extremities, with loss of tenderness on pressure upon the abdomen; depression or listlessness; indications of perforation and peritonitis, as sudden increase of pain in the abdomen, with tympanitis, nausea, hiccough, and prostration; hæmorrhage; increased offensiveness of discharges, with sloughs of membrane or other gangrenous or decomposed matter, resembling washings of disintegrating and putrefying flesh; dry, brown, cracked tongue and lips, with bleeding from these or from the mouth; suppression of urine; low or active delirium; subsultus tendinum; cadaverous expression; collapse.

Bad—almost desperate—as are these indications, the physician should be the last to relinquish hope, which, indeed, should only be given up with the last breath, as most remarkable recoveries have been known to occur, when even perforation of the intestine had occurred, or when friends have abandoned the case as one far gone with "mortifica-

tion," on account of the intense putridity of the discolored dejections, which were supposed to necessarily possess a contagious quality.

Treatment.—The *prevention* of dysentery is, to some degree, practicable by a careful consideration of the ætiology of the disease.

A cheerful state of mind should be encouraged, as it is well known that mental or emotional states affect the alimentary system, both as regards its secretions and its muscular actions. Cramps and looseness have frequently been produced by the sudden announcement of unpleasant tidings; and all predisposing causes should, of course, be avoided.

In times of prevalence of dysentery or diarrhœa—for, as before stated, these are closely related, the latter sometimes developing into or predisposing to the former—especial care should be observed to avoid exposure to sudden changes of temperature and to the night-air of malarial districts. A chill at such times is, above all things, to be guarded against. The use of woollen underwear is generally safer than that of other material—and to persons predisposed, by previous attacks or otherwise, the wearing of a band of flannel over the bowels has been found to be of decided service. This, with teething infants, has often been found to be an important safeguard.

The avoidance of anything in the way of diet, and especially of medicine, which may have a tendency to irritate, or to produce increase of secretion of the glands of the alimentary system, is exceedingly important.

A sufficiency of rest must always be secured, too great a tax upon the strength being deleterious to the general health and, of course, predisposing to any prevailing trouble. The refreshment of bathing, under proper conditions, where no risk of chill is incurred, is toning and fortifying.

The abstinence from even ripe and wholesome fruit and vegetables, which has often been insisted upon by extremists, is not only an extremity of caution, but a positive error. No food and no practice which is generally conducive to health, should be prohibited. The establishment of a rigorous and minute course of restrictions for persons already naturally apprehensive, is to be reprehended as confining the mind too constantly to a subject which should be kept out of view as far as practicable. We should be as alert to guard against *mind-poisons* as against the "blood-poisons" which are so much talked of and so greatly dreaded.

It seems almost unnecessary to state that sitting upon damp ground, going with damp feet, wearing damp clothing, and especially sleeping in damp sheets, are at all times, and especially during the prevalence of dysentery, exceedingly hazardous proceedings.

A care with regard to the quality of water used should not be forgotten. Boiling the water, while perhaps not absolutely depriving it

of all possible deleterious quality, is certainly an unobjectionable and useful precaution—at least, when there is a suspicion of taint from sewage. When there is reason to apprehend that the water offered for use may possibly be contaminated by discharges from victims of diarrhœa or dysentery, it should be rejected, no matter at what cost or inconvenience.

The use of closets or vessels which have received the dejections of dysenteric patients, especially when there is about them the peculiar dysenteric odor, is a procedure attended with considerable risk.

The exercise of a discriminating common sense, which will lead to prudent and temperate habits, followed by good general health, is the principal and sufficient rule of prevention in the case of this, as of most other diseases.

The *hygienic* treatment, which includes nursing, diet, the use of disinfectants, and the general management of the patient, is at no time more important than in the management of dysentery. Indeed, it is not an exaggeration to say that a sick person will fare better and have a greater prospect of early recovery, if placed under favorable conditions as regards nursing and sanitation, without medicine, than if placed under disadvantageous circumstances hygienically, but with the best medical treatment which can be devised or applied.

The first and most important direction that can be given is, that the *horizontal posture* shall be at once assumed. Exercise, while generally healthful, must now be imperatively interdicted. The patient should have mental and physical repose, as complete as possible, in a comfortable bed, and should be advised against yielding to the desire to rise and go to stool. A brave resolution in this direction often has decidedly good effect, while the ready accedance to the prompting to strain tends to increase the difficulty. The object should be to render the interval between actions as lengthy as possible, and it is to be remembered that the upright posture, with motion, tends to diminish this interval. So important is this advice that in severe cases arrangements should be made to prevent the patient from rising to evacuate the bowels or bladder; a bed-pan, or an abundance of cloths, or other material which can be burnt, should be provided. The elevation of the head, in weak conditions, is often attended with nausea and faintness, while the gravitation of the superimposed organs upon the portion of the intestines most affected, with an increase in the flow of blood to those parts, increases the tormina, and particularly the tenesmus.

It is only in an advanced state of convalescence from chronic cases that gentle exercise, by riding or slowly walking in the open air, may be considered safe or desirable. Backsets and relapses are common, and no more certain way of provoking them can be found than that of leaving the bed before nature has had time to restore the inflamed or ulcerated parts to a normal condition. Cases that might have ended

in prompt recovery have often run into the chronic state by a disregard of the foregoing considerations; and while patients are often willing to prematurely leave the bed upon their own responsibility, it is to be remembered that the responsibility, after all, really rests upon the medical attendant, who should be rigorous in the enforcement of so important an item of his directions.

Thorough *cleanliness* in all respects must be emphatically insisted upon; and first in importance is *clean air*. Free ventilation—not from the corridor or the "next room," but from the outside—must be enjoined, regard, of course, being had to the temperature of the air, and the position of the bed respecting drafts, for the patient should not be chilled. A temperature of about 70° Fahrenheit, or a little lower if the patient is well covered and not especially sensitive to cool air, will be found generally suitable. All sources of disagreeable odors should be banished at once, even that of offensive disinfectants, and it is often a delightful relief to the invalid who has been under the old style of medication to hear the homœopathic physican who has superseded the former attendant order instantly from view the array of bottles which confronts him on the mantelpiece, washstand, or table near by.

Not more than one person sick with dysentery should occupy the same room, and most scrupulous attention should be given to the cleanliness of the person and surroundings of the patient. After each discharge warm water with castile or other mild soap should be used, and when a tendency to excoriation about the anus appears, which is quite frequent with children, and not uncommon with adults, the parts should be anointed with Vaseline or some other suitable ointment. Chamber-vessels or bed-pans should be thoroughly cleansed, and while pure air and a free use of water and soap are the best general disinfectants, it is well to use also a solution of sulphate of iron, chlorine water, or other disinfectant. Disinfectants should likewise be used in and about the water-closets or other receptacles of the dejections. These discharges should, if possible, be buried or burnt—cremation of filth being generally advisable; at all events, they must be carefully disposed of with a view to preventing possible or suspected dissemination of the disease; and all articles soiled accidentally or by involuntary evacuations should be promptly removed, and, if practicable, disinfected before being washed by themselves. The effect of direct sunlight as a disinfectant should not be forgotten.

A change of air and surroundings has often been followed by marked improvement in chronic cases; the best results have been observed when the change was from a higher to a lower temperature, and from a lower to a higher altitude. A change, however, even from one house or one room to another, has often been followed by a beneficial result. It sometimes looks as though there were occult influ-

ences depressing a patient, from which escape was made by even a slight removal. The mental effect in such cases is not to be overlooked; but that there are other effects is manifested by the improvement observed in the cases of children too young to be much, if at all, impressed mentally, and the number of such cases of children is large.

Diet.—The alimentation of dysenteric patients is a matter of the greatest concern. "What must the patient drink?" and "What must he eat?" are questions constantly asked, and they should be answered upon the basis of a discriminating judgment.

In the early stage of acute cases there is often a coated tongue, with anorexia, but there may still be thirst, and there is danger of indiscretion in quenching it. A full draft of cold water may be more than the stomach can bear, and may cause vomiting; or it may produce chill, to which there is often a predisposition, and it will very often bring on the tormina which precedes an action. Water should therefore be given in small quantities at a time, but may be given frequently, so that the demand of the system for the essential element of water may be supplied. Crushed ice is often desired, and, if not taken too rapidly, may be refreshing and beneficial. The quality of the water should of course be scrutinized, and if questionable, should be boiled and cooled. A slight acidulation by the use in it of some acid fruit-jelly is generally grateful to the taste, and is only exceptionally harmful. Lemonade or orangeade are not to be denied when craved, unless experience shows some contraindication of their use. Carbonic acid water is generally well received by the stomach, and is wholesome. The customary coffee or tea, reduced in strength and quantity, may be required, and it is a "more nice than wise" course to invariably deny articles to which the system has been for many years accustomed; the unsatisfied craving for these, indeed, will often retard the recovery of appetite. Fermented drinks are not usually desirable or suitable, nor is wine indicated in the early stages. At later periods and in chronic cases, however, the use of wine to a moderate degree may be of advantage, especially where there has been an established habit of its use. Milk punch, made with whiskey or brandy, is a favorite form when a stimulating diet is needed.

The digestive organs being usually weak and irritable, it is generally well to let them have a rest, especially as food taken in the early stage of acute dysentery, when there is considerable fever and constitutional disturbance, is not digested or assimilated. Sweet milk, boiled or fresh, is the most useful general article of diet. Barley, gum, or rice water, or other mucilaginous drinks which are slightly nutritious and easy of digestion, will be among the first articles of nutriment used, and these will often have to be continued for some time before it will be prudent to advance to more substantial articles. Of course, much

will depend upon the habits of life, and the customary diet of each particular patient. The Scotchman, whose staple article of diet was oatmeal porridge, will find this to agree better with him than it would with one with whom it would be a new, and perhaps distasteful, dish. Panada is generally a safe and agreeable article, and it is always to be borne in mind that it is well to keep the blood liberally supplied with water by some means. The white of egg, beaten with water and sweetened, is a light and useful form of nourishment, and wine-whey comes in well at times. Buttermilk has been credited with even curative effects, and the common fear of it is probably not justified.

Farinaceous articles should generally not be given when there is dryness of the mouth, as this indicates a suspension of the secretions needful for digestion. At other times, sago, tapioca, rice, and other starchy foods, may be used, either by themselves or in the shape of puddings, or custards, suitably sweetened and flavored. Whatever food is used should be seasoned to the taste of the consumer, as there is thereby such an appeal to the appetite as occasions a flow of the digesting fluids. Insipid food is discouraging to the salivary glands of many persons. Rice boiled in milk, and boiled milk thickened with flour, are excellent articles when relished, but may be almost nauseating to those unaccustomed to such dishes.

Fats are not readily digested, unless in the later or chronic stages; still, where the appetite calls for something of this kind, they may be used as an experiment. Animal broths, of beef, mutton, or poultry, are among the most useful items of the invalid's dietary. Fresh beef essence is preferable to the prepared articles, Liebig's, etc., although these may be also used with advantage. Preparations of gelatin, while not particularly nourishing, are somewhat so, and are often refreshing, leading on to an appetite for other food. The extraction of the juice of beef by chewing, rejecting the hard fibre of the meat, is an excellent way of obtaining an easily digested and nourishing food. Soft boiled eggs, when the system is recovering, are nutritious and not difficult of digestion, while the yelk of hard boiled eggs is still better.

Oysters are usually easily digested and may be regarded as among the lighter animal foods. An oyster broth is often one of the first articles desired by patients, and is generally of benefit.

Raw beef, scraped, is often taken readily, especially by children who have been reduced by continued fluxes, improvement frequently following speedily. Fish, of light quality, may precede the use of solid meat when there is hunger for it.

Many persons, physicians included, have an undue fear of the use of vegetables and fruits during any stage of dysentery. While these articles should be used with caution in acute conditions, they often supply a need of the system during convalescence, and rapid recoveries of dragging chronic cases have been observed when fruit or

vegetables have been given in response to a decided craving. Potatoes, especially when baked, are useful, and onions, squashes, tomatoes, carrots, parsnips, etc., are not less healthful, when properly cooked, for convalescents from dysentery than for other invalids. New sweet potatoes are eagerly looked for by many in the South, as the diet which will be most suitable for children suffering from protracted diarrhœa or dysentery.

Peaches, watermelons, blackberries, and other fruits, have often been found beneficial, especially in army practice, where, from want of a proper dietary and other causes there was a scorbutic complication. Even green fruit has been found serviceable in such cases, and many has been the time when a surprising improvement has been observed to follow the clandestinely procured mess of "greens" or fruits; this was especially the case during the war.

In the use of any vegetables or fruit, excepting the softer, sound, and ripe qualities of the latter, the cooking should be complete, and where there is tough fibre, or where irritating seeds are found, the articles should be strained.

Therapeutics.—The number of medicines used and recommended in dysentery, quite as much as the number of synonyms applied, shows the variety of opinion concerning the nature of the disease and the difference in the forms which are met and treated at different times and places. Before the writer lies a list of two hundred and seventy remedies noted as having been used by one physician and another. To review and discuss the respective merits of these would be a task both endless and useless. The probability is that many of these remedies have been found useful,—but generally, the more useful, the more frequently have they been abused, and thus many excellent remedies have been placed almost under a ban. The most striking example of this is one of the most important preparations of *Mercury*, and as an illustration may be cited the following clause of an order which is worthy of perpetuation:

"Surgeon General's Office, Washington, D. C., May 4th, 1863.

I. From reports of medical inspectors, and the sanitary reports to this office, it appears that the administration of Calomel has so frequently been pushed to excess by military surgeons as to call for prompt steps by this office to correct the abuse; an abuse the melancholy effects of which, as officially reported, have exhibited themselves not only in the innumerable cases of profuse salivation, but in the not unfrequent occurrence of mercurial gangrene. It seeming impossible in any other manner to restrict the use of this powerful agent, it is directed that it be struck from the supply table, and that no further requisitions for this medicine be approved by medical directors. This is done with the more confidence as modern pathology has proved the

impropriety of the use of mercury in very many of those diseases in which it was formerly unfailingly administered."

Another section of this order condemns in like manner, and strikes from the supply table, Tartar emetic. The order is signed by W. A. Hammond, Surgeon-General.

Notwithstanding this evidence of the mischief arising from the improper use of a mercurial preparation by many of the best of old-school physicians, forms of this important substance have been in common and beneficial use by homœopathists from the time of Hahnemann—and were never more used than at the present time. Indeed, some of the more attentive and progressive old-school physicians—Sydney Ringer, among the number—profiting by the sad experience of the past, and taking note of the success of practitioners who do *not* produce evil effects with medicines, have used and recommended doses of less than the one-hundredth of a grain of *Mercurius corrosivus* in bowel affections—a grain of the substance to be dissolved in a pint or quart of water, and given in doses of a teaspoonful every two, three, or four hours in some cases.

Allopathic toxicology abounds in evidence of the fact that a common tendency of mercury is to produce acute intestinal catarrh—principally of the large intestines—attended by cutting pains with straining discharges of bloody mucus. Provings made by homœopaths confirm this, while the clinical results of the use of this medicine not only show the excellence of its qualities, but at the same time demonstrate the truth of the homœopathic law.

Mercurius, then, is the chief—the first and principal—remedy of the homœopathic physician in the treatment of dysentery. From the chilliness and fever, with coated tongue, to the pronounced inflammation and ulceration of the mucous membrane of the intestines—especially the lower parts—it produces symptoms similar to those of the disease; and the testimony of thousands of the best physicians of all enlightened countries continues to come forward to prove that it is, when properly used, a safe and efficient remedy.

It is indicated in the altered condition of the secretions which often precedes the development of the disease, and is more emphatically called for when there is tormina and tenesmus, with discharge of slime and blood. Indeed, all of the various appearances of the dejections of dysenteric patients are due to different degrees or stages of inflammation, with the attendant modification of the secretions, and are closely imitated by the effects of mercury at one time or another. It has caused, and has cured, in other cases, all of these varieties—the colorless mucus, almost as thin as water; the jelly-like mucus; the more stringy mucus, mixed with blood, and of bad odor; the shreddy mixture of false-membrane; the pus, in various shapes and combinations; the gangrenous slough with putrid, cadaverous smell.

The preparations of mercury most commonly used are the Mercurius vivus, M. solubilis and M. corrosivus—each having its advocates—each being depended upon by one or another—while good results have been reported from all. There is probably no preparation that produces the usual mercurial effects but would be found to answer the purpose. The Merc. viv. has been principally relied upon by the writer, who, without questioning the utility of the other forms, or the advantage of this or that potency, has found the lower triturations of this, in doses given every two or three hours, efficient and trustworthy, while free from any deleterious effects, even when continued for a considerable length of time. It may be for a time suspended, occasionally, in favor of some other remedy, and then resumed with advantage.

Aconite will often be called for on account of the feverish condition attending the disease, and is indicated when there is chilliness, thirst, and excitement and tension of the arterial system, with dry skin. Its action will not interfere with the Mercurius, and it may be given, when needed, at the hours between the doses of that remedy until the pulse is softened and the skin moistened.

Belladonna is a remedy of importance, adapted to a condition of hyperæsthesia and excessive tenesmus, to many of the sympathetic troubles which arise, and especially when there is irritable bladder. It is suitable when there is great restlessness and erethism—a common condition with children—and when there are attendant pains of a neuralgic or rheumatoid character; when the cerebro-spinal system is excited, and when, finally, there is paralysis of the sphincters.

Arsenicum is appropriate in cases in which the nervous system is profoundly impressed, and where there is great prostration; where there is thirst with restlessness in the later stages; when the discharges indicate disintegration of tissue, with great foulness and putridity of the dejections, and when there is a tendency to coldness and collapse, with cadaverous countenance.

Colocynthis will be found useful when there are colicky and cutting pains with enteralgic complications. It is adapted to the incipient stage and to cases of undetermined character, being related to the small as well as to the large intestines. In colicodynia, which frequently simulates the pains of dysentery, it is the chief remedy, and, in alternation with the Mercurius, it has done good service.

Ipecacuanha is useful in the acute catarrhal form of the disease, with nausea and gastro-intestinal disturbance, extending to the large intestines. It is an old-time remedy revived by the old school of late years, and used and recommended, as by Dr. Joseph Ewart (in Quain's *Dictionary of Medicine*), and some of the prominent physicians of India (Dr. Docker, Dr. MacLean, and others) in doses of from a scruple to a drachm, in the epidemic dysentery. Others find more satisfactory results from non-nauseating doses, as, for example, Dr. Henry Hartshorne (in note to article in Reynolds's *System of Medicine*), who gives it in doses "not larger than one grain every two hours." It is, however, in the hands of homœopathic physicians that Ipecacuanha has done its best work—especially in cases of children.

Among other medicines which may be consulted, are *Aloës*, *Nux vomica*, *Podophyllum peltatum*, and, malarial complications existing, *Quinia*.

Gamboge is probably worthy of more attention than it has received, as "in single doses of three or four grains it causes nausea (sometimes bilious vomiting), colicky griping, tenesmus, and watery evacuations." "Taken in large doses, Gamboge produces actual inflammation of the intestines; the violent abdominal pain, vomiting and purging, are

followed by collapse and death; such cases having been repeatedly recorded." The quotations are from page 112 of the volume on Materia Medica of "Wood's Library of Standard Medical Authors," by Dr. Charles D. F. Philips, who on the next page gives this paragraph:

"*In Dysentery.*—It would appear, however, that there is one very different application of Gamboge which is really of much use. Malgaigne and Betz found the use of very small doses (about ¾ grain in twenty-four hours) to be exceedingly valuable for dysentery, especially in young persons;—an apparently paradoxical fact, but established on good evidence; and, after all, not more strange than the completely opposite action of small and large doses of Strychnia and many other drugs."

It is surprising how many of these "paradoxical facts" are met with in the allopathic literature of dysentery—nearly all of the cathartics having been used and lauded, as well as abused and abandoned. As we are done with the phantoms of "peccant humors," we no longer use emetic or purgative doses of anything—that is, modernized physicians do not. The opiate and astringent courses are still pursued, often with great detriment to patients, by the old-style physicians—which fact recalls the remark of a colleague while in consultation upon a dysenteric case of a child. He had been for years an old-school practitioner, and, when asked by the writer how he had gotten along with such cases while he used the old remedies, Opium, Acetate of Lead, etc., made the memorable reply, "Well, I just slew them, right and left."

Topical Applications.—The sponging of the patient with tepid or cool water, or with alcohol and water, especially in warm weather, is often refreshing and comforting—and therefore useful. Warm applications, moist or dry, are often agreeable, and to some extent palliative. Poultices of various sorts are at times insisted upon by nurses and kind attending friends, and should not be denied unless containing substances which are harmful or repugnant to the patient. The convenient rubber-bag for hot water is frequently a comforter. The use even of a mustard poultice, or the rubbing, to a moderate degree, of the abdomen with turpentine, is not to be always interdicted.

Enemata of warm starch-water, flax-seed tea, or other non-medicinal mucilaginous liquids, are often found to be palliative of the tenesmus, and may be used in small quantities after each action. In chronic cases large injections—a pint to two or three pints may be used with advantage. These may be of the above mentioned mucilages or of simple warm water, or warm milk—or may contain some disinfectant ingredient, as chlorine water (Labarraque's Solution) in the proportion of one part to twenty of water, for example. A small proportion of

Hydrastis, or other suitable substance, may be added to the plain water or mucilage. These, if given slowly, are often retained when the patient is encouraged to resist the inclination to eject them, better than would be supposed, and have proved beneficial. They distend the small pouches of the bowel, and dislodge the scybala which have sometimes been retained in these small sacks or folds of the mucous membrane long enough to become sources of irritation, and there is a soothing effect from this bathing of the intestines. In the acute stage, and when the anus is too irritable, so that the syringe would give too much pain, of course, enemata will not be thought of, but soothing applications will be made to the external parts.

The *convalescence* of dysenteric patients, which is often tedious, must be conducted upon judicious general principles—the homœopathic treatment of the disease in such cases being attended with a much greater degree of success than where the harsh proceedings of allopathic medication have to be borne.

Surgical interference may be required where the accidents of fistula or abscess occur, or where the healing of large ulcerated surfaces has left cicatrices which occasion stricture.

Comparative results.—In the report of Dr. J. C. Morgan, Chairman of the Committee on Legislation of the American Institute of Homœopathy, at Niagara Falls, in June, 1883 (see *Transactions*, p. 75 *et seq.*), is given a collection of statistics which goes to prove that the homœopathic treatment of diseases generally, as compared with the allopathic, is not only attended with a much lighter mortality, but that the average duration of diseases is less.

One part of the report gives the number of allopathic and the number of homœopathic physicians in the cities of New York, Boston, Philadelphia, Newark, and Brooklyn, with the respective number of deaths, as follows:

4071 allopathic physicians report 71,802 deaths, or about 17 each.

810 homœopathic physicians report 8166 deaths, or about 10 each.

Another table, giving the deaths from especial diseases, shows that to every 100 deaths from dysentery under allopathic treatment, there were but 39 under homœopathic treatment.

ASIATIC CHOLERA.

BY J. P. DAKE, M.D.

Cholera Asiatique; Asiatische Cholera.

The term *Asiatic Cholera* is everywhere sufficiently well understood without a display of many synonyms. The disease so designated may, or may not, become *epidemic;* and it may, or may not, display *spasm* or *asphyxia.*

It is indigenous and endemic in India, seeming especially to rise up and prevail in Bombay and Madras, and to reach the commercial tide of the world in the cities of Dacca and Calcutta. It is infectious and, so, indirectly contagious.

History.—It is mentioned as prevailing in India centuries before the Christian era. It was well described, in its epidemic form, by some of the most ancient Sanskrit writers. Characterized by them, according to its leading symptoms, it was known as *Vishû dschikâ*—vomiting and sweating; again as *Alsikâ*—cramps; and again as *Rilambikâ*—collapse. Its first appearance in Europe was in the year 1830, coming through Russia and Poland. Observing no definite period, it has repeatedly ravaged the countries of Europe, scourged the British islands, and crossed to America since that time. The first fatal case in Russia was at Orenburg, August 26th, 1829, from which time it passed from town to town, all through the year 1830, not reaching St. Petersburg till June, 1831.

It was brought to England by merchant ships from Riga, quite a number of fatal cases occurring on the river Medway during the summer and autumn of 1831. Its first appearance in epidemic form was at Sunderland in November, whence it spread to Newcastle, Edinburgh, Glasgow, Belfast, etc., arriving in London, February, 1832.

First Visit to America.—From Dublin it went to Cork, and thence to Quebec in America, where it appeared in June, 1832. It is a question, not fully settled, how the disease came to New York city, whether overland from the St. Lawrence, or by ship from infected ports abroad. It was recognized in that city before the end of June; and by the first of September it was spreading along the Mississippi. Before the end of October it was in New Orleans.

It prevailed in Kentucky in 1833, and reappeared on the St. Lawrence in 1834, not spreading extensively however. And again, in 1835, it seemed to have been imported from Cuba into New Orleans and Charleston. It has been claimed by some writers that there was no fresh importation during the years 1834 and 1835, but, rather, a springing up from a few temporary depositories of the seed.

Second Visit to America.—After the lapse of nearly eighteen years, in July, 1847, the cholera again entered Russia, at Astrakhan, and, ascending the Volga, pursued nearly the same line of march taken in 1829–30, reaching Orenburg in October. In the same month it appeared in Constantinople, whence it passed to Odessa and up the Danube into Austria, and thence into Italy the following year.

During the winter of 1847 it was on the Baltic and also in the interior of Russia, not severe, but quite sufficient to demonstrate its presence.

It was at Berlin in July, and London in October, 1848. So far as known, the first vessels from infected ports, having had cholera cases

aboard, arrived in American waters in the winter of 1848, the one landing at New York, December 1st, and the other at New Orleans, December 11th. At the New York Quarantine about one hundred cases occurred, one-half being fatal, while in the city proper there were only two cases. There was no spread of the disease, so far as recognized, till the following April, during which time other vessels had arrived with emigrants from infected ports. The first case in the city occurred on the 11th of May, from which time the disease prevailed, with varying severity, till the close of September, causing over five thousand deaths. The vessel that had brought cholera to New Orleans, December 11th, had lost thirteen of her passengers on the way. One of her emigrant passengers died with the disease, in the city, two days after her arrival, no quarantine having been enforced. Before the end of that month four hundred deaths from cholera were reported, and in January six hundred. The number of fatal cases continued to increase till June, when it reached two thousand and five hundred. A steamboat, having had several cases among passengers and crew, arrived at Memphis from New Orleans, December 20th. Two days afterward the first case appeared, near the wharf; and four days thereafter two more, on a flat-boat near by, all fatal.

After the lapse of nearly three weeks, during which time other deaths occurred among persons frequenting or residing near the landing, the disease began to appear in the interior of the city. Another steamboat from New Orleans, having had nine deaths on board, from cholera, arrived at Nashville, on the Cumberland river, December 27th; but no cases occurred among the residents of the city till the 20th of the following month, after the arrival of several other boats from New Orleans. Soon ofter that date the disease became epidemic. Thus, from New York and New Orleans, both, the cholera spread till it had again traversed the busy haunts of the United States, as an epidemic. The river and lake cities suffered greatly, being on the lines of greatest and most speedy travel.

It was the fortune of the writer to first encounter the disease at Pittsburgh, at the head-waters of the Ohio, where its ravages were severe during the months of June, July, and August, 1849. The constant arrival of emigrants from infected ports, during the winter of 1849–50 and, possibly, the survival of the seed from the previous season in the warm and unclean parts of New Orleans, caused the disease to appear again in that city and in the river towns above, during the summer of 1850. It extended north and eastward only so far as Pittsburgh.

Third Visit to America.—During the years 1851–2–3 cases of cholera occurred and the disease was epidemic in some parts of Europe, but broke out with greater fury in Russia, in 1853, extending westward into Germany, southward into Austria, and Italy, and northward along the shores of the Baltic, to Denmark and Sweden. From July to

December there were twelve hundred cases in London. It was severe in the leading cities of England and Scotland, and lingered about them, more or less, during the winter of 1853–54.

Some twenty-eight vessels sailed from infected ports to the United States before the following summer, with a total loss of over eleven hundred passengers with cholera while on the way; and yet, the first cases of cholera reported in this country in 1854 occurred in Chicago, where emigrants unpacked and brought into use the clothing and bedding from infected places abroad.

Though cases of cholera, usually termed sporadic, had occurred in different parts of the country during the years 1851–2–3, it is generally believed that there was a fresh importation of the seeds in 1854. Appearing in Chicago in April, it was not severe till June, when it was declared epidemic. In May it was in Detroit, and by June had reached New York. It had appeared, also, during the winter of 1853–54, along the Mississippi, becoming especially severe at St. Louis, from February all through the spring and summer. Thence it spread in all directions, especially along the rivers traversed by steamboats. It was severe at Pittsburgh from the middle of September to the 10th of October. It was in Nashville in June.

As before, the disease was confined to the chief lines of travel, appearing to go by stage-coach and wagon, as well as by steamboat and railway train. It gradually disappeared as the cold weather came in the winter of 1854–55.

Fourth Visit to America.—During the year 1865 the cholera was very severe in the Bombay presidency, eighty-four thousand people dying with it. Thence it extended along the Red sea and came to Alexandria with the pilgrims from Mecca. Conveyed by the shipping of the Mediterranean, it reached Marseilles in June, and passed on to Paris, where it raged, at times with great fury till the end of the year. In October and November ships, having had cholera cases aboard, arrived in New York, from Havre. Cases occurred on Ward's Island, but the disease gained no headway during the winter months. In April, 1866, a steamship from Liverpool arrived at New York, having lost forty-six passengers with cholera before reaching Halifax, where she was held in quarantine and subjected to fumigation. Another steamship from Liverpool arrived, April 18th, having lost thirty-eight persons with cholera; and, during the spring and summer, at least half a dozen more vessels arrived there, reporting deaths from cholera on the way.

The first cases in New York occurred early in May, and in quarters usually frequented by emigrants and seamen. Great precautions were taken by physicians and health authorities, so that only individual cases appeared.

In the month of July, in a quarter of Brooklyn inhabited almost entirely by foreigners, a severe epidemic occurred; and a little later it

was severe, also, on Ward's Island. Extending to Governor's Island, and other points, it was soon distributed over the country. Before the end of July it was down the Atlantic coast and along the Gulf to New Orleans; and before September it was in Texas, and up the river in Mississippi, Kentucky, and Ohio. Early in September it raged severely at Nashville; and by the middle of November had apparently disappeared from the country. A notable feature of the visitation of 1866 was that it seemed to cling very closely to army quarters, and to proceed with troops in their travels from place to place. But that feature was not peculiar to the epidemic of 1866, as in all epidemics in the old world the cholera had shown a great partiality for armies, caravans, crowds of pilgrims, and for extemporized settlements.

In the summer of 1867 cholera reappeared among the troops in the west, but did not prevail to any extent among the residents of the country.

Ships from infected ports came to New York, having lost passengers with it on the way, but the careful measures of quarantine, or other favoring circumstances, prevented an epidemic.

Fifth Visit to America.—From its eastern haunts cholera invaded Russia again in 1869, and spread gradually over the empire. Thence it went into Turkey, Austria, and Italy southward, and westward into Germany, reaching Havre and London in 1872. It gained no foothold, however, in England, but passed on westward to Brazil and the United States. The strict quarantine at the port of New York allowed no spread of the disease there; but it is believed that the seeds were carried through from the ships in the unopened baggage of emigrants from infected ports, as the disease appeared at several points inland to which they had gone. The initial cases were in Louisiana, February 9th, 1873. In April there were some in Mississippi, Arkansas, and Tennessee; and in May in Illinois, Missouri, Kentucky, Indiana, and Ohio. The disease was epidemic at Nashville in June. It was not promptly recognized on account of the bilious character of the stools in the early cases. In that regard it was much like the form of cholera that prevailed in Japan a few years later, and with which 158,000 people were said to have perished in one year.

Enough of history has now been given to show something of the nature and ways of cholera, and of the measures requisite for its prevention.

Ætiology.—Much has been written, especially during the last fifty years, upon the essential cause of Asiatic cholera, and various have been the theories put forward in regard to it. It has been looked upon as some mysterious influence, from the conjunction of certain planets, from chemical changes in the composition of the air, from vapors arising from the earth, from pollution of water, and from other more or less inscrutable causes. It has been looked for in winds, earthquakes, floods, swamps, cesspools, and sewers. The scalpel, the microscope,

and chemical reagents have been employed in the search. Of late years, writers on the subject have been almost unanimous in regarding East India as its birthplace, and the field producing the seeds that, under favoring conditions, have given rise to the epidemics which have swept the greater portions of the habitable globe.

It must be mentioned, as a singular fact in the literature of this subject, that Hahnemann, before he had ever seen a case of Asiatic cholera, while he was almost hidden away at Köthen, from his careful reading of the reports coming to him from the fields being traversed by the destroyer, put forth views as to the essential cause of the germs of the disease, which are to-day indorsed and confirmed by the results of the most scientific research.

This is his language (*Lesser Writings*, p. 758): "On board ships—in those confined spaces, filled with mouldy, watery vapors, the cholera miasm finds a favorable element for its multiplication, and grows into an enormously increased brood of those excessively minute, invisible living creatures, so inimical to human life, of which the contagious matter of the cholera most probably consists—on board these ships, I say, this concentrated, aggravated miasm kills several of the crew; the others, however, being frequently exposed to it, at length become fortified against it, and no longer liable to be infected. These individuals, apparently in good health, go ashore, and are received by the inhabitants without hesitation into their cottages, and, ere they have time to give an account of those who have died of the pestilence on board the ship, those who have approached nearest to them are suddenly carried off by the cholera. The cause of this is, undoubtedly, the invisible cloud that hovers closely around the sailors who have remained free from the disease, and which is composed of probably millions of those miasmatic, animated beings, which at first developed on the broad and marshy banks of the tepid Ganges, always searching out in preference the human being to his destruction, and attaching themselves closely to him, when transferred to distant and even colder regions, become habituated to those also, without any diminution either of their unhappy fertility or of their fatal destructiveness."

It would not be easy for Dr. Pettenkofer or Dr. Koch, after all their investigations in this field, with all the improved appliances of modern times, and all the accumulated lights of observation and experience, to set forth more clearly and satisfactorily the specific cause of Asiatic cholera, its home, its haunts, and its ways, than was done by Hahnemann more than fifty years ago.

If the views put forth by these modern scientists, now so favorably received throughout the medical world, have led to any modes of recognition, or measures of prevention and cure, better than those suggested by the sage of Köthen, no proofs of the fact have yet appeared.

The infectious character of cholera, and its transportation from place

to place and person to person by reason of the "minute, invisible, living creatures," constituting an essential cause, was ridiculed and violently opposed by such writers as Hufeland. Only after the accumulation of facts, developed by many epidemic years of cholera, has it come to be acknowledged generally, among authors as well as practitioners, that the disease does not spring up *de novo* from beds of filth under summer heats, in the several countries where its ravages have been felt, without the access of the living germs, indigenous only to India.

The following ætiological propositions may be considered as quite generally admitted now among well-informed medical men:

I. That the essential cause of malignant or epidemic cholera is indigenous to East India alone.

II. That it consists of minute organisms, living and susceptible of rapid multiplication, as yet identified only by their effects in the human body.

III. That these organisms occur in the ejections of persons already infected, and may be potential in a moist state, in water, food, or filth, or in a dry state in clothing, bedding, merchandise, and confined air.

IV. That their vitality, especially in a dry state, may be retained for days and, possibly, for weeks.

V. That persons become subject to their influence, chiefly through the alimentary canal, and less often by other channels.

VI. That their potency is impaired or destroyed by a very low or very high temperature; also by the processes of fermentation in their menstruum; and, again, by chemical reagents.

VII. That their actual power depends on their number and organic integrity within the human body, and, consequently, their effectiveness upon the receptivity or non-resistance of the individual subject.

This last proposition, touching upon individual predisposition or liability to cholera, calls for an honorable mention of the advanced and wise thoughts of Hahnemann. He said (*Lesser Writings*, p. 759): "The sailor closely but invisibly environed by this pestiferous, infectious matter, against which, however, as has been observed, his own individual system is, as it were, fortified by long resistance of his vital force to its action, and by being gradually habituated to the inimical influence surrounding him,—this sailor (flying from the corpses of his companions on board) has often gone ashore apparently innocuous and well, and behold! the inhabitants who hospitably entertained him and, first of all, those who came into immediate contact with him, quite unused to the miasm, are first most rapidly and most certainly attacked without any warning and killed by the cholera, whilst of those more remote such only as are unnerved by their bad habits of life are liable to take the infection."

These graphic words advocate the truth that newcomers, persons in health, fresh and receptive, are the first to take the disease and to take it most severely. Persons responsive to other influences, sensitive to external impressions generally, and by no means necessarily sick from other causes, are the ones who take it most readily.

Beside the essential and predisposing causes of cholera there is another class to be considered—the exciting; and, as belonging to this class, the following may be mentioned:

1. Fear, disturbing the harmony and efficiency of organs, especially hindering the processes of digestion and assimilation.

2. Improper food and drink, burdening the stomach and exciting undue alvine evacuations.

3. The impression of cold upon the surface of the body and limbs, or within the stomach, disturbing the circulation and so impairing the strength of vital resistance in general.

Pathology.—Inquiries into the natural history of Asiatic cholera, as manifested in its subjects, in order to learn upon what tissue its first impression is made, and how it proceeds in the disturbance of one organ after another till dissolution results, must always be a matter of interest to the thoughtful physician. While the symptoms or signs of the disorder, in this as in other cases, must mainly serve as the practical guide in therapeutics, a knowledge of the interior changes, the structural lesions, corresponding with the outward display, must afford aid in treatment as well as in diagnosis and prognosis. The undue importance, however, given to pathological views by disappointed therapeutists of the old school, has led more to useless disputations than to any solution of practical difficulties. At the very time that Hahnemann, under the guidance of the homœopathic law, was pointing out the great remedies for cholera, his distinguished neighbors, Andral and Broussais, of Paris, were hotly contending, the one for the neurotic, and the other for the inflammatory, theory of the disease.

Andral, on his theory, argued for antispasmodics, while Broussais, on his, favored antiphlogistics; and yet no practical good came from either source.

Numerous post-mortem examinations have shown that in cases attended with much vomiting and purging, especially the latter, the epithelium along the alimentary canal, particularly in the small intestines, is destroyed in patches.

The same has been observed, to some extent, in the urinary tracts. Hayem, of Paris, after a series of examinations, sums up his observations in the following words: "The only organs constantly involved are the intestines. The capillaries, the different layers of the epithelium, the sets of glands, and the villi had all undergone certain changes, but differed in no way from the changes observed in ordinary intestinal catarrh. In the blood was found an increase of the white corpuscles

and small fragmented globules. These are explained by the stasis of the blood in the algide period and the decrease in the proportion of water. No microscopic characters peculiar to cholera were found."

On the other hand, Dr. Koch, in his examinations made in Egypt, India and, later, in France, claims to have discovered a species of microbe in the dejections and the small intestines, peculiar to cholera victims. He asserts that this parasite, denominated by him *the comma bacillus*, is present in all cases of Asiatic cholera.

But so far he has failed in the proof of its specific causative character by originating a case of cholera through its agency, when entirely dissociated from other probable causes. If, as claimed by Koch, his bacterium cannot exist in a dry state—if its vitality depends on a moist menstruum or nidus—he must account for, what has been repeatedly observed, the conveyance of the seeds of cholera in the baggage and bedding and confined air of chests, taken inland to distant points from infected ships. If all he asserts regarding the habitat of the comma bacillus be true, there is strong ground for the belief that it is not the specific cause of epidemic cholera.

When asked in what way his bacillus acts in the production of cholera, Dr. Koch replied: "First its pressure causes diarrhœa and vomiting, leading to thickening and chilling of the blood. Then it secretes an intoxicating poison which causes the dry, instantaneous cholera, without diarrhœa."

It is not easy to understand how enough bacilli to secrete the "poison" necessary to cause dry cholera could be present without occasioning the "pressure" that he claims to be the cause of vomiting and purging.

This discovery by Dr. Koch has been heralded over the world as one of great importance, while, in fact, it places the pathology of Asiatic cholera, as well as its prevention and cure, not one step in advance of where it was when that disease first invaded Europe and America.

The world may be thankful that the recognition of the destroyer from the Ganges does not depend upon the microscope, nor its successful treatment upon anything that the theories of Dr. Koch may suggest.

Symptomatology.—The symptoms of cholera can best be set forth by mention of typical cases:

A., being in the enjoyment of usual health, suddenly has a disposition to stool. The discharge from the bowels is painless, or nearly so, quite watery, of light color like thin, flocculent rice-water. A second action occurs, with a sense of relief, as though the evacuations would be beneficial. Repeated, gushing, and more copious discharges occur, with a feeling of weakness, nausea, and epigastric distress.

Vomiting and purging are simultaneous; there is great thirst, yet a

prompt ejection of all liquids drank; cramps come in the muscles of the legs, arms, and abdomen; the voice is husky and cavernous; the surface becomes cold and wet with perspiration, then shrivelled and blue; the urine is scanty or suppressed; the pulse is weak at the wrist; the face shrunken and old looking; there is great restlessness and tossing, loss of voice and pulse, collapse and death.

B. has been well except, for a few hours, he has had a sense of fulness in the head, perhaps a ringing in the ears, when, suddenly, he has nausea, vomits food eaten hours, perhaps days, before; copious watery stools, at first dark and then like rice-water, occur; vomiting and purging are simultaneous; no pain, no cramps, but rapid collapse and death.

C. has had some dizziness and feeling of weakness, but continues at business till, walking in the street, he is suddenly seized with cramps in his legs, falls, and is picked up; his breathing is difficult, his face livid; he sinks rapidly, becomes pulseless, and dies, within an hour, without the least vomiting or purging.

D. retired, after drinking beer, or lemonade, or buttermilk, feeling quite as well as usual, and is awakened, toward morning, with nausea and vomiting; one very copious dejection occurs; there is great epigastric distress, more vomiting, collapse, and death, all in the space of two hours.

In different persons these symptoms are varied, some having no purging, and others no vomiting or cramps. Some sink and go into collapse quickly, while others resist longer, and maintain the fight for twenty-four hours, or more. Some have little or no pain, while others have cramps, not only in the limbs, but likewise in the muscles of the trunk, and even of the face.

The pathognomonic symptoms of Asiatic cholera may be stated briefly as these:

1. Rice-water dejections, very copious.
2. Sudden and excessive vomiting and purging.
3. Cramps in the legs, later in the arms and trunk.
4. Husky voice—sepulchral, choleraic voice.
5. Leaden hue of the skin—later shrivelled and cold.
6. Sense of heat while cold to the touch.
7. Rapidly sunken eyes and pinched features.
8. Suppression of urine.

Persons may die of heart failure, through fright, and from apoplexy and convulsions from other causes, during a cholera epidemic; but none will die with Asiatic cholera without exhibiting three, or more, of the eight symptoms just mentioned—in a large majority of cases, all of them. As shown in the typical cases presented, there can be no classification of symptoms by stages, each stage coming in a particular order, and occupying a definite period of time.

Cramps may come before vomiting, and vomiting before purging, and *vice versa*.

In cases of recovery, the symptoms mentioned become less severe and less frequent till convalescence is secured. The vomiting and purging cease, the cramps relax, warmth returns, and the patient is safe. A darker color of stool and reappearance of urine are favorable.

Diagnosis.—The recognition of a case of Asiatic cholera must depend on the symptoms displayed; and yet, without its history, showing the nearness of some case or cases of that disease, it might at times be no easy task. Cases of sporadic cholera or cholera morbus occur every summer, presenting symptoms quite similar to those given as characteristic of Asiatic cholera; but usually the vomiting is less forcible, the stools less gushing and of darker color, the voice not so husky, the skin less blue and shrivelled, and all of these less rapid and fatal.

Should the microbe of Koch prove to be an invariable accompaniment of Asiatic cholera, always discoverable in the ejecta of the subject, the differential diagnosis might become quite sure to the expert microscopist, provided always that the same microbe was not discoverable in the ejecta of persons having cholera morbus or other enteric and gastric affections. At present we must take in the history and relations, as well as symptoms, of first cases in order to arrive at a correct diagnosis.

Prognosis.—That there is a difference in the morbific power of the germs or seeds of Asiatic cholera, as shown in the same localities in different years, and in different localities the same year—that in one locality or during one season the cases are more rapid and more fatal—there can be no question. The explanation of this fact has been variously based on differences in rainfall, in temperature, or in weight of atmosphere. Aside from such extraneous influences, affecting the people, there is good reason to suppose that there may be differences in the vigor and propagating readiness of the germs themselves, arising from causes with which we are, as yet, not at all acquainted. The prognosis, then, in this disease cannot always be the same; nor can it be based on anything that we may know beforehand of the individual or his surroundings, except as already mentioned in the section on predisposing and exciting causes. It may be said, however, that the prognosis is more favorable in winter than in summer, and toward the close than at the beginning of an epidemic; also, that it is more favorable in persons not addicted to the use of stimulants and narcotics.

Treatment.—The measures resorted to in the prevention and treatment of cholera have been as numerous and various as could be devised by the learning and ingenuity of man.

Empiricism has gone the rounds and tired itself, and theorists have taxed their skill in vain, to furnish satisfactory remedies. Sad as the results have been where cholera has prevailed, no one can read of the ups and downs of vaunted specifics, of the worthless and often disgusting trash, and of the wild fancies that, one time and another, have had the confidence of the profession as well of people, without a feeling of amusement.

The leading medical journals of the old school abound in acknowledgments of failure after the coming and going of each epidemic; and so, likewise, do the voluminous reports of governmental commissioners and inspectors.

After the epidemic of 1873, in the United States, a surgeon was detailed by the War Department to inquire and report upon it. After giving its history and noting the various lines of treatment, with comparative results, he says: "In the advanced stages of the disease the entire range of the Pharmacopœia seems to have been brought into use with no better results than have been obtained in previous epidemics." The number of cases reported to the surgeon was 7356, with a mortality of 52 per cent.; but this rate was moderate, compared with that of the epidemic of 1884 in France and Italy, which ranged from 50 to 90 per cent.

When it is remembered that all the lights of medical science in the hands of a profession, regulated by governmental boards and censors in those countries, failed to save more than one in four or five of the people attacked by cholera, the conclusion is irresistible that the boasted lights were worthless and the censorship a fraud, or there was some great obstacle in the way, some unusual hindrance to medical ministrations. When we read in the daily bulletins of the consternation among the people, how they not only had no confidence in what medical men could do for them, but were so possessed of fear that the doctors would make them worse by their experimental drugging that they actually drove them away by peltings with sticks and stones, we may begin to realize how little of promise was afforded by orthodox medicine in the large cities of those enlightened countries.

Where authority is given to official boards to regulate the practice of medicine there is, necessarily, an orthodoxy, a fashion, sustained by law as well as custom, that is deaf to the criticisms of heterodoxy, and intolerant of every proposed measure of medical reform.

At Naples, where more than six thousand people died with cholera, during August and September, 1884, Dr. Rubini, a veteran of more than fourscore years, with a record of success in cholera treatment equalled by that of no other man, appealed to the authorities in vain to provide *Camphor* for the people, a remedy which then, and often before, in his hands and the hands of others, had proved itself an almost infallible preventive. Speaking of this, Dr. Cigliano says:

"But it was not to be; and the welfare of the people has been sacrificed in obsequious obedience to Sardinian officialism, which is as careless of public gratitude now as it was in 1854, when Signor Giustiniani was forbidden to found, at his own expense, a hospital for the homœopathic treatment of cholera at Genoa!"

Prevention.—The failure in measures for the cure of persons attacked with cholera, on the part of traditional medicine, has given especial fervor to efforts for the anticipation and prevention of that disease. The surgeon commissioned to report to the United States Congress on the cholera epidemic of 1873, said (p. 15): "With the admitted uncertainty of therapeutic measures in this disease its outbreak at sea should be the signal for the most scrutinizing search for its origin, with a view of thence stamping it out." And, in concluding his recommendations, he said (p. 19): "The true remedy against cholera is preventive medicine."

These quotations plainly show the utter poverty of old-school therapeutics, and the urgent desire for prevention, as realized of late years in the highest quarters of that school.

In the new school, from the time of Hahnemann, there has been a full understanding of the importance of preventive measures, such as isolation, disinfection, hygiene, and prophylaxis.

The first publication upon cholera, from the pen of the master, issued in pamphlet at Leipsic in the autumn of 1831, contained strong and conclusive arguments upon the infective character of the disease and the necessity of isolation and disinfection. Clinical experience and earnest research have at last taught the medical world that he was right and Hoffman wrong.

Quarantine.—As cholera has never appeared in America and become epidemic without having shown itself, shortly before, in European countries with which we are in constant and comparatively close communication, the first step toward its prevention must be taken by the general government. Thorough inspection of all vessels coming from infected ports, and satisfactory proofs of no cases of cholera in transit, should be required before passengers and crew, and baggage and even merchandise, are allowed to land.

Detention and inspection, by United States authority, should be practiced upon all vessels coming to us during, and for months after, the prevalence of cholera in European cities; and where cases of cholera have occurred upon any of them while at sea, thorough disinfection, as well as detention, should be enforced. All baggage and clothing and bedding and the cargo, so far as exposed to the cholera miasm, should be removed, opened out, and subjected to dry heat and the fumes of sulphur in close apartments, and then sprinkled with a strong alcoholic solution of camphor before being removed from quarantine. And the detention of passengers and crew should be long

enough to allow the development of cholera in any who may have taken in the seeds of the disease.

Public Hygiene.—As the foothold and prevalence of cholera in a community depend somewhat upon conditions that man may control, such as the quality of air, of water, and of food, the second step toward prevention must be taken by the local authorities. The water supply should be carefully inspected and improved where subject to pollution; springs, wells, and cisterns, receiving sewage or filthy surface water, should be closed; areas, vaults, cesspools, alleys, and streets should be cleaned, and, where necessary, disinfected by special means. While no amount of impure air, or water, or food can produce a case of Asiatic cholera, they can afford a menstruum, or nidus, in which the seeds of that disease may germinate and multiply, and so beget an epidemic.

Private Hygiene.—When quarantine has failed to keep cholera out of the country, and public hygiene has done no better for the community, individual action is imperative.

Those residents who have a particular fear or personal apprehension of cholera, and those who are subject to diarrhœa, should leave upon the sure approach of the dreaded disease. They, and such others as may not be needed to attend upon the sick, or to supply the necessaries of life for the community, should take refuge in localities away from the usual highways of travel and commerce; and arrangements for such resorts should be made in advance of the first home cases, in order to avert a panic, and to avoid the distribution of the disease.

A community thus relieved is in better shape for the encounter, as physicians will have more time to look well after those who remain and are stricken down, and there will be less terror and neglect generally.

For those who remain, the following suggestions may be useful:

1. Make no change in clothing, except to put on something a little warmer, especially a bandage of flannel secured tightly around the body, extending from the arm-pits downwards.

2. Avoid sitting and, yet more, sleeping in a draft of air; stay in at night, and take the usual amount of sleep.

3. Take no unusual baths; especially avoid bathing in stale or stagnant water.

4. Take no unusual exercise, but attend to accustomed business.

5. Attend no meetings in chilly or damp weather, except in rooms properly warmed; and, in general, avoid groups of people where the subject of cholera is being discussed.

6. Keep away from rooms and houses in which there are, or lately have been, cases of cholera, unless compelled by duty to be there.

7. In diet make no great or sudden changes, except to avoid articles likely to induce diarrhœa, such as cabbage, cucumbers, roasted

green-corn, beets, turnips, squashes, new potatoes, snap-beans, etc. Most persons do well to adhere to bread, toast, crackers, rice, beef, breakfast bacon, well stewed tomatoes, and tea, cocoa, or coffee. Avoid articles, usually wholesome, that may be the vehicles of infection, such as milk (except when just boiled), buttermilk, cheese, etc.; and all articles of food or drink while in apartments occupied by cholera patients. Veal, poultry, fresh fish, and eggs are not safe. Ice-water, or large draughts of cold water, calculated to chill the stomach, are bad. The safest water is from cisterns that are allowed to take in no rains after the close of winter. Distilled or fermented drinks are unsafe; though it is not best to make too great or sudden changes in their use—especially not to increase them in quantity or frequency.

Fruits, especially uncooked, should generally be avoided. Much good may be done by relief committees in the distribution of rice, crackers, bread, beef, bacon, and tea and coffee, among the poor, who are largely dependent on cheap vegetables for nourishment, especially during a cholera epidemic, when their occupations and incomes are suspended.

Prophylaxis.—The homœopathic rule applies not only in the use of remedies for the sick, but likewise in the use of agents for the prevention of sickness in the healthy. This fact has been shown with great clearness during the prevalence of cholera, and is of too great importance ever to be forgotten or misunderstood. Without an effort at argument here, this proposition is submitted, that so long as the institution of a similar pathological condition is necessary for the removal of one already existing, a successful prophylactic must have the power to institute in the healthy organism a condition similar to that to be prevented. Vaccination for small-pox, Belladonna for scarlatina, and Camphor and Cuprum for Asiatic cholera, afford good examples. Whether the prevention comes from the exhaustion or molecular change of a stored material, or a tissue, the presence and original state of which constitute susceptibility in the individual; or whether a special power of resistance is aroused or developed, or a degree of tolerance effected, whereby the germs or morbific influences are made harmless, it is clear that an abnormal state is occasioned, and that that state is similar to the one effected by the disease to be guarded against.

Persons in the most robust health, with each susceptibility normal, or excited by a predisposing cause, such as already mentioned, are the ones first to take the cholera, and to have it most severely. Those, as mentioned by Hahnemann, gradually inured to the miasm, or subjected to the influence of a homœopathic agent, like Camphor or Cuprum, are exempt or only slightly affected by the disease. This fact we accept, whether its explanation, so far as made, be satisfactory or not. In the tract issued by Hahnemann in 1831, as the cholera was

approaching from Austria, directions were given for the use of Cuprum as a prophylactic agent. In the "*Cajeput oil*," imported from India in copper vessels, he recognized "a Camphor property as well as some portion of copper;" and, knowing that these agents were capable of inducing symptoms closely resembling those of cholera, and, further, that the Cajeput oil had proved very efficient in the treatment of that disease, he advised the use of Cuprum as a preventive, and Camphor as the first and most important remedy.

Copper plates, and chains, and rings had gained favor in Hungary as cholera preventives.

The ready and correct perception of the truth by Hahnemann, in the ætiology of Asiatic cholera, had its parallel in his ready and vigorous grasp of the truth in its prophylaxis. The indorsement of his views as to the former, throughout the medical world, is now nearly equalled by the sanction given to his recommendations as to the latter.

No prophylactic agents for cholera have been so successfully employed, during any epidemic in any country, as *Cuprum* and *Camphor*.

During the epidemic of 1884 in Naples, the latter was in greatest favor. Dr. Cigliano says: "The prophylactic which has enjoyed our entire confidence here (Naples) during the past epidemic, and also in those which preceded it, is Rubini's Camphor,* given in drop-doses, two or three times a day. A very large number of persons have used it, about fifty thousand, and all, with the rarest exception, affirm that they have been preserved by it, though they have nursed cholera patients, and have lived in houses wherein people have died with the disease."

Camphor was freely distributed to the poor from the Homœopathic Central Pharmacy of Naples, when the municipal and all other authorities refused to provide it for the people.

But, outside of Italy, Cuprum has been more frequently employed than Camphor, as a preventive. In the epidemics of 1831, 1849, 1854, 1866, and 1873, it made an excellent record wherever homœopathic remedies were brought into use.

Nor has all the favorable testimony come from the avowed advocates of homœopathy. Dr. Burq, of Paris, who had been investigating the therapeutic properties of metals variously applied, made the discovery in 1849 that workers in *copper*, foundrymen, machinists, and others, had experienced a wonderful exemption from cholera. In reporting his observations to the Academy, in Paris, he said: "The preventive effect was, no doubt, produced *directly* by contact, and in proportion to the amount of the protecting metal, and *indirectly* by simple vicinity, as in the case of those who are near a lightning-rod;

* A saturated solution made by trituration of the gum in alcohol.

at least, it is by the latter mode only that we can account for the marked preservation which was experienced by the neighborhood of nearly all the copper foundries, unless it may be attributed to the emanations from the metal, caused by its fusion, or, rather, by its manipulation in the workshop, either in the form of highly-attenuated particles, or of effluvia of a peculiar character."

Dr. Burq was inclined at the outset to the opinion that the electric or magnetic properties of copper and its alloys should be credited with the protecting power; though, as intimated above, he finally considered it possible that the inhalation and absorption of "highly attenuated particles" might have something to do with it.

After saying that the protecting power might reside in other metals, in proportion to their electric and magnetic similarity to copper, he said: "The *curative* power appears, on the other hand, to reside in copper alone, which would seem to act upon the cholera miasm as sulphate of quinine does upon intermittent fever. This curious property has been very often brought to our notice, attested by the most incontrovertible evidence; and many a workman or master of a copper foundry has been preserved from cholera because he continued to live in the midst of the *coppery* dust and emanations, while others lost their lives by fleeing from the, as they thought, infected atmosphere of the workshop."

The views and recommendations of Dr. Burq, as to the uses of copper in cholera epidemics, were largely indorsed by those who gave them any thoughtful attention, and copper chains and plates were worn by many people. But proofs accumulate from allopathic sources. The "miasmatic, animated beings," mentioned by Hahnemann, recognized and defined by Koch as microbes peculiar to Asiatic cholera, are consigned to sure and swift destruction, both within and without the patient, by the use of the *salts of copper!* During the epidemic of 1884, in France, the fact was developed that the views of Dr. Burq had gained the support of such great allopathic lights as Claude Bernard, Littre, Marchal de Calvi, Baron Larrey, and Professors Charcot, Luys, and Dumontpallier.

The latest theory to account for the fact of prevention is, that "salts of copper, taken in doses of from 15 to 20 centigrammes a day, albeit for weeks, harm neither man nor warm-blooded beast, but slaughter low organisms." Paul Bert, of Paris, leading all others in support of what the London *Lancet* facetiously calls the "Cupric Saviour," asserted that "these salts remain for some time in the system, and particularly in the liver, and are innocuous, unless taken in large doses, and the person whose liver is saturated with copper may defy cholera."

Without waiting to determine whether it be to the electric, magnetic, mechanical, antiparasitic, or homœopathic relationship to the morbific agency in cholera that the credit of protection is due, the

practitioner is very fully justified in exhibiting *Cuprum* as the best of all prophylactic agents.

Insoles for the shoes, made of very thin sheet copper, worn with only a thickness of ordinary hose between them and the feet, are more effective and more convenient than plates or chains elsewhere worn. The triturations of Cuprum, such as made in our pharmacies, should be taken, night and morning. The writer has prescribed the second decimal, in three-grain doses, with the happiest results, in every cholera epidemic in America except the first.

Therapeutics.—If Samuel Hahnemann, in his long lifetime, had done no more than to point out the real character of Asiatic cholera, with the best methods, public and personal, for its prevention, and the most efficient means for the treatment of its subjects, he would have earned a place among the world's greatest benefactors.

Of all the examples of the need of a general therapeutic law, and all the proofs of the value of the one stated in the terms, *similia similibus curantur*, not one has been so convincing and so glorious as that afforded in the homœopathic conflict with the great destroyer from the Ganges.

The approach of the dreaded monster in the countries of Europe was viewed with consternation, because no line of treatment, suggested by clinical experience or the learning of the medical profession, had been found successful against it. It was reserved for Hahnemann, to whom the relationship that must exist between morbid conditions and those instituted by drugs for their removal had been revealed, to name the remedies for cholera, in advance of any personal experience in the treatment of that disease. The little tract, written by him at Köthen, and published at Leipsic in the autumn of 1831, before he had ever seen a case of Asiatic cholera, pointed out the uses of three remedies, *Camphor*, *Cuprum*, and *Veratrum album*, which have saved more lives in jeopardy from that disease than all other drugs put together. In the entire history of medicine there is not an instance of such clear prevision on the part of a writer, and such faultless clinical confirmation of a therapeutic principle, as shown in that little pamphlet and in the literature of Asiatic cholera since 1831.

Hahnemann advised the instant use of *Camphor* on the appearance of cholera symptoms, one drop on a small lump of sugar every five minutes; also, in severe cases, the rubbing of the palms of the hands and other parts of the surface with it.

He also recommends an enema of two teaspoonfuls of Camphor-spirits in half a pint of warm water, and the evaporation of some of the same on a hot iron in the room—these latter measures especially when the patient was unconscious or unable to swallow.

When the case had progressed to what is now known as the second stage, characterized by cramps as well as severe vomitings or purg-

ings, he advised the use of *Cuprum* in place of Camphor, repeated every hour or half hour.

He also mentioned *Veratrum album* as an indicated remedy in such cases, used alone or in alternation with Cuprum.

For the typhoid condition, at times following a cholera attack, he recommended the employment of *Bryonia* and *Rhus tox.* alternately; and, in the last or collapse, stage, Camphor was again his favorite remedy.

While Hahnemann advocated careful individualization in medical practice, he was not slow to perceive that, with a specific cause, ever the same, and symptoms showing little variation in different cases, there could be no occasion for a great number or variety of remedies.

The logical method that had led him to a sound therapeutic principle, he would not discard in the hour of its greatest need, and he generalized drugs as well as symptoms. The most satisfactory success has crowned the efforts of those practitioners who have met the pathognomonic symptoms of cholera with the characteristic symptoms of drugs, wiping out the former, as by magic, under the pointings of *similia.*

Some writers (generally those who have never faced cholera on the battle-field) have questioned the homœopathicity of Camphor, claiming that it could be indicated only in cases designated as *cholera sicca;* but a proper examination of the pathogenesis of that drug will show that it is homœopathic, in the first stage of all cases,—to the shock, the chilliness, the depression, and the faintness of the invasion, and the flushing, the dizziness, and the epigastric heat of the reaction. In many, perhaps most, cases the invasion may not be noticed, nor yet the reaction that quickly follows, till nausea, vomiting, purging, or cramps set in. If it is a good maxim in financial economy that, "when the pence are well taken care of, the pounds will take care of themselves," it may be as good, in the management of cholera, to say that, *when the first stage is well taken care of, those following will take care of themselves.* Most wisely did Hahnemann recommend the use of Camphor, as an immediate preventive, by all persons obliged to attend upon, or come in contact with, cases of cholera. The vital resistance, properly aroused, may prevent invasion, or overcome attack, before the development of the most serious phases of cholera. And Camphor becomes the chief remedy, again, in the last, or collapse stage, of cholera, when the fury of the fight is past, and the forces of life are failing. It will bring back the pulse and restore warmth when stimulants and artificial heat have failed.

The most thorough and successful use of this remedy, anywhere reported, especially in late epidemics, has been in Italy. Dr. Rubini, of Naples, already referred to, has had an experience with it greater, doubtless, than any other physician.

In 1854–55 he treated 703 cases, losing but two: Dr. Tripi, of the army in Sicily, under the direction of Prince di Satriano, treated 641 cases, in 1854, losing twenty-five; Dr. Goth, at Geneva, the same year, treated 841 cases, losing seventy-two; all, with the saturated solution of Camphor. The more fully to show the confidence reposed in this remedy, a quotation is here made from a paper, in the *Monthly Homœopathic Review* (London), for December, 1884, written by the gifted Dr. Tommaso Cigliano, of Naples. He says: From observations made by ourself, and from those we have, with great care, collected from the aforesaid sources, as well as from the reports of patients who have either cured themselves, or been cured by their friends, with *Camphor*, we are able to draw the following conclusions:

1. In the incubation stage of cholera it is in every case successful in preventing the development of the disease.

2. In the early stages, that is, when there are already vomiting and purging, it arrests the disease and prevents its further development in 80 per cent. of the cases in which it is used; and when it fails in its quickly abortive action it will still, with perseverance and in increased doses, be the means of bringing on the desired reaction, even when the patient falls into the stage of collapse, provided that he be not disturbed by other remedies. In these cases the reaction will be developed in from two to six hours, or, more rarely, after from twenty-four to forty-eight hours.

3. In the stage of collapse it succeeds with almost certainty, provided that no other remedies have been previously used, especially such as laudanum and warm bottles.

4. In women the reaction is often later in making its appearance than in men.

5. In children, who often reject it by the mouth, it succeeds equally well when rubbed in over the stomach, under the armpits, and over the temples every half hour; and then no internal medicine need be used.

6. In the fever of reaction it is still indicated, two or three doses of one or two drops being given in the twenty-four hours. The fever in the majority of cases lasted twelve hours. In no case, where cure followed, were there any typhoid symptoms.

7. On discontinuing the *Camphor* during the stage of reaction, if there be any relapse, it will be cured by again resorting to the same remedy. But it is more prudent not to discontinue its use for some days, even after apparent recovery; though the quantity and frequency of dose may be reduced, one or two doses a day being sufficient. Only when each administration is followed by vertigo or other pathogenetic symptoms should it be given up.

8. In treating a case with *Camphor*, any other remedy, especially Laudanum, disturbs its beneficent action. Warm baths in a majority

of cases are injurious, and sometimes fatal. So, also, is changing the bed or linen during any delirium which may precede the sweating, and during the sweating itself. All these rules are important in securing good results from treatment.

Dr. Cigliano, after comparing statistics of treatment, claims that, whereas the mortality under the use of Camphor, Cuprum, Veratrum album, Arsenicum, and Carbo veg., and other remedies, after the usual manner of the books, at the best is not less than five or six per cent., under the use of *Rubini's Camphor* alone, it may not exceed one per cent., the average rate of mortality under the use of Opium, Calomel, and other allopathic drugs being, at the same time, over 50 per cent.

Rubini's Camphor has been given usually in five-drop doses on small lumps of sugar; in grave cases it has been given in ten- or fifteen-drop doses repeated every fifteen minutes.

During the prevalence of cholera in a community, or in places not far away, prompt attention should be given to disorders of stomach and bowels, especially to any fulness in head, dizziness, nausea, or diarrhœa. Beside the uses of Cuprum and Camphor, as already indicated, it is necessary, in case of diarrhœa, to employ *Arsenicum*, if the stools are quite liquid, of brownish or greenish color, attended with great thirst, nausea, or a sense of epigastric oppression; *Croton tig.* or *Ricinus*, when the stools are more liquid, of lighter color, and more copious and gushing.

When the pathognomonic symptoms of cholera are present, and Camphor has failed to prevent the progress of the disease, the following remedies may be successfully employed: *Cuprum met.*, when there are cramps in the limbs or muscles of the trunk, with or without vomiting or purging, a dose every half hour; *Veratrum album*, when there is extreme nausea, active vomiting, gushing, almost involuntary stools, with other grave symptoms. In full and urgent cases these two remedies have been very successfully used in alternation fifteen minutes apart. When there is great perspiration, with coldness and blueness of skin, and other appearances of collapse, *Camphor* should be given, and, if the cramps persist, it may be given in connection with the *Cuprum*, say two doses of the former to one of the latter, ten minutes apart.

Other remedies, more or less homœopathically indicated, have been employed with some reported success, such as *Cuprum arsenicosum* (Arsenite of Copper), *Phosphoric acid*, *Secale cor.*, *Hydrocyanic acid*, *Jatropha*, etc. These and others, which may not be discussed here, are to be considered in exceptional cases, or in the absence of the more efficient remedies already named. In cases of excessive nausea, vomititing, and cramps, the Arsenite of copper promises much.

In regard to *Veratrum* it should be mentioned that, after its successful use in homœopathic practice for more than fifty years in cholera epidemics, an old-school writer of distinction, Privy Councillor Dr.

von Blödau, of Sondershausen, discovered *Veratrin* to be an excellent remedy for cholera! "Having frequently administered strong doses of *Veratrin* as a remedy against cramps in the calves of the legs during sleep, and always with success, he concluded that, as it possessed a stimulating influence on the spinal nervous system, it might restrain the danger of threatening symptoms in cholera." Dr. Weber, of Cologne, has written on the same uses of the drug, but honestly acknowledges that the Veratrum album had been for a long time known to homœopathic practitioners as useful in cholera. In regard to the preparations or attenuations in which the remedies should be used, the writer would say that each prescriber should be fully persuaded in his own mind. His own experience, which has been ample, taking in every epidemic that has occurred in America since that of 1832–33, has given him greater confidence in the lower attenuations, ranging from the first to the sixth decimal, except in the case of *Camphor*, when he would use *Rubini's saturated solution.*

In conclusion, on the medicinal treatment of cholera, it should be said that the most successful practitioner will ever be the one who, quickly recognizing the foe, selects and adheres to well-tried remedies, nothing doubting as to good results. He who takes time to search a repertory with a long list of drugs, each of which may have displayed some symptom similar to one characteristic of cholera, will often find his patient fatally collapsed before his individualizing pursuit is satisfactorily ended.

Accessory Measures. — As already intimated, the successful management of cases of cholera does not depend entirely on the drugs administered. The patient should be enjoined to obey certain requirements, among which these are the chief.

1. To lie down at once and keep still, not rising from the pillow to take the medicine, nor even in the act of vomiting or purging. Let pans and cloths be used so as to receive and remove ejecta promptly and effectually. The matters ejected should be mixed or saturated with a strong solution of sulphate of copper or carbolic acid, and then burned as speedily as possible—in no case being deposited in a cesspool or sewer.

2. To have courage and confidence in what is being done, and a determination to survive the attack. To this end the physician and all attendants should be self-possessed and cheerful, not allowing a word or look of discouragement.

A few sharp words to patient or nurse, or some rallying jests from the physician, have sometimes broken the spell of fear and snatched patients from the jaws of death. The room of the cholera subject is no place for long-faced or undecided doctors and nurses.

3. To take no food till the progress of the disease is checked; and

to abstain from drinks also, taking moderately of pounded ice, when the thirst is intolerable.

4. To keep well under covers, not too heavy, so as to preserve vital heat. Artificial heat, in bricks, irons, bottles of hot water, etc., is of service only in the stage of collapse, after the evacuations and excessive sweating have ceased.

When there is no more vomiting, and a desire for nourishment is expressed, well boiled rice-water or barley-water, seasoned slightly with salt, may be allowed; and when that is well borne and something stronger is desired, beef tea, without grease, may be taken.

Sequelæ.—Patients treated homœopathically seldom have the inflammatory affections, or fever, observed to follow cholera attacks, where opiates, astringents, and more heroic drugs have been freely used. Should there be any such, they must have the remedies indicated and usually employed for the same conditions arising from other causes.

ERYSIPELAS.

BY J. G. GILCHRIST, M.D.

Erysipelas, otherwise "St. Anthony's fire," or the "rose," is a peculiar form of inflammation attacking, for the most part, the skin, subcutaneous cellular tissue, and mucous or serous surfaces; it is contagious in character, and essentially of a typhoid nature. It spreads rapidly, and destroys the parts affected to a considerable extent, desquamation or suppuration being the common forms of termination. The term suppuration is used in default of a better, as in this case there is a liquefaction of tissue, and not an active cell-proliferation, a disintegration rather than any genetic action.

The disease, under one name or another, has been known and described in all ages; Hippocrates (*Epidemics*, Bk. iii.) gives quite a full account of it, one that could be used to-day without much change; Galen, Celsus, and in fact nearly all the writers of antiquity, treat exhaustively of the affection, differing little in their description, but widely in their theories of causation. At all times, however, the fact seems to have been quite generally recognized that the affection is not a local one, and Stillé (*Encyclopædia of Surgery*, I., 161) practically covers the ground when he gives the following definition: "Erysipelas may be defined as an acute, specific, and contagious fever, tending usually towards a typhoid type, and characterized locally by a peculiar inflammation of the skin or mucous membranes."

Symptomatology.—It will be observed that there are two forms of erysipelas, in a sense, the idiopathic, or symptomatic, and the traumatic or surgical; in essential particulars there is really no difference, but clinically the differences are important. The surgical form

of the disease, as the name implies, occurs in connection with wounds or other injuries. The first symptoms are something as follows: There is a chill, more or less violent and prolonged; occasionally something as to the intensity of future symptoms may be prognosticated from the character of the chill, the disease being grave or mild as the chill is severe and prolonged or slight and short. The temperature rises rapidly, there is increase of such fever as may have already existed, or the fever commences *ab initio*. The glands of the part are found enlarged, as also those of the cervical group and the supra-clavicular; the wound becomes dry, the discharge ceasing; if any union has already taken place, the parts fall asunder again; the margins of the wound become everted, more or less swollen, and the color of the raw surfaces becomes dulled, more or less of a leaden hue. Soon a serous, sanious, or "ichorus" discharge appears, becoming quite profuse, sometimes assuming a pus-like character, but the absence of healing forbids any hope that resolution has commenced. The fascia, connective tissue, sheaths of the muscles, tendons, ligaments, cartilage, bloodvessels, and bones successively become devitalized and slough, in about the order named, so that, should recovery be secured, it is almost invariably at the expense of great tissue loss. Other local and general symptoms correspond with those of the symptomatic form, soon to be considered. The occurrence of surgical or traumatic erysipelas, therefore, is to be anticipated when the wound becomes dry, and the patient has chill, fever, and glandular enlargement. It will be observed that puerperal peritonitis presents the same premonitions, and the surgeon must remember that septicæmia, pyæmia, and perhaps tetanus, have a similar commencement. From these facts I am inclined to argue an identity in these various processes, a consideration which will be had later. Perhaps, however, the gravity of surgical erysipelas may be largely due to its occurring from an open wound, which predisposes to more rapid disintegrating processes from its communication with the open air.

The commencement of erysipelas of the symptomatic form resembles the stage of invasion of most, if not all, the eruptive fevers. There is a feeling of undefined illness, perhaps aching of the back and limbs, headache, loss of appetite, often vomiting with or without nausea, coated tongue, a diminution (or increase) of the urine, and some disturbance of the bowels. In some instances there is a convulsion, particularly in post-puerperal cases. In the cases of lying-in women there will be a suppression or change in the lochia, and in those who are bed-ridden, or suffering from any chronic illness, if there is a discharge of any kind, it will likely be suppressed. These symptoms are not peculiar to erysipelas; they are common to all acute febrile maladies, particularly the exanthemata. Some hours, their number varying greatly in different cases, after the commencement of these premonitory symptoms, there will be a chill, sometimes very severe

and prolonged, at others short and scarcely noticed, followed by fever of corresponding intensity. The pulse is full and strong, the surface-heat intense, frequently reaching 104° F., or above; the tongue is heavily coated, and all the usual symptoms of sthenic fever appear. The tenderness of the lymphatic glands now becomes very obtrusive, but it is a clinical fact of some value in diagnosis that more or less swelling and tenderness of the lymphatics may exist for days before there are any pronounced symptoms of erysipelas. Some authors, indeed, consider swelling and soreness of the cervical glands, when occurring without assignable cause, as an almost certain promise of erysipelas. Later symptoms now depend upon the part affected, whether an external or an internal surface; the symptoms, of course, are the same in either event, but as the internal parts are for the most part removed from actual inspection, the physician in making his diagnosis is compelled to rely very largely upon the subjective sensations experienced. In the account of these symptoms I propose to describe the appearance of external surfaces, or of those which can be brought into view.

The part about to be invaded by the inflammation of erysipelas, at first feels tight and constricted, usually within two days from the first premonitory symptom, which soon gives place to, or becomes mixed up with, an itching or burning-itching, quickly succeeded by a steady pain, which grows worse at night and upon being touched. The itching and heat continue with the pain throughout the course of the active disease. About the time the pain commences, a faint red blush appears, gradually extending its circumference, and becoming deeper in color, until in severe cases it is purple, almost black. At the same time the part becomes greatly swollen, with a sharp line of demarcation. This feature is peculiar in this form of inflammation. The redness and swelling do not shade off into the surrounding healthy parts, but terminate abruptly; in persons of a fair complexion the contrast between the inflamed surface and the healthy skin is most marked. The swelling is proportionate to the laxity of the tissue affected, or the amount of areolar tissue; in the scrotum or labia, or about the orbits, the swelling will become so enormous that the natural appearance of the part is completely lost. In parts of a denser or less distensible structure, the swelling may not be very prominent, but on passing the hand over it the abrupt line of termination is distinctly detected, the tissues actually inflamed being felt as hard and dense, and the skin roughened. On applying a magnifying glass, the papillæ are found enlarged from the injection of the skin, which is also covered with a fine vesicular eruption. In cases which may be considered idiopathic, or which arise without assignable cause, particularly when there exists neither traumatism nor history of exposure to

contagion, the first symptoms oftener appear in the face, particularly across the bridge of the nose, or about the genitals.

The inflammation, having once commenced, extends in all directions, although not uniformly or steadily; it sometimes extends in one direction, then starts off in another, in either case spasmodically, remaining stationary for a day, then suddenly rapidly extending, with an accession of fever. In some cases, known as the wandering form (or *Erysipelas ambulans*), fresh points of inflammation start up at a distance from the original outbreak, apparently without any reason or order of development. Thus it often occurs first at the root of the nose, next on the ear, then on the cheek, then, a coalescence of these detached patches takes place; next, the other side of the face will go through the same process, whence the inflammation extends over the entire head and scalp. It is a curious and inexplainable fact that the chin is very rarely involved, even when all the rest of the head and face is affected. The skin does not "pit" on pressure, nor is it elastic; it feels hard and brawny, except in late stages of some forms (*phlegmonous* and *œdematous*), when it becomes baggy. These are the local or peripheral symptoms, the pain, heat, swelling, and redness being extreme, showing the most intense inflammation, yet with many important differences from ordinary phlogosis, such as the hardness of the parts and the abrupt termination of the swelling and discoloration.

The general symptoms increase in intensity *pari passu* with the local manifestations. The fever is intense, the temperature running up to 105°, or even higher; the mind becomes clouded, or actual delirium is set up; the tongue is heavily coated; there may be diarrhœa; the urine is loaded with urea, and more or less albumin is found in it; there is much debility, with trembling of the hands on raising them; the teeth become covered with sordes; chills are frequent at the commencement of each accession of fever; nausea and vomiting are common, and the skin is dry and hot. In fact, the general symptoms are of the gravest character, and are in harmony with the alarming appearance of the objective phenomena. The invasion of the skin has the effect to arrest its transpiratory functions, hence there is increased work imposed upon the other emunctories, resulting in diarrhœa, various kidney affections, or effusions, as into the ventricles of the brain when the head is chiefly affected.

The temperature forms a very valuable indication of the course of the disease, and often serves to mark a distinction between erysipelas, pyæmia, and septicæmia, conditions which I nevertheless believe to be essentially different expressions of the same morbid action. In erysipelas the temperature runs up, in the beginning, to 104°, or very nearly; the thermometer rarely marks anything less than this until resolution commences. Sometimes it runs down to 102°, in the morn-

ing, when a remission of the fever is quite the rule, but it never gets down to 100°, or lower, until the disease is near its termination. When the fever has reached its maximum, and a change occurs, it is common to note a fall of temperature, even in the course of a single night or hour, to normal or something below. If it falls one or two degrees, certainly if three degrees, below normal, a fatal issue is to be feared; if it falls to normal, or very near it, on either side, even though it may rise again slightly at night, a favorable termination may be expected.

In pyæmia the temperature reaches 105° or even 107° F., regardless of the time of day, without any regularity, and in an hour or two it falls to 98° F., or lower; it fluctuates between this and 100° F. for a day or for a few hours, and then shoots up again to a great height, to again fall as rapidly. The peculiarity in pyæmic thermographs is the sudden, extreme, and irregular fluctuations in the temperature, resulting in long, needle-like tracings. The elevations gradually becoming lower, and the depressions not as far below zero, renders a prognosis good.

In septicæmia the temperature is always above normal, but not more than two or three degrees; it is regularly higher in the morning and lower in the evening; the variations are regular and of limited range, always above the normal point unless a fatal termination is threatened, when it falls suddenly below normal, and does not again rise above that point.

The observations of temperature in these allied affections are of great value in furnishing a ready means of establishing a differential diagnosis and a prognosis. Finally, it may be noted that, while in most acute affections death occurs with a low temperature, in erysipelas a fatal termination usually, but not always, takes place with a high temperature.

The intensity of the fever having reached its maximum, the symptoms gradually abate; the sharp line of demarcation becomes less distinct, the induration gradually softens down into the healthy feeling, and the color in the surrounding parts gradually assumes the normal tint. As the swelling subsides, the skin lies in wrinkles, the epidermis peeling off in scales or strips, or even in a powdery, scurfy desquamation, leaving the parts bright red and sensitive for some little time. Unlike many of the exanthematous fevers, one attack of erysipelas does not protect from subsequent contagion; as a matter of fact it is quite the reverse, and those who have had a severe attack are constantly liable to a recurrence, at uncertain intervals, and on very insignificant provocation. Erythema is frequently described as erysipelas, and it may, indeed, be held to represent a mild form of the disease; quite commonly it is the form described in the vulgar use of the word.

The above refers particularly to erysipelas as it affects the skin or the mucous surfaces, and represents the common form of the disease.

When the case is more severe, and the deeper structures are involved, additional symptoms must be noted. The skin, in such cases, is raised in blisters containing a clear yellow serum; the color becomes considerably darker, and the hard, brawny feeling gives place to a soft, doughy one. When this change occurs, with a lowering of the temperature and a subsidence of the fever, it is indicative of approaching resolution. But the temperature remaining high, or even going up somewhat, the fever, if changed at all, is increased, and the general symptoms become more grave. Indistinct fluctuation is sometimes elicited, and the experienced practitioner knows at once that the worst has yet to come. In subacute cases there is an attempt made, not always successful, to limit the boundaries of what has now become a vast diffused abscess; but, in acute cases where the morbid action is so violent that plastic organization cannot keep pace with the advancement of the inflammation, or in chronic cases where organization is too feeble to oppose any barrier, the pus is widely diffused under the skin, dissecting it up from the deeper parts, and only arrested by its reaching some fibrous or tendinous obstacle about the joints; in extreme cases, however, even these tissues are powerless to prevent the onward march of the disease. The skin finally gives way, or is opened by the surgeon, and the deeper parts are found to be extensively disorganized; the areolar tissue is destroyed, the skin is perfectly free from deeper attachments, the muscles are separated from each other, and collections of pus occur wherever it can find a cavity in which to lodge. In the worst cases the fascia and connective tissue come away in masses or strips, looking like "wet chamois skin;" the muscles and other soft parts become gangrenous, the integument sloughs, and lastly, the bones and cartilages are destroyed. When the destruction is limited to the skin and fascia, extensive ulcers form, which are healed with difficulty, often producing some such deformity as results from deep burns or scalds. There are occasional instances of complete separation of the skin from deeper parts, and yet recovery follows evacuation of the abscess without death of the integument.

The constitutional symptoms in this form or stage of erysipelas are severe, and of the most ominous character; diarrhœa, hectic sweat, chills, delirium, increase of fever, and great prostration are commonly noted. This form of erysipelas is spoken of by older writers as *phlegmonous*, a significant term, and when these characters appear from the commencement, it might be proper to consider it a distinct form of the disease. Inasmuch, however, as the symptoms described often appear as secondary, or as a late stage of the ordinary form, there does not seem to be any necessity for retaining the old and artificial classification.

So also with what was formerly called *œdematous erysipelas*, which is a simple modification of erysipelas simplex, the inflammation being

of a low grade, the color of the skin paler, and with a tendency toward œdema. It represents the chronic form of the disease.

Some writers and teachers speak of still another form, the *gangrenous*, but careful study of the literature of the subject, and particularly of clinical reports, will soon establish the fact that they are, each and all, simple modifications of a common type; circumstances, relating to the patient or his surroundings, determining greater or less malignity in the morbid action. The same remarks apply to the so-called "metastatic" or "ambulatory" form, the "visceral," "peritoneal," "pelvic," etc., which all represent either a modification due to the tissues invaded, governed by the resistance one tissue opposes to such influences more or less than another, or some accidental occurrence to which the individual under observation may have been exposed.

Limited space forbids an exhaustive treatment of these manifold modifications; the reader is therefore referred to the articles on *peritonitis*, *peri-uterine cellulitis*, *pelvic cellulitis*, etc.

Ætiology.—The symptoms enumerated show a morbid process of great intensity and exceeding gravity. It is a question of interest to inquire what are the causes which operate to make this form of inflammation so much more dangerous than others. As already stated, the disease is practically a *fever*, a constitutional affection, the local inflammation being a peripheral symptom by means of which the disease is recognized. While not inclined to accept the doctrine of germ implantation, which is quite generally held to-day, I am unable to satisfactorily account for the occurrence of the disease on any other ground if *material* contagion is conceded; at the same time, even this teaching falls very far short of the necessities of the case. If the disease is parasitic, the parasite must be discoverable; if it is due to the lodgment of germs or spores, these micro-organisms should be present in every case. The facts seem to be otherwise. That the disease is contagious none can question; that it may be epidemic must be at once apparent. These two facts would argue that the contagion is material, and the germ theory is the only plausible one from a materialistic stand-point. We will remember that syphilis has a similar ætiology, a material contagion, and yet the pus cell, the vehicle of contagion, cannot be differentiated from other pus cells. The materialistic germ-doctrine is not invulnerable, and whilst it affords a convenient explanation of phenomena perhaps otherwise unexplainable, yet it has been too rudely assaulted of late to warrant our trusting to it until time has settled the question of its trustworthiness. The many micro-organisms credited with being causative of so many morbid conditions may well be conceded to convey infection to those not protected against their influence; yet, it is more than questionable, in my mind, if they have any higher part to play than that of mere carriers; in other words, it may be that they themselves are

without pathogenetic influences or properties, but may be charged with a virus which they convey from one to another, as flies carry putrefiable and putrescent matter.

Another question arises, viz.: has the contagion thus communicated any *specific* contagious properties, or does it act as an irritant, an accidental exciting cause? We know that with a predisposition to erysipelas, whether in the individual or from peculiar epidemic influences, a very slight irritation may be sufficient to give rise to the most severe form of the disease. This is the case in so many forms of morbid action that the mention of the fact is all there is needed to call attention to it. It is a clinical fact that the greater number of cases occur in the winter and spring months, a season when exposures to "check of perspiration" or suppression of habitual discharges, whether normal or not, are common. As to individuals, the bed-ridden, the wounded, the lying-in women, and the aged, as well as the ill-fed and poorly-housed, are more liable to contract the disease than are others more happily situated. These facts are important, and have led to the following conclusions as partly explanatory of erysipelas.

I think it was Mr. Durham who said that defecation is as important a function of the body as is its nutrition. When we consider the enormous elimination going on through the skin, the lungs, the kidneys, and the bowels, the very mention of the amount must be indicative of the great value of such elimination, the various solids, fluids, and gases of which it is composed being putrefiable and putrescent matter, dangerous to health and life if retained in the body. The suppression of but one of these excretions is well known to be followed by dangerous symptoms. Take, for instance, suppression of urine in acute maladies; what physician is there who has not the most intense interest in the reëstablishment of the flow? What surgeon fails to be solicitous about the brain, or the intestinal canal, when the transpiratory function of the skin is destroyed by an extensive burn? It will not do in such cases to depend upon the compensative efforts of nature, for they are unreliable; urinary suppression is not *always* (far from it) compensated for by increased integumentary excretion, nor is the opposite condition. It requires little more than a statement of the facts, therefore, that the function of defecation, if not equally important as that of alimentation, is at least a highly necessary function, and health and life are prejudiced when it is seriously disturbed.

It is found that in traumatic and puerperal erysipelas the first indication is an arrest of repair and a suppression of secretion; partly united parts fall asunder, and the discharges disappear. This shows two important changes: first an arrest of defecation, comprehending a retention of morbific, effete elements within the body; second, the conversion of an excreting surface into an absorbing one. If addi-

tional proof were needed, look at the tender lymphatic glands, the swollen and irritated, perhaps inflamed lymphatics; the primary constipation, the diminished urine, with the increase of urea and other evidences of waste in it. This is the beginning of erysipelas, as it is of septicæmia, of pyæmia, and of tetanus; hence, it seems to me, erysipelas is of septic origin. It is also well known that idiopathic erysipelas is quite frequently caused by being chilled, by exposure to a strong wind, or by unusual bodily exertion. Here is an abundance of reasons for attributing even this form of the disease to an arrest of elimination; the cutaneous elimination is suppressed, the surface feels hot and dry, the lymphatics are tender and swollen, and perhaps the renal secretion may be slightly increased for a time. In short, so far as I am able to form a conclusion from a somewhat extended reading and clinical experience, I feel assured that the controlling element in the ætiology of erysipelas is the arrest of defecation, with a resulting conversion of the excreting into absorbing surfaces.

Examples are abundant which seem to show that the germs of erysipelas, essential to its production, may find entrance into dwellings and hospital wards through sewer gas or from defective drainage and ventilation; these facts have led many careful students to attribute the outbreak of erysipelas to specific contagion through these sources. For example: "In Middlesex Hospital, London," says Dr. Stillé (*loc. cit.*), "it was observed that the only patients attacked with erysipelas in a certain ward were those who occupied two adjacent beds. After long searching in vain for the cause of this peculiarity, it was discovered that the pipe of a water-closet which ran behind the plaster of the wall at this place, was defective. It was repaired, and no more cases of erysipelas occurred at the time. But ten years later, the same beds became unhealthy with erysipelas, and the same remedy put an end to the disease." This is simply one case out of hundreds which are quoted to show the material character of the poison, but I am unable to accept them as proof of the positions taken. It is true, beyond question, that the disease is often produced in this way; the stoppage of drains, the leakage of gas or of water-pipes, and many other similar occurrences, may act as the exciting, nay, as the *direct* cause of erysipelas, and yet there may be a want of proof that any specific morbid principle results therefrom. The effect of impure air, particularly in dormitories, is generally recognized as being septic, especially upon the wounded, or upon those who are similarly exposed to the absorption of floating particles in the air, or which may be brought into contact with the absorbing surface. The result of exposure to such influences as in the cases mentioned would be to induce septic difficulties. Another class of cases seems to bear out this assertion, although they are quoted indiscriminately by the same authors as proof at once of the material nature of the contagion and of its resi-

dence in impure air. The same author, Stillé, says (*Encyclopædia of Surgery*, I., 165): "Again, in the hospital at Rostock, it was found that those patients only who had recently undergone surgical operations were attacked with erysipelas. After fruitless researches the pillows of the operating tables, which by long use had become saturated with blood, fell under suspicion, and were replaced by new ones, after which no more cases of the disease occurred. The soiled pillows were then treated with hot water, and an extract procured with which two rabbits were inoculated. One escaped unharmed; but the other was attacked with severe inflammation of the skin and connective tissue, which spread extensively, and was accompanied with blisters, gangrene, and fever, from which, however, the animal finally recovered." Here is a representative of a large class of cases, quite different from that formerly quoted, and yet pressed into the same service. Again we admit the fact of causation, but deny its specific character. The same causes are universally recognized as essential to septicæmia, and I hold to the belief that the diseases are the same in *kind*, whatever difference there may be in *degree*. If asked what is the explanation of one case being simple septicæmia, and the other erysipelas, I can only answer by asking one in return, viz.: why does bad sewerage in one case result in diphtheria, in another in typhoid fever, in erysipelas in a third, or in septicæmia in a fourth? Probably because these morbid conditions are really identical, differing only as one individual differs from another. The present state of science will not permit a more definite answer.

But what shall be said of epidemic erysipelas, particularly when malignant, as it very often is? Here inoculation reproduces the erysipelas, and any doubt about its specific nature is set at rest. If there is any ground for the doctrine of specific germ implantation, it is here, and yet I am not prepared to admit its correctness. It is an established principle of pathology, I take it, that inflammations of peculiar characters,—specific, if you will—reproduce themselves. The extension of carcinoma, of syphilis, or of tuberculosis, is a literal extension of the disease by an extension of its inflammation. There is a *specific* character to the inflammation. In malignant epidemic erysipelas, or in epidemic puerperal peritonitis, which is the same, there is an unquestioned propagation and extension of the disease from one to another by material contagion, but the contagious element is derived from those previously infected, and so on until we reach the first case, when the question might arise, whence is this infection? Often there is no palpable cause for it; or if there is, the cause is of precisely the same character as would produce septicæmia, or in others a more benign form of erysipelas.

We are now prepared to sum up the ætiology of the materialistic

doctrine, that is, the implantation of germs. Orth, according to Stillé (*loc. cit.*), gives probably the best summary in the following:

"1. Epidemic traumatic erysipelas is caused by a poison in the blood as well as in the secretions of the affected part."

"2. These secretions are capable of producing erysipelas by inoculation."

"3. Bacteria are generated *pari passu* with the development of erysipelas."

"4. Bacteria stand intimately related to the septic cause of erysipelas, for its characteristic symptoms may be produced by artificially propagated bacteria."

"5. But bacteria are only an indirect cause of the disease, since they are not formed abundantly in the blood of infected animals, and because they may be removed without entirely destroying the infecting liquid."

"6. Bacteria appear to belong to the microspheres and schizomycetes."

"7. It is probable that in different forms of the disease different micro-organisms occur, but thus far no proof of this proposition exists."

Few will be likely to deny the fairness of the summary given above, or question that it gives less than the actual state of science. Few, if any, again, will be likely, after careful consideration, to deny that the "hypothetical is in excess of the demonstration." There is much to be taken for granted, and even then there is a sufficient number of weak points to cause wise men to avoid hasty acceptance of the doctrine.

My own position—and I think there are a large number who agree with me—is that the bacteria may possibly be *a* cause of erysipelas, but not from any specific action; they may convey the infection, as carriers or vehicles, or they may furnish the conditions of septicæmia in their own dead bodies, adding just so much more to the septic material already abundantly applied in the retained excreta; as actively causative, in their character as bacteria, there is so much doubt that I feel warranted in excluding them altogether from the list of ætiological factors.

My belief is, therefore, that erysipelas arises from a suppression of excretion, a retention of putrefiable material in the body, and the consequent establishment of septicæmia, which develops erysipelas, as one of its forms, from conditions as yet not understood, either within the body, from surrounding external influences, or from both.

Pathology.—The morbid anatomy of erysipelas is similar to that of other typhoid conditions when the morbid action extends deeper than the integument. In the lighter forms, those which are confined to the skin or mucous membrane, the parts are filled with a sero-

fibrinous exudation, rendering them thicker and more firm than usual, the exudate being filled, more or less, with leucocytes. In later stages the white corpuscles are found to be granular, and in many cases disintegrated preparatory to absorption. The blood is quite generally found to be significantly altered, the proportion of leucocytes being increased from 1 to 200, or less, to 1 to 15 in extreme cases; in all cases, it is said, there is a marked increase in the colorless corpuscles, frequently double. The spleen, and other "blood-glands," are often found enlarged, ulceration of the intestines, with hæmorrhage, often occurs, and without a previous history of the case an anatomist might be pardoned for supposing he saw lesions indicating leucocythæmia. Frequent attacks of cuticular inflammation leave the parts permanently thickened and more or less stained.

When deeper tissues have been involved, the skin is frequently found dissected up from the muscles and fascia, the subcutaneous areolar tissue having been destroyed for long distances. The muscles are found softened, the connective tissue in large sloughs, collections of pus in the muscular interspaces; the glands are swollen, softened, and often filled with pus; veins are plugged with thrombi, even arteries are closed with clots, and all the soft tissues are in a more or less disorganized or gangrenous condition. The periosteum is sometimes raised from the bones; the bones themselves occasionally are necrotic; cartilages are swollen and softened, and sometimes detached from the bones.

Apart from the enlargement and engorgement of the spleen, and perhaps of the thyroid gland, the viscera rarely show any lesions unless they have been directly implicated. The intestines, however, particularly in the neighborhood of the glands of Bruner, are very frequently ulcerated, as occurs in cases of severe burns or extensive scalds from steam, and for similar reasons; that is, the arrest of cuticular transpiration, by the destruction of the skin, determines an increased effort on the intestinal glands as well as other emunctories, resulting in hyperæmia which may become inflammation, and ulceration follows from the general adynamic state. Hence the occurrence of diarrhœa is always ominous, more particularly if it is at all bloody, and should prepare the attending physician for the occurrence of hæmorrhage from the bowels.

Although the mind is so commonly affected in erysipelas, it is not usual to find any lesions in the brain; even when the head has been chiefly affected, some effusion may occur in the arachnoidean spaces or the ventricles, but rarely to any considerable amount. The arteries do not seem to be enlarged, and there is no evidence of inflammation, but the veins are occasionally found filled with blood.

A fact observed in connection with phagedæna is prominent in the general pathology of erysipelas: the muscles may be extensively de-

teriorated, as also the tendons, the periosteum, or even the cartilages, but the bloodvessels, particularly the arteries, and the nerves, resist the morbid action to the last. Their track is usually found converted into sinuses, but they themselves are seen lying in the pus without any appreciable injury to their tissues. They are last to yield, and in fatal cases death is produced from other causes before any injury is inflicted upon them. In fact, I know of no instances of hæmorrhage from ruptured bloodvessels, apart from intestinal ulceration, occurring as a feature of erysipelas.

Diagnosis.—There does not seem to be much room for confusing erysipelas with other inflammatory conditions, unless it may be to confound it with erythema; this malady, however, may justly be considered a minor degree of the affection. In inflammation proper, the redness shades off imperceptibly into the healthy color of the part; the swelling, likewise, gradually merges into the normal tissue; there is little induration, pain is comparatively slight, and unless very extensive, there is little constitutional disturbance. Angeioleucitis, or lymphangitis, may in some respects resemble erysipelas, but it commences suddenly, runs a very rapid course, and the redness extends in streaks, following the course of the lymphatics, and often terminating in a swollen and tender gland, or taking a fresh departure from such a point.

In erysipelas there are some marked and pathognomic symptoms. Chiefly there is the abrupt termination of the swelling and redness, the local pain, and the general constitutional disturbance. Joined to these is the rapid rise in temperature. It seems hardly possible to mistake erysipelas for any benign inflammation, even when of a minor degree, of the face. Prior to the appearance of the eruption, in idiopathic cases, there may be some uncertainty as to what is coming; but in traumatic or symptomatic cases, the suppression of the excretions, the swollen and tender glands, the rapid access of fever, and the arrest of repair in the wound should put one on guard. Whilst tenderness of the cervical glands is generally esteemed an almost certain premonition of erysipelas, yet it is well not to attach too much importance to it. My experience has been that it depends very greatly upon the point about to be attacked: when the outbreak occurs in the upper extremity, or trunk, the axillary glands are enlarged; when in the lower extremity, the glands in the groin are similarly affected. There are a few instances, however, of erysipelas of a severe form coming on without any preceding glandular swelling. Exceptions to the rule then exist.

Prognosis.—Experience has amply demonstrated that under homœopathic management the prognosis of erysipelas is vastly better than is generally given in standard text-books. As far as the lighter forms are concerned, the remark of Trousseau that they recover with-

out treatment, is true; the graver forms of epidemic and traumatic erysipelas, the same authority says, will nearly always terminate fatally. In fact, there are some good authorities who think the sole function of the physician, in these severe cases, is to "smooth the pathway to the grave." It is in this class of cases that the superiority of homœopathic therapeutics is manifested, the percentage of mortality being very low. In general terms it may be said that cuticular erysipelas is almost invariably cured, providing there are no deeper complications, as extensive abscesses and the like.

Epidemic, traumatic, malignant erysipelas has a natural tendency to terminate in death. The prognosis depends upon many conditions. When the swellings become less brawny in feel, the sharp line of demarcation commences to disappear, the temperature falls, the color is lighter, the fever abates, the tongue cleans off, and the pain diminishes, a favorable termination may be expected. So long as the induration terminates abruptly, the morbid process is active; improvement does not commence until it begins to shade off into the healthy parts.

Supposing this to occur, the parts become softer, but boggy, the temperature still remains high, or may even continue to rise, the fever is undiminished, and the constitutional symptoms remain unchanged, then the indications are that the erysipelas has become phlegmonous, and that the prognosis must be uncertain. Now the danger is great in proportion as the typhoid symptoms are greater or less, joined to the previous state of health of the patient. In these cases, if life is eventually preserved, it will only be after a severe struggle and a long and tedious convalescence. As Stillé (*l. c.*) says: "In general terms, the conditions that increase the danger of erysipelas are such as involve debility, including infancy, old age, and complication by previously existing or concomitant diseases, such as phthisis, Bright's disease, diphtheria, or the eruptive and typhous fevers. Moreover, death has occurred by hæmorrhage from the bowels in a case which was otherwise benign, and in which no lesion could be found to account for the accident. Finally, blindness has been known to result from erysipelas of the face." The cause of hæmorrhage from the bowels has already been stated as a destruction of the epidermis, and consequent suppression of cuticular transpiration. All things being equal, erysipelas of external parts is less fatal than of internal organs, and the robust are more likely to recover than those of delicate habit. Inebriates, or those who are habituated to the use of alcohol, are in greater danger than their temperate fellows, not only of a fatal termination of erysipelas, but of suffering from attacks of disease.

Treatment.—The treatment of simple erysipelas of a mild type is chiefly, if not entirely, medicinal. There is no particular objection to the use of unmedicated topical applications for the purpose of relieving the pain or itching. I am not satisfied, however, that any

benefit is derived from such measures, but as the majority of patients desire something of the kind, no harm at least will follow a yielding to their wishes. Dry flour, particularly buckwheat, may be dusted on the part; it enjoys an extended reputation as diminishing the burning or itching; vaseline may be used for similar purposes; so also may cotton-batting. Wet applications, whether hot or cold, are useless, even hurtful. At first they may afford a sense of relief, but very soon they aggravate the pain, heat and dryness, and I have thought greatly prolong the case. The part may feel more comfortable so long as the dressings are wet, but the moment they commence to dry, the sufferings become much aggravated. In simple, uncomplicated cases of cuticular erysipelas I confine myself to the use of remedies as far as possible, but if the patient or friends are desirous of topical applications, I yield the point as to *dry* dressings. Certain practitioners speak in high terms of the advantages of painting the part with collodion. They consider this method as eminently useful in allaying pain and irritation, as well as in hastening a cure. For a small extent of surface I can easily admit its usefulness, but should hesitate, from the consequent arrest of transpiration, to apply it to extensive surfaces.

The remedies mentioned below are those oftener indicated, even in the more severe forms of the disease; they are given together at this place, although something remains to be said of surgical procedures which are necessary in the graver forms of the malady.

Aconite.—Useful in the prodromal stage, where there is intense fever, with dryness of the fauces, great restlessness and fear of death.

Apis.—Bruised, sore pain, and much swelling; stinging, burning or prickling pains in the skin, which is very sensitive to the slightest touch; erysipelas of the face, with puffiness of the eyelids, particularly the lower; eruption pale; œdematous forms of the disease. There is suppression of urine in many cases; no thirst with the fever.

Arnica.—Phlegmonous erysipelas, with extreme tenderness and painfulness on pressure; the swelling is hot, hard, shining, deep-red or blue-red; nervous, impatient of pain, and tired feeling or lameness as if beaten.

Belladonna.—Parts fiery red, intensely hot, feeling as if the heat came from a stove: severe headache and delirium; tongue red and dry; great thirst. Lymphatics inflamed and glands enlarged. Later the swelling becomes of darker color, and the pain is pulsating, passing over into the gangrenous forms if unrelieved.

Borax.—Slight erysipelas of the left side of the face, only painful when the muscles are moved, as in laughing, or on touching the parts; *face feels as if covered with a cobweb.*

Bryonia.—Erysipelas about the joints, with dark or pale swelling, very sensitive to the least touch or motion.

Cantharides.—Typhoid conditions marked, with retention of urine or strangury; vesicular erysipelas, the pains being fine, stinging, burning, superficial, and deep, unrelieved by cold water; great thirst, and yet drink of all kinds is disgusting.

Euphorbium.—Erysipelas of head and face, with digging, boring, and gnawing pains, followed, when ameliorated, by creeping and itching of the part; considerable swelling, with vesicles of yellow fluid.

Lachesis.—Typhoid symptoms marked; the parts are dark-colored, or mottled with gangrenous blisters. I have found it useful late in the case when there is threatened gangrene, the blisters being filled with a dark watery fluid, very offensive.

Phosphorus.—Has been used with occasional success in cases with hæmorrhage from the bowels.

Pulsatilla.—"Erysipelas erraticum," particularly when the inflammation extends very rapidly, is superficial, and does not attain great intensity.

The above are the remedies oftener called for in the milder forms of the disease, or exceptionally so in the more severe. Two remedies require separate mention as of the first importance in the grave forms of the disease, such as occur in surgical practice or in epidemics.

Arsenicum.—This is an important remedy when the attack comes on suddenly, runs a very rapid course, and is accompanied by the most profound constitutional disturbance. Emaciation is rapid, debility correspondingly great. Œdema may be so extensive that it amounts to anasarca; the color of the part is not often bright; either mottled, dark-bluish, or like ecchymosis. There is a tendency to translation of the disease from external parts to internal organs. There is great bodily restlessness, general internal burning heat, thirst, nausea, vomiting, and diarrhœa.

Rhus toxicodendron.—This is the typical remedy in the graver forms of erysipelas. There is a pronounced typhoid condition; much pain, which compels constant motion; the skin is tensely swollen, heat extreme, covered with blisters filled with yellowish, slightly viscid serum; the color is at first intensely red, soon becoming dark, bluish or ecchymosed; diarrhœa, vomiting, delirium, and sometimes suppression of urine. When suppuration occurs, the pus is thin and ill-conditioned, not particularly offensive.

There are other items of treatment to be considered, of not less importance, probably, than the medicinal treatment. In cases of extreme swelling, particularly when the skin begins to assume a dark-bluish tint, and when there is danger of gangrene, small incisions, from half an inch to an inch in length, should be made, extending down to the subcutaneous fascia, which will greatly relieve tension, somewhat facilitating the discharge of whatever exudation there may be, and to some extent preventing mortification. The incisions must not be made in the same line, but on alternate lines, thus | ' | ' | ', as giving greater relief from tension than when made in a continuous line, and accomplishing the purpose as well as, or better than, longer incisions, which would otherwise be necessary. Some judgment must be exercised in facial erysipelas, as the scars left would be quite disfiguring; the necessity must be unmistakable under such circumstances. When suppuration is apparent, free incisions must be made to give the pus exit, and room for the speedy extrusion of sloughs. Sinuses must be opened up on a director, and every care taken to keep the parts free from accumulations of pus.

It is the fashion just now to dress all open wounds with *Carbolic acid*, dust them with Iodoform, or use some other so-called "antiseptic" or "germicide," but I have become quite firmly convinced that the best antiseptic and the best "germicide," is found in the best vulnerary. Experience has amply proved that *Calendula* possesses these properties in an eminent degree. The remedy is to be used both externally in tincture, diluted, and internally in the same strength or attenuated. It will be found to rapidly diminish the amount of pus,

and when the fever commences to decline it will speedily induce healthy granulation.

The question of nutrition must also claim serious attention. Formerly there was much controversy as to whether stimulation or depletion should be attempted. Happily, there is now almost complete unity of sentiment on this point, and every care is taken to sustain the patient by nutritious diet, avoiding any mere stimulation. Alcohol is to be forbidden, even in the smallest quantities. Good food, nutritious in quality, when it can be used, must be supplied in abundance; and milk, nutritious broths, beef tea, and the like, form important features of the treatment.

The sick-room must not be too light; at all events, the patient's face must not be directed towards an unshaded window. The temperature of the room should be regulated with reference to the comfort of the patient; ventilation should be looked to, care being taken not to expose the patient to drafts or currents of air. Cleanliness, both of the person and surroundings, must receive due attention, and all excreta, as urine and fæces, are to be at once removed.

With care in the selection of the remedy, an intelligent oversight of the hygiene of the sick-room, and prompt institution of such surgical measures as may be indicated, it is only in cases occurring in epidemic form that solicitude need be felt as to recovery. In epidemic cases a prognosis must be very guardedly given; death is the rule under nearly all methods of practice, but I feel confident that remedies given upon indications as furnished by our materia medica will often conduct to a successful issue cases which would otherwise perish.

INFLUENZA.

BY A. K. CRAWFORD, M.D.

Synonyms.—Epidemic catarrh; (Latin) Catarrhus epidemicus; (Ital.) Influenza; (Fr. and Ger.) Grippe.

Definition.—An epidemic catarrhal inflammation of the mucous membrane of the respiratory passages, and frequently, also, of the gastro-intestinal canal, with profound disturbance of the cerebro-spinal centres. The febrile movement, the great prostration, and the implication of the naso-pharyngo-bronchial mucous membrane are its early and chief characteristics.

History.—This disease has been described with sufficient clearness for recognition as far back as the tenth century; writers in the twelfth and thirteenth centuries also noted its occurrence epidemically.

A very severe epidemic of it ran through France in the year 1311, and again, in 1403, it was so prevalent and fatal that the law courts in Paris were closed.

It is not known how frequently during this period of several centuries the disease recurred, nor over what extent of country it ranged. But since the beginning of the sixteenth century up to the present time, the literature furnishes concise and consecutive records of the various widespread catarrhal epidemics which visited the human family during these cycles. There are, in addition to this, accounts given of milder and more circumscribed attacks which, in fact, seemed to be endemic rather than epidemic in nature. Vast differences were noticed to exist between the various attacks in regard to their virulence or moderation, the diffuseness or limitation of territory covered, and the connection they bore to other diseases.

In this later period, from the sixteenth to the nineteenth century, something more than three hundred years, over ninety vast epidemics swept the civilized globe, and at least eighty of lesser import were interspersed throughout these.

This disorder in its visitations exercised the utmost impartiality, attacking alike the highest potentates of state and church and the meanest subjects and grovellers of the land. Yet, certain epidemics evinced a decided preference for one or another class in the community, attacking the garrisoned military unmercifully at one time, to the almost total exemption of civilians, while at another the latter would suffer to the immunity of the soldiery.

Beginning with the epidemic of 1510, which appeared first at Malta, and spread in a northwesterly course over all Europe, causing but few deaths, the more noteworthy of the catarrhal epidemics occurred chronologically as follows:

That of 1557 comes first. It was remarkable for its making a circuit of the Northern hemisphere. Starting in Asia, it coursed through Europe, and made its way across the Atlantic to far-off America. But it played no such havoc amongst mankind as did its successor.

The epidemic of 1580. Its dire march has been well attested by Marcado, in Spain; by Rivière, in France; by Sennert, Boeckel, and Rensner, in Germany; and by others in Asia and Africa. In Saxony, about four-fifths of the populace was attacked, and Rome is said to have lost some nine thousand by death. This epidemic was thought by Buldutius to have had its origin in France,* but however that may have been, France was early under its ban, and suffered immediately thereafter with the plague.

The year 1658, according to Willis, witnessed an epidemic in Great Britain and the continent of Europe, which was marked by its suddenness of onset, and by a fatal form of epidemic fever which followed it.

Only a few years passed, and another catarrhal epidemic made its appearance in Germany, in 1675, as noted by Etmüller and Rayger.

* Short's Hist., i., 262.

In England, Sydenham recorded its complication with acute inflammations of the chest, and Peu, an obstetrician in France, said it very generally attacked pregnant women. In the same year Malta was visited by the plague, and it is noteworthy that only once since then has the island been visited by the same disease.

Accounts of a general catarrhal invasion throughout central Europe, in 1709, were written by Fautoni, of Turin; Lancisi, of Rome; and Hoffman, of Berlin.

The epidemic which began in the latter part of 1729, and which continued with but slight abatement through several years following, was one of the most general and fatal of the whole series. It may be more properly characterized as a succession of epidemics, extending from 1729 to 1738. The years in which the more aggravated attacks occurred were 1729–30, 1732–3, and 1737–8. It began in Germany, and in five months it had invaded every country in Europe. It spread to America, and after a time reappeared in Germany, and raged in Edinburgh before London was attacked. Simultaneous with its appearance in Scotland, Switzerland suffered, and so with Flanders when it broke out in London. Soon it had completed a second circuit of the European countries, and after again crossing to North America, it progressed, with its old-time rapidity, from New England southerly to the Barbadoes, Jamaica, Mexico, and Peru. It was in this epidemic that three forms were described as prevailing in Scotland, the encephalica, the thoracica, and the abdominalis.*

Rome, Turin, Milan, and the Rhine region suffered great losses, and Loew says that London's mortality during this epidemic was greater than it had been at any time since that city was the scene of the plague, in 1665. On its first visitation to Vienna over sixty thousand of the inhabitants fell sick with the complaint.

The next epidemic of moment appeared in 1742–3, of which Haller, Juch, Zuberbulher, Sauvages, and Huxham have left us histories. It prevailed in Germany, Italy, England, France, Switzerland, and Holland, and in the Mediterranean it proved to be the precursor of the Messina plague.

It was during the prevalence of this siege of the disease that for the first time it received the name of *Influenza* from the Italians; another appellation, by which it is also well known, viz. *Grippe*, was given to it by the French about the same time. The first of these terms was applied to the catarrhal epidemic because of the supposed influence exerted by the weather in its propagation, and the second term because of the supposed dependence of the disease upon the presence of an insect in the atmosphere. The former is the name

* Edin. Med. Essays, vol. ii., p. 31.

adopted by writers in English to designate the disease, and the latter is used by the French and Germans.

Attacks of this epidemic of influenza recurred in the years 1753, 1758, 1762, and 1767, but these were not of such gravity as some others yet to be enumerated. That of 1753 was marked because of its complications of pleurisy and pneumonia. The visitation of 1762 ran a mild course in Britain, but London suffered from an epidemic of dysentery afterward. Yet, in southern Europe it was quite severe, Venice bearing the heaviest losses.

The 1775 epidemic, like those of 1728 and 1732, was remarkable in that a similar disease appeared as an epizoötic, especially affecting horses and dogs. In Germany, where the complaint was most severe, the abdominal type prevailed.

In 1782, it again appeared, spreading from the east, and marking a path which was very closely followed by the cholera epidemic of 1832. It started in Canton, China, in the fall of 1780, and, at the very time it broke out in that city, it also prostrated the crew of a British merchantman while sailing in the Chinese waters. The next year it made its way to the East Indies, and later on appeared in Moscow, whence it proceeded, early in 1782, to St. Petersburgh and Tobolski. Then it continued its course through Holland, traversed the shores of the Baltic, and spread through England, Ireland, France, Italy, Spain, and Portugal successively. London suffered as severely from this epidemic in June, 1782, as did Canton in the month of September, 1780, and with a precisely similar train of symptoms attending their sick. It was estimated that over half of the inhabitants of Europe fell ill in this siege, and it proved fatal to very many.

The members of the College of Physicians, of London, published a résumé of the most reliable observations on this epidemic made by different physicians. And Dr. Gray, of that city, also wrote a book on the same subject, in which he states, as a peculiarity of the epidemic, that isolated cases of influenza often occurred weeks or even months before the epidemic invaded the localities where these individual cases had existed. The chief continental writers were Metzger, Ranoè, Munsen, and Mursinna.

Some lesser epidemics were witnessed in 1788–90, 1799–1800, and in 1803; then there was a lapse of twenty-seven years during which time humanity escaped unscathed.

But in 1830, the influenza was again an invader in Moscow and St. Petersburgh, and it was soon found to be prevalent throughout Prussia and Austria. In 1831 it made its appearance in England, France, and Switzerland. This same year it was known to exist simultaneously in widely separated spots on the globe, as, for example, Java in the east, the Indies to the south, and North America in the west. It ran, how-

ever, a mild course. The Asiatic cholera of 1832 followed upon the heels of this epidemic.

It was stated that at one time some thirty thousand people were sick with this catarrhal disease in Berlin alone, and when it arrived in Paris, the number ill at once reached forty-five thousand.

Europe was free from influenza in 1832, but it still existed in Hindostan. The year 1833 had barely begun when Russia, Prussia, Austria, and England were again over-run by it.

Undoubtedly, the severest attack of influenza in this decade was that which ran its course in 1837. Its primary starting point was Denmark, whence it progressed through Sweden, Germany, England, and France, and, journeying southward, included Switzerland and Spain. At the same time it was prevalent in the southern hemisphere, at Sydney and the Cape of Good Hope, and the mortality was excessive. The deaths occurred, in great part, because of the progress of the disease into what is called suffocative catarrh, the patients dying asphyxiated.

Since that date there have been epidemics in the years 1847, 1860, and 1874; they deserve only mention, since they were neither peculiarly extensive, dangerous, nor in any way remarkable.

Ætiology.—A disorder so eminently epidemic in its character as influenza, at once urges the question, by what means is it propagated, is it contagious? A number of English writers have held that influenza is a contagious disease, and based this opinion on the rapid extension of the malady, on its universal propagation, and on its successive transmission from one country to another. In support of this opinion, Dr. Hamilton said that in examining the throats of two influenza patients there exuded a sort of vapor of a disagreeable odor which gave the disease to others. He also mentioned the case of a patient confined at home on account of a fracture, who was thus guarded from external influences and from contact with any one sick with the epidemic disease until visited by friends who had had the influenza, when he immediately fell a victim to it. A similar occurrence is recounted by Cullen in his "Lessons." MacQueen relates a circumstance peculiarly fit in this connection. Some fifteen to twenty leagues from the east coast of Scotland is a little island inhabited by some twenty odd poor families who hold no communication with the mainland. Once a year the rent-collector visited them, and on one occasion he came from an infected district, and was himself a sufferer with the influenza. The very day after his arrival the epidemic had broken out among these islanders.

Again, Chisholm affirms that this epidemic catarrh was carried to Grenada by sailors landing there from infected neighboring islands. The negroes about the docks who came most in contact with the

sailors were the first to be attacked, and from them it spread in all directions.

When the London Society, in 1803, undertook to garner testimony from many sources as to the contagiousness of influenza, several of its prominent members answered the question in the affirmative. It was stated even that the then recent epidemic was carried to London from Manchester by an individual patient.

Of course, there were many who dissented from this view, and among those who held that influenza is not contagious were found Flint, Dixon, Luke, and other medical men whose names were prominent in their day.

In opposition to the contagious theory of the disease Gintrac* formulates his conclusions after this wise:

First. Different individuals of the same family and of the same locality who were affected at the same time, were under the same common influences.

Second. The contagious property attributed to influenza cannot explain the universality of the disease, nor the simultaneous appearance of the disease in widely separated countries, the rapidity of its propagation, or its almost sudden cessation in the countries it has travelled over.

Third. Many people, without exposure, were attacked by it, and others, who were exposed continuously, escaped; there were mothers who did not give it to the infants they nursed.

Fourth. The fact related by Hamilton was not repeated in subsequent epidemics.

Fifth. In regard to the Grenada incident, may it not be presumed that the negroes were exposed to cold and rain? Was it not in the nature of their work that they came more directly under atmospheric vicissitudes than the other inhabitants?

Sixth. The importation of influenza from one city to another has not been verified by recent epidemics. It has been often noted that the disease will break out in several different quarters among persons who have no sort of relation with individuals affected.

Seventh. Does it not jump from Paris to London, from London to Bordeaux without a trace of the disease being seen in the intervening portions of country? If influenza were contagious, would it not march progressively, and would not its communication be gradual?

If to these reasons are added, that a tendency towards the disease has been noticed in certain localities for some time prior to its outbreak, and that its influence on other diseases is quite appreciable after the subsidence of the epidemic, then the inference is that the cause itself undergoes gradual development. Again, a more expansive view of the malady, and the facts pertaining thereto, are entirely at

* Dictionnaire de Médecine, tome ix., art. Grippe.

variance with the deductions reached by the study of a few isolated cases which appear to be exceptions to the rule. And, from this same plane of observance, it would appear that the atmosphere is only the vehicle for the transmission of the cause.

The simultaneous outbreak of influenza on ships and on land between whom there has been no contact, nor with others diseased, and the rapidity with which the epidemic spreads over an entire kingdom, far outstripping the fastest mode of travel, makes any theory of personal infection, or of contagion, seem quite incredible.

Thus the conclusion is arrived at, and it is the one now generally accepted, that the propagation of influenza can not be attributed to contagion.

It has been often noticed that of the atmospheric changes which precede epidemics of influenza, coldness and moisture have been most frequent. A humid atmosphere and abundant rains have been remarked a less number of times. When the coldness and moisture succeed a spell of hot and dry weather, the epidemic thereafter would prove to be violent. Again, these atmospheric conditions anticipating an attack have, at times, been wholly reversed. An epidemic would spring up in a spell of hot and dry weather which had followed a cold and rainy season. More often the disease has seemed to depend upon frequent repetitions of these changes in the weather. It has manifested itself after a thick fog, an immense snow-storm, or when earthquakes, volcanic eruptions, or displays of aurora borealis were hovering about.

Of all these meteorologic manifestations cold and moisture exert the most potent influence on this epidemic. But the influence from this source has not been constant, and the very opposites have been seen to exist in diverse epidemics. Therefore it is impossible to look on these changes in the weather as the cause of influenza.

Records were taken in 1857–58 of the amount of ozone present in the atmosphere at a point where this disease prevailed. At the end of December, 1857, the quantity of ozone was nearly normal. In early January it was notably less, and it attained its minimum at the moment the influenza raged most violently. By the first of February these conditions became modified, the ozonometers indicated seven degrees of elevation, and the epidemic disappeared, but it was followed by a prevalence of pneumonia.

The season of the year in which it most frequently comes is spring. Next in frequency after the month of April, the winter months have been most often invaded by the disorder. But the epidemic has made its appearance in all the months and seasons, and while it is admitted, theoretically, that low and damp places are most subject to this disease, yet it visits, as we know, all manner of countries. It assumes

greater activity among the inhabitants of populous cities than among those of villages or of the country.

Telluric influences have also been accredited as causative agents in the development of influenza, through some perturbation of external forces which modify the surface of our planet. But in the present state of our knowledge this belongs to the field of speculation.

Influenza affects equally all classes of society, but those who by virtue of their occupation are most exposed to vicissitudes of the atmosphere are the first to succumb, and on these it wages most ardent warfare. It is capable of invading, and without difficulty, those who are habitually housed and well protected. Such individuals as have some pre-existing pulmonary irritation, even if they are accustomed to observe the nicest hygienic rules, readily take the disease and exhibit the worst symptoms.

As to the different constitutions and temperaments, all are alike liable. The robust and weak are both attacked, and often the strongest is the first victim.

The greatest number of sufferers are adults; persons of advanced years and infants furnish a much less number. Of the infants Loew regards those of one year of age as peculiarly liable, and Whytt reported that the Edinburgh epidemic of 1758 commenced in a school of children. But usually children are not so subject to attacks when the disease is in its vigor as when it is on the decline, for then the majority of the patients are from six months to four or five years of age. The aged who take the malady are very prone to take it with them to their graves. This was a specially noticeable feature of the epidemic of 1782 in London.

Save at the first appearance of an epidemic, when men comprise the bulk of the patients, the disease appears to be pretty equally distributed between the sexes.

It is impossible to say what might be determined in regard to the ætiology of influenza if an epidemic were to make its appearance at the present time.

There is no question whatever but that those who make a particular study of microscopic organism in connection with disease would, in such an event, have presented to them a grand opportunity for original study. Not unlikely, another microbe would be added to the list, christened the *Bacillus Grippe*, upon the demonstration of which a new ætiology and pathology of influenza would be founded.

To recapitulate: Influenza is not caused by contagion or infection. It is not the result of meteorologic or volcanic disturbances. So far as we know, it is not due to ozonic or telluric variations; it is not linked to any special season of the year or class of society; and neither can any constitution, temperament, age, or sex be classed as distant or predisposing causes.

In epidemics of this nature it is generally conceded that all pertaining to its source lies in the realm of the invisible. We can but say that it is caused by some occult force in nature, of which the effects alone are revealed to us. Yet, in its reign it is undoubtedly governed by a law, a fact applying to all epidemics. The specific cause of this bronchitic epidemic is shrouded in mystery.

Morbid Anatomy.—Upon examination of the body, post-mortem, redness of the Schneiderian, throat, and bronchial mucous coverings is found to exist. This redness appears more usually in spots, and the membranes have, sometimes, a soft and granulated look.

These alterations are found regularly in the largest bronchi; and again in the smallest subdivisions where capillary bronchitis has been present, in which case a muco-purulent secretion fills these five tubes. Two kinds of exudate products have been noted in the bronchi: A membranous concretion described by Hourman and Dechambre, and a fibrinous described by Legrand. These plugs do not adhere to the walls of the tubes, as do the membranes in croup. It may be that some neighboring red or gray hepatization so immobilizes the bronchi that they fail to expel these secretions.

When the lungs are exposed to view, they present a distended appearance, they crepitate very little, they are of a red or violet hue, and their specific gravity is augmented. When a case succumbs early in the disease with pulmonary involvement, the lung tissue appears rather dry, but cases which have resisted death longer have œdema of the lungs. In the aged victims the posterior inferior portion of one or both lungs is of a dark color, and the tissue is friable. It resembles somewhat a gangrenous lung, but lacks the odor. The bronchial glands have been observed to be enlarged and softened.

The right side of the heart is distended in a degree, and polypoid coagula may be found blocking the pulmonary artery.

When typhoid complications have existed, Peyer's patches are tumefied and the meninges inflamed.

Morbid Physiology.—Influenza is a complex disorder. It belongs to the order of catarrhal phlegmasiæ, its chief attribute being irritation of a portion, great or small, of the mucous membrane. It is a sort of erythema which disperses itself over the mucous membranes of the air-passages and of the digestive tract. Yet, in some rare and exceptional cases the general symptoms of the epidemic have existed without bronchial irritation, just as we sometimes meet a case of measles without an eruption, or a case of cholera without a discharge from the bowels.

Irritation of the bronchial mucous membrane represents the general character of the disease, but this does not constitute it an ordinary bronchitis. There are several points of difference. Only a portion of the mucous system is involved in bronchitis, and even in case there is

an additional tracheitis, laryngitis, pharyngitis, and coryza, these different parts are invaded successively, while in influenza they are all involved simultaneously.

Bronchitis does not begin and end with such suddenness as influenza, and chronic catarrhal conditions are much more likely to follow bronchitis.

There is a greater analogy offered in the consideration of influenza with the eruptive fevers, more particularly the measles. The two diseases sometimes run coincidently. The fever which precedes the appearance of the eruption of measles, with the accompanying lachrymation, coryza, and cough, are symptoms very similar to those of influenza, but the development of the exanthem, the course of the disease, and the absence of nervous symptoms and sweats, establish points of difference which cannot be mistaken.

Blakiston considered influenza to be a disease of the nervous system, with consecutive troubles in the organs of digestion and circulation. Landau and Graves held similar views. There is sufficient perturbation of the nervous system in influenza to warrant the supposition. The cerebro-spinal centres suffer by the quick invasion, the rapid development of the morbid phenomena, and, perhaps, are themselves directly influenced by the epidemic agent. But this influence is only temporary. However violent the lesion may appear to be at first, it soon terminates, and the organs of innervation are then seen to have sustained no tissue change. If a typhoid, or cerebral, or ataxic state develops, then the disease assumes new characters and symptoms which are of prime importance in the case.

Because of the pronounced disturbance of the alimentary tract, vomiting, diarrhœa, and cramps, a supposition arose that some degree of relationship existed between influenza and cholera. They are both pre-eminently epidemic diseases; they cover large territories; they are swift in their march, and pursue nearly the same pathway; but there is nothing common in the essence of these diseases, either in their symptoms, their gravity, or their ordinary mode of termination, which do not point divergently from each other.

Another condition to which reference is sometimes made in connection with influenza, is hay fever. They are both pre-eminently catarrhal in their nature, and they both involve the air-passages and eyes, the one preferably, the other exclusively. Hence they both have in common, lachrymation, coryza, sneezing, cough, and a host of laryngo-bronchial symptoms.

But the one is an epidemic, the other a periodical affection. The one is very often fatal, the other not at all dangerous. The one runs a short, definite course, the other lasts a whole season. For a long time the cause of hay fever lay as much in the dark as does the cause of influenza; and this remained so until Blackley, of Manchester, a

homœopathic physician, published a work* of no ordinary merit, which clarified our knowledge on this score. In a treatise on the same topic, Dr. Morell Mackenzie said of Blackley that his experiments were "most ingenious and carefully conducted," and that the "work is a model of scientific investigation."

Not until the year 1819, had we any detailed account of hay asthma, or summer catarrh. Since that time, there have been an abundance of writers on the subject, and a constantly increasing number of hay fever subjects. During this same period, or, rather, since the year 1837, the epidemics of influenza have very greatly declined; so that we observe concurrently growth of the one and decay of the other of these affections.

In these physiological considerations, positive and comparative, the desire is to disengage influenza from all false alliances, and to give it its proper place as a distinctive malady. It is a phlegmasia of the nasal, pharyngeal, and all the laryngo-bronchial mucous membranes. But this phlegmasia is of a special nature, modified by epidemic influence, and productive of symptomatic expressions and certain epiphenomena peculiar to itself.

Hardy and Behier state that influenza is a bronchitic epidemic, with its own particular phenomena, and not a general disease with the phenomena of bronchitis.

In its manifestations, influenza is far from being uniform. Each epidemic carries a stamp borrowed from those circumstances under the influence of which it is developed. Hence, each epidemic differs from its predecessor and from its successor; even in the same epidemic varied aspects are often presented.

Symptoms.—The onset of influenza is sudden; the prodromal stage is of brief duration, lasting but a few hours, rarely more than a day or two. The first indication of the attack is usually some shiverings, intermixed with feverish sensations. These repeated "creepy" feelings over the back, loins, and limbs constitute the period of chill in the febrile movement, and in some instances they persist in recurring throughout the attack. Even thus early a wondrous sense of depression is experienced by the patient. The horizon of his life has suddenly taken on sable hues, and neither his physician's assurance of recovery, nor the gracious care of kind friends, can charm away the dark spell. The patient appears, actually, to be too tired and weary to take any interest in, or even arouse to, the recognition of things transpiring about him. With this oppression there is headache, and a sense of weight in the nasal sinuses; the eyes are sore and dull, and it follows very quickly that these organs are bathed in the exudation peculiar to the disease. The eyes lachrymate profusely, and the nos-

* Experimental Researches on Hay Fever, by Charles H. Blackley, M.R.C.S. Eng.

trils fill, and discharge abundant mucoid secretions which are mostly of an excoriating nature. Accompanying this severe coryza, there is frequent and irrepressible sneezing. The same condition which invaded the eyes and nose continues its course downward, passing from the fossæ into the pharynx, fauces, larynx, trachea, and œsophagus. These tubes evince pain and soreness from the congestion and inflammation of their mucous coverings, and very soon they are the seat of excessive catarrhal secretions. This profuse, rapidly developed, and extensive catarrhal condition is the pathognomonic symptom of the disease. The implication of the larynx and trachea gives rise to hoarseness and cough, and, in the œsophagus, to a rough, scraping sensation on swallowing. There is, moreover, a great degree of muscular soreness of the back, legs, and chest, which is complained of previously. This involvement of the respiratory muscles makes the breathing constantly distressing. But, in addition to this, the violent catarrhal state of the upper respiratory tract is apt to pass down into the bronchi, and through blocking the air-tubes, or even loading the air-cells with the profuse mucous secretions, a *bona-fide* dyspnœa is set up, often threatening life.

It is not uncommon in this complaint to find that præcordial distress is experienced, and a mental anxiety naturally couples itself with such a state.

The prostration of strength so peculiar to influenza, and which, next to the catarrhal condition, is the most marked feature of the disease, is, by this time, at its full development. The pulse lacks tone, and runs rather feebly and rapidly. The number of beats per minute does not much exceed ninety or one hundred, and the temperature is only slightly raised. There is but little thirst, marked inappetency, and the tongue is thickly coated with a creamy white substance.

In the historical notice of this epidemic three forms of the disorder have been described; the encephalic, the thoracic, and the abdominal. These proved to be in no wise essentially different in their nature; but in different epidemics, or in varying cases of the same epidemic, the catarrhal inflammation would expend its force chiefly upon the passages of the head, or of the chest, or of the abdomen. According to history, also, the symptoms of influenza have been remarkably similar in most widely separated countries, and among totally different races. So, too, have the different epidemics borne a striking family likeness the one to the other.

In the order of their importance, the structures most seriously involved in this malady are: *first*, the mucous membrane; *second*, the nervous system; and *third*, the secretory and circulatory apparatus. By taking up these heads separately, the symptoms pertaining to each may be considered more minutely and carefully.

The Mucous Membrane.—The conjunctivæ of the eyes become red

and congested, and photophobia is sometimes observed. The nasal passages are especially involved, and this is the case from the very onset of the disease. The swelling of their lining membrane is so great as to interfere with respiration through them, a profuse fluent discharge is certain to be present, and this condition may extend to, and involve, the frontal sinuses. Sometimes the gums swell, and less frequently the tongue assumes the general inflammatory state.

It has been noticed among infants that pharyngeal inflammation constitutes almost the entire exhibition of the attack. If to this are added a slight fever, but little head trouble, swelling of the submaxillary glands, and a cough, then the picture of such cases is complete. The pharyngeal catarrh in influenza, like ordinary cases of inflammation of this part, may extend along the Eustachian tube to the middle ear, producing pain, swelling, and abscess of this organ.

The larynx becomes markedly involved, and gives rise to a dry cough, and a rough, hoarse voice, or complete aphonia. The indications of tracheal and bronchial implication are the sensations of pain, heat, constriction, and oppression which are felt in the supra-sternal and sternal regions. The cough is at first dry and erratic, and the pain attendant upon it is attributed to the successive force with which the air strikes the inflamed membrane of these tubes. The subsequent expectoration is of a serous, frothy nature, quickly degenerating into a profuse, thick, greenish mass. Attacks of croup have been known to attend cases of influenza.

Although it may sometimes be wanting, dyspnœa is more often present to a greater or less degree. The dyspnœa shows, at times, a marked intermittent tendency, and without exhibiting any rhythm or rule in so doing. When this symptom is a prominent feature, the complaint is termed "suffocative influenza." This condition is necessarily a grave symptom, because of the serious condition from which it springs.

Threatening dyspnœa may be referable to a bad pulmonary or cardiac complication, such as an atonic state of the bronchial mucous membrane, the development of capillary bronchitis, or pneumonia, or to the depressing influence of the epidemic disease on an old heart lesion.

The physical signs adduced in examining the chest of an influenza-subject are the same as those found in ordinary bronchitis or in broncho-pneumonia, according to the advance the disease has made on the lungs; so that, in cases where the attack is slight, or where there is but little secretion, and that of a viscid nature, in the tubes, there may be no abnormal respiratory sounds heard. Again, there may be present the whole gamut of sibilant and sonorous rhonchi and mucous râles; and subcrepitation may be looked for when the finer bronchi are affected.

In continuing the consideration of symptoms emanating from disturbed mucous membranes, the digestive tract next presents itself, and it supplies us with quite a prominent list. They consist chiefly of nausea, and vomiting of bilious matters, thirst, anorexia, and diarrhœa or constipation. As one or the other of these symptoms appears, the portion of the alimentary tract involved, and the order of its involvement, is readily determined by the attendant physician.

The Nervous System.—The phenomena observed under this head are essentially as much a part of the epidemic influenza as the distressing and diffuse catarrhal symptoms. They are ever present and profound. They comprise a weighty sense of lassitude, depression of spirits, and marked prostration of the vital forces. One of the first symptoms of the attack is weakness; so marked and sudden is this in some cases that, when the attack has come on in the street, the patient has sunk to the ground, and, being unable to stand or walk, has been conveyed home. This weakness persists, and increases with the development of the complaint, and subsides only when convalescence has fairly set in.

Headaches are quite common, and, without doubt, are often due to the disturbance of the nervous system. When the seat of pain is in the frontal region, or in proximity to the nose, it may be the result of inflammation of the frontal sinuses. But usually the headaches are of such order as to point to nervous origin. They vary very much in different patients, and they vary just as much in the same patient at different times. A respite from the pain may be experienced during the day, only to throw into greater contrast its violence in the night. The headache may be occipital, temporal, a megrim, or it may assume a decidedly neuralgic form. Of a neurotic order, also, are those deep-seated, contusive pains which disport themselves in various parts of the body and extremities; other symptoms seen occasionally, such as vertigo, perversions of the special senses, and sexual aberrations, follow along in this same category.

Less frequently convulsive movements, muscular cramps, and spasms have been observed, and at times the triumvirate brain exhibits special sympathy with the general nervous derangement by the tendency to coma or delirium.

The Circulatory and Secretory Apparatus.—The most important symptom in this group is the fever; a chill, not by any means severe, precedes it, and its usual course is an exacerbation at night, and termination by a sweat in the morning. If the chilly stage is prolonged, it is indicative of pneumonic complication. The pulse varies with the degree of fever heat and the condition of the skin. Yet, there seems to be nothing of significance gained from its study, for it ranges from the normal standard up to a considerable rapidity, and through the shades from soft to hard in unquestionably favorable

cases. Towards convalescence the pulse usually becomes full, strong, and tense.

When the febrile reaction is established, the skin is quite hot to the touch, and the face is flushed and swollen, the nostrils are red, and hydroa appear about the lips. Usually the capillary circulation is good, and the sweat-glands of the skin play fairly.

When it is remembered to what an extent the mucous membranes throughout the body are involved in influenza, it will not appear strange that hæmorrhages occur, and from many sources; epistaxis, hæmoptysis, hæmatemesis, menorrhagia, bleeding hæmorrhoids, and bloody diarrhœas have all been observed.

Various forms of eruptions upon the skin are seen at different times. They appear on the upper part of the body, chiefly, and are of an erysipelatous, miliary, vesicular, or petechial form, or they may consist of livid patches.

The urine of patients suffering with influenza is high-colored and scanty. It deposits an abundant red sediment, on standing, like the urine of rheumatic subjects, and it contains eurothrin or purpurin in considerable quantity.

Course and Complications.—The march of influenza is marked by three distinct periods: *first*, the invasion, in which the nervous system suffers mostly; *second*, the fever and inflammation of the mucous surfaces; *third*, the sweat and dispersion of the symptoms.

After the disease has progressed through these stages, the fever and bronchial irritation often persist, and there occurs a complete recrudescence.

Some cases assume a regular remittent or intermittent form of fever, of the quotidian or tertian type; others cannot be classified, for they are apparently subject to every atmospheric variation.

The duration of the disease is ordinarily from five days to two weeks. Its progress through the different stages is necessarily brief, but the time it occupies is habitually shorter in children than in adults or the aged.

The average time during which the epidemic abides in any one locality is about six weeks.

Most frequently the termination of influenza is in recovery, either slowly by an abundant and thick expectoration, or suddenly by a crisis. The crisis which may abruptly end this epidemic disorder is a proper sweat, a heavily loaded urine, a nasal hæmorrhage, or bilious vomiting.

The eruptions sometimes appear in consequence of a rapid abatement of the bronchial trouble.

The diseases which complicate or follow an attack of influenza are pneumonia, pulmonary phthisis, capillary bronchitis, laryngitis, diseases of the heart, pericardium, or pleura, ophthalmia, intermittent

fever, rheumatism, neuralgia, or erysipelas; of these pneumonia is the most common. Landau noted its occurrence 33 times in 125 cases of influenza, and he, as well as Piorry, and others, remarked several points of difference between idiopathic pneumonia and the form which complicates this epidemic disease.

Numerous other morbid states have been seen to involve influenza, or it them, such as inflammation of one or the other of the digestive organs, or the exanthemata. Several epidemics have borne the imprint of an adynamic or typhoid state. Unfavorable consequences have also grown out of hæmorrhages from the lungs, the womb, or the kidneys.

Those individuals whose diatheses are of the gouty, scorbutic, dropsical, or bilious kind fare badly when attacked by influenza; but the asthmatic and phthisical suffer most cruelly. It is not unfrequent that influenza precipitates caseous phthisis, and when it clashes with incipient tuberculosis the purulent period is much hastened. Yet death, in such cases, is more directly the result of the profound depression of the nervous system—the power of resistance of such patients being almost *nil*—than from the aggravation of their pulmonary lesions.

The termination of epidemic catarrh by death may be rapid from the violence of the cough and asphyxia or from acute cerebral congestion. The aged and weak are most prone to succumb to the uncomplicated malady; while among those who have suffered previously with respiratory troubles the mortality is high even in mild epidemics.

Symptoms.—The usual course of convalescence is protracted. When the chief have disappeared, the patients remain feeble, the cough still persists, and they suffer with vague pains. The appetite is slow to return. During this period of recovery changes in the weather affect the afflicted as though they were mercurial barometers, and relapses are not unfrequent. Nor does one attack give exemption from a second, or from a succession of them.

Diagnosis.—There is little difficulty in diagnosticating influenza, especially when the epidemic is already established.

The prostration, depression, and various nervous symptoms distinguish it from bronchitis. The cough of influenza, too, is more violent than that of bronchitis. It is very painful, fatiguing, and harassing at night, in fact much worse than the physical signs would lead one to expect.

The distinguishing character of the sputum of influenza is that it is particularly full of air-bubbles. This point has been strongly emphasized by Graves.

The almost constant absence of an eruption in influenza prevents it from being mistaken for any of the exanthemata.

Some subjects in whom influenza exhibits itself with great prostra-

tion, headache, epistaxis, a particular alteration of the physiognomy, and a continued fever, always increasing, may easily be mistaken for typhoid fever patients. But the absence of the pathognomonic abdominal and brain symptoms of the latter, together with the march of the disease, its duration, and the rose eruption on the one hand, and the presence of the catarrhal symptoms on the other, are sufficient to declare the diagnosis.

Pneumonic influenza differs in several ways from true pneumonia. The chill which precedes it may be very slight or entirely lacking. The pain in the chest is not especially characteristic, but in the pneumonia of influenza it makes itself felt on a level with the false ribs. The cough retains its primitive character, and the expectoration remains mucoid and white, as in influenza. Then the rapid enfeeblement of the forces, the alteration of the stroke, and the softness of the pulse, the very intense dyspnœa, all these are symptoms not in keeping with the local alterations, nor with ordinary pneumonia. Pneumonic influenza, also, is essentially insidious in its approach, and quickly assumes an adynamic form.

Prognosis.—There is ample warranty for giving a favorable prognosis in simple influenza. It is only through its complications that dangers crowd in. These complications may be either such as supervene during the course of the malady, or those which existing previously are now aggravated.

Any one who is the possessor of a feeble organism, whether because of tender or advanced years, or from pre-existing disease, will run a great risk if attacked by influenza, because of the likelihood of complication with capillary bronchitis.

Fatal cases usually occur from the tenth to the fourteenth day of the disease. Although influenza is not as serious nor as rapidly fatal as cholera, yet it can furnish a no less considerable mortality, because it affects a much greater mass of the people than cholera. From careful statistics, made in London, Paris, and Dublin, it is computed that during the height of an epidemic of influenza the mortality reaches double, and often triple, the ordinary death-rate.

Treatment.—The treatment of the milder and uncomplicated forms of influenza is simple. In fact, quite a share of those who are affected lightly, pass through the attack without calling-in medical aid. But when the disease acquires greater intensity, when certain of the vital organs are implicated and their functions disturbed, when there is fever, more or less strong, and marked nervous derangements, then medical skill is a paramount necessity.

Guarding the patient against further atmospheric changes is one of the first items demanding the attention of the physician. And to do this most effectually, the conditions which seemed to have precipitated

the epidemic must be fully considered, so that a counteracting influence may be brought to bear on the patient.

It is commonly recommended that the air of the room be warm and dry, and this has often afforded relief, but not always. In 1833, in Britain, the average temperature was 45° F. for three months prior to the outbreak of the epidemic. In April, it ranged ten degrees warmer, and the influenza appeared. The temperature increased until, by the middle of May, it had reached 80°, and in a corresponding ratio the epidemic increased in violence. It was observed that those patients who were confined in heated rooms suffered the most. Hence, a little judicious management is requisite in order that the temperature and humidity of the air in the sick-room may moderately antagonize the outside atmospheric influences.

The light should also be modified, just as we do in cases of measles or in any affection where the eyes are irritable.

In the early stage of the disease hot pediluvia and mild diluent drinks may be ordered to aid in restoring the normal state of the skin, and it is claimed that by the use of Aconite in this stage the disease may be aborted.

According to Hartmann,* it is an easy thing to suppress influenza when its first symptoms appear, by smelling a few times of Camphor, but he does not by any means claim that this was infallible. He says he used the Camphor in the first dilution, in a later epidemic, and found it a sovereign remedy.

Hahnemann held that Camphor is the remedy for the cold stage of the disease, but that even if the heat has begun, its administration in more and more attenuated doses greatly moderates the vehemence of the attack.

When the disease is still young, some help has been derived from the use of nasal baths. They are at least soothing to the patient. Simple cool water, or salt water, Calendula and water, the second decimal dilution of Carbolic acid, or the third of Mercurius cor., can be snuffed into the nostrils at will.

Benefit has been derived also by the inhalation of steam of hot water, when a sense of great soreness of the windpipe existed. The same measure alleviates the headache and cough.

The usual applications of moist heat, for instance, by means of hot poultices, to acute thoracic and abdominal diseases, are of equal benefit when complicating lesions of the organs in these cavities arise in influenza.

Alcoholic stimulants are not indicated, unless it be in the aged after the active symptoms have subsided, or where a very marked adynamic state has developed.

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* Hartmann's Acute Diseases, by Dr. Hempel, vol. i.

In caring for those advanced in years, or for those who are debilitated, it must never be forgotten that their tendency is to run into adynamia, or to develop pulmonary trouble. To successfully ward off such complications may be equivalent to saving the patient's life.

To those who have the care of public institutions or hospitals, it may be of interest to know that from his observations made during a succession of epidemics, Dr. Addison * concluded that patients under such an affection are not safe in the wards of an hospital. This opinion was arrived at from the number, the severity, and the relapses of cases which he had witnessed in Guy's Hospital. He said that cases admitted for other diseases took influenza and died.

The stage of convalescence still requires assiduous care—care to restore well the lost strength, care to prevent relapses. During the course of the disease the diet is necessarily light and limited; but now, congestion of the organs and tissues having subsided, and recovery having fairly begun, some solid food may be added to the patient's diet, and the quantity be made more liberal. Mutton or beef, boiled, broiled, or in broth, are good and substantial condiments on which to begin the restoration.

Should the bronchitic mucorrhagia persist a long time after the epidemic attack has subsided, it degenerates into a function of the part, acting abnormally. Such a condition is likely to be long-lasting, and its cure will require long and persistent treatment. In addition to the proper remedy, a change of air and the use of mineral waters in bathing and drinking, may be needful to this end.

The few authors in our school who are old enough to have had much experience in the treatment of influenza, in any of its grand epidemics, are much at variance in regard to the intrinsic remedies for the complaint.

Dr. John F. Gray, of New York, was of the opinion that Tartar emetic is the proper homœopathic remedy for the first stage of the disease; in fact, it was his main reliance. When the second or bronchial stage was fairly on, his choice lay in Phosphorus and Bryonia, assisted by Aconite and Hyoscyamus. But as soon as the mucous secretions became profuse, he returned to the Tartar emetic.

In a certain, rather limited, epidemic, Dr. L. B. Wells † found in most cases that Euphorbium alone sufficed for a cure. This is a remedy which Hahnemann classed with the anti-psorics, and which is somewhat analogous in its action to Veratrum, Colchicum, Elaterium, Tartar emetic, and Arsenicum.

About the same time, Dr. W. H. Burt,‡ in another portion of the country, used Aconite and Belladonna in the first stage of the disease,

* The London Lancet, January, 1837.

† Transactions of Hom. Med. Society, State of New York, vol. x., 1872.

‡ U. S. Medical and Surgical Journal, vol. viii., 1872-3.

and Kali bichromicum as soon as the nostrils began to discharge freely. These remedies, he thought, did most good.

Dr. R. Hughes,* by inference, makes a very excellent selection of a few remedies for influenza. His first choice is Arsenicum, and in alternation with it he would give Eupatorium perfoliatum if the bone pains were severe. For the bronchial trouble following, he mentions Kali bichromicum and Tartar emetic as the chief remedies.

The last-named writer tells us also that Jahr gave Rhus and Causticum for the lameness of the extremities, with the bruised and sore sense peculiar to the initial stage of the disease, and thus changed the character of the complaint to a simple catarrhal fever. Elsewhere† the following additional remedies can be found as being particularly applicable to influenza: Arnica, Aurum, Bryonia, Camphor, Iodum, Kreasotum, Lycopodium, Mercurius solubilis, Phosphorus, Stramonium, Stibium.

The group which Hahnemann‡ mentions consists of Arnica, Belladonna, Bryonia, Camphora, Capsicum, and Mercurius.

The use of Camphor in this affection by Hartmann has already been mentioned. In the same work he gives an extended outline of the treatment of influenza, which may be most briefly sketched thus: For the inflammatory involvement of the respiratory passages, his remedies are Aconite, Nux vom., Mercurius, Phosphorus, Bryonia, Rhus, and Sabadilla; for the cough, Bryonia, Nux vom., Mercurius, China, and Opium; for choleraic symptoms, Veratrum; and for typhoid symptoms, Aconite and Pulsatilla. For old people he chooses Carbo vegetabilis and Bryonia; for the violent, pressing headache, Bryonia; and for any acute cerebral symptoms, Belladonna. For the period of decline of the disease and convalescence, Sulphur, Hyoscyamus, Belladonna, Conium, Ferrum aceticum, and Kali hydriod. If the patient was threatened with phthisis, Stannum and Carbo veg. sufficed; and if there were any obstinate after-effects, Arsenic removed them.

In the fever-wort, or Triosteum perfoliatum, we seem to be possessed of a new remedy for influenza. In Allen's§ work, the sneezing, sore throat, asthmatic breathing, pain and stiffness of the joints, and aching of the bones all point that way. But one of the provers, Dr. Tallmadge, says later‖ that in making a proving with the berry he found it had a direct action on the lungs and nervous system, in the one case producing congestion, in the other erethism. He adds that

* Manual of Therapeutics, by Richard Hughes, L. R. C. P., Edin.
† Jahr's New Manual of Hom. Practice, by A. Gerald Hull, M.D.
‡ Materia Medica Pura, by Samuel Hahnemann.
§ Encyclopædia of Pure Materia Medica, by Timothy F. Allen, A.M., M.D.
‖ Transactions of Hom. Med. Society, State of New York, vol. viii., 1870.

no such effects can be derived from the root, from the employment of which Dr. Allen's provings are taken.

The remedies which Jousset* places before us are few in number, but they include one or two not mentioned elsewhere, and the indications given are very concise. They are Bryonia, Camphor, Eupatorium, Hepar, Iris, Lycopodium, Opium, Spigelia, and Arsenicum.

When we are placed in the anomalous position of having to treat a disease which is without a distinct pathological train, like this epidemic influenza, the latitude allowed for the choice of a remedial agent must be great; much greater, indeed, than would be at all necessary were the foundation conditions otherwise. Not only do the different epidemics vary, and the same epidemics show varying features, as has been stated, but even the different localities in which it thrives have their own peculiar modifying influences.

In the cities influenza usually develops a predominance of nervous symptoms; in the country the catarrhal symptoms are most prevalent; and in high elevations the inflammatory conditions are most marked. From this it would seem that the profit to be derived, usually, from intelligent notations and comparisons must in this instance be denied the physician, a consideration which makes a thorough study of the Materia Medica of still greater import.

Therapeutics.—**Camphora.**—This remedy covers extreme feebleness, coupled with a sense of fainting: face pale, cold, and death-like: pulse small and slow. These symptoms change rapidly to the contrary condition, red and hot face, with strong and rapid pulse, great moral anxiety; violent spasms of the chest, brought on by violent emotion, with pleuritic stitches, sighing, moaning, and fear of death.

Arsenicum album.—Acrid, fluent coryza, with shiverings, great sense of prostration, and desire for artificial warmth; tendency to faint, mortal anguish, and presentiment of coming death; headache and pain in the limbs. Dyspnœa to the point of suffocation, with coldness and cold sweats, cough deep, fatiguing, shaking, cough from constriction in the larynx, viscid sputum.

Aconitum napellus.—High fever, respiration hurried, painful, and labored; suffocative paroxysms; chilliness from motion, thirst, restlessness; hoarseness, heaviness in the limbs, raw burning sensation diffused over the whole chest; dull frontal headache.

Belladonna.—Especially when the patients become delirious as soon as they close their eyes, and the look is staring. Nervous, dry cough; tickling in the larynx; attacks worse at night. Swelling of the glands of the throat.

Nux vomica.—Fever-heat with chilliness, worse from moving and drinking. Coryza, dry at night, fluent during the day; acrid discharge from the obstructed nose; sneezing; scraping in nose and throat; sudden failing of strength; oversensitiveness of all the senses.

Gelsemium.—Great depression and languor; watery discharge from the nose; sneezing, with dull headache; cough from tickling and dry roughness of the fauces; burning in the larynx; collection of mucus in the throat.

Bryonia alba.—Weight in the nasal sinuses; eyes sore, dull; cough as if the head and chest would fly to pieces; sudden prostration, the patient shunning all motion.

Arum triphyllum.—Coryza fluent, acrid, excoriating nares, alæ and upper lip; excessive acrid saliva; throat and tongue very sore; lassitude and low spirits.

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* Matière Médicale et Therapeutique Positive, par le Dr. Jousset.

Allium cepa.—Chills, followed by fever; sometimes intense pain in occiput and cervical spine; headache over the eyes and in the region of the occiput; profuse lachrymation and nasal discharge; soreness and dryness of throat, and sometimes a dry racking cough; acts well on young and old.

Sanguinaria nitr.—Particularly indicated when the disease invades the larynx, pharynx, etc.; hot tears; fluent coryza, worse on the right side; heat in the throat; throat so dry, it seems as if it would crack; aphonia; burning in the pharynx and œsophagus; patient not disposed to move or make any mental exertion; torpor.

Euphorbium.—Chill; headache; stiffness of the cervical muscles; pains in the back and limbs; general malaise; prostration; watery eyes and nose, with burning and smarting; same condition in trachea; much mucus.

Triosteum perfoliatum.—Aching pains all over, and heat, especially in the limbs; relieves pain of a pleuritic character in the right antero-inferior part of the thorax; sweating and nervous erethism; it quiets the nervous symptoms like Coffea, Hyoscyamus or Stramonium.

Eupatorium perfoliatum.—Aching in every bone, with weak pulse, prostration, coryza, intense darting pain through the eyes, vomiting of bile, with trembling and nausea, causing great prostration.

Phosphorus.—Hoarseness; dry, tearing cough, with oppression of the upper chest; headache and sensation of excoriation in the trachea or bronchi, or both; weakness and prostration; old people with tendency to pneumonia.

Mercurius solubilis.—Great languor and dejection, with rigors and intermittent flashes of heat; at night a copious sweat conjoined with much thirst; rawness, roughness and burning in the throat; muco-purulent and acrid coryza and lachrymation; violent, racking cough, worse at night; involvement of the digestive tract.

Tartar emetic.—Lassitude, with great sensitiveness to cold, with chilly feelings, headache, pasty tongue, inflammation of the throat (tonsils, arches of palate, or pharynx), short turns of nausea; achings in the bones, especially of the lower extremities; yellowness of the skin; slight hoarseness; more or less fever, heat, and sweats. Much rattling of mucus in the bronchi; dyspnœa; moist, loose cough, requiring the patient to sit up; no expectoration, or copious, frothy expectoration.

Hepar sulphuris calc.—Scraping in the throat when swallowing, impeding speech but not swallowing; loose and choking cough, exciting vomiting; coryza with painful swelling of the nose, like a boil.

Kali bichromicum.—Coryza fluent, excoriating the nose and lip; ropy, tough discharge, often also from the posterior nares, offensive or not; heat and redness in the eyes, with desire to rub them; the pharynx is dark-red, glossy, puffed, with burning sensation, extending to the stomach. Cough, with pain from mid-sternum through to the back; expectoration of tough, stringy mucus; periodical, wandering pains in the limbs; weariness in the limbs as the pains subside.

Rhus toxicodendron.—Tearing pains in limbs during rest; worse on beginning to move, better from continued motion. Dry, hard, tickling cough; the air-passages seem stuffed up, worse in the evening until midnight; fever-blisters and crusts under the nose; epistaxis with typhoid symptoms.

Arnica montana.—Hæmoptysis consequent upon external injuries. In nursing women, in plethoric or young tuberculous subjects, or when caused by a cold or exertion; frequent sneezing; dry, short, and hacking cough, as from a titillation in the trachea, every morning after rising.

Baptisia.—Great muscular prostration; typhoid condition, with predominant nervous symptoms; much languor, wants to lie down; eyes injected; tight, dry cough, and irregular action of the heart.

Phytolacca decandra.—Great exhaustion; prostration; muscular paresis; pain streaking up and down the spine; rheumatism in the lumbar muscles; pharynx dry, rough, feels like a cavern; fauces dark bluish-red; tonsils swollen; glands on the right side of the neck, hard. Well adapted to infants.

Chelidonium.—Slimy tongue, coated white or gray; loss of appetite, with disgust and nausea; bilious eructations; great debility and lassitude after eating; dry cough in paroxysms, or racking as in consumption, with much expectoration.

Pulsatilla.—Tongue white or yellow, and coated with tenacious mucus; fluent or dry coryza; loss of taste and smell; nostrils sore. Later, yellow-green discharge; anorexia, eructations, diarrhœa; worse evenings, better out of doors.

Antimonium crudum.—Thick, milky, white coating on the tongue, with the concomitant symptoms of little thirst, no appetite, and general catarrhal derangement of the intestinal tract belonging to this remedy.

Mercurius iodatus or **Aurum Chloride,** when there is special involvement of the Eustachian tube, threatening the middle ear.

Ipecacuanha.—Cough dry and fitful, provoked by a titillation in the larynx or substernum; coryza at first dry, then fluent, with a tendency to vomit; expectoration difficult, with nausea; dyspnœa; pulmonary engorgement, and threatening suffocation from excessive secretion; face bluish, respiration short, and sweats after the fits of coughing.

Sepia.—Is always indicated in glandular inflammations, in the dartrous and hæmorrhoidal constitution; the throat feels rough and grating; there is excretion of tenacious mucus; the expectoration resembles millet-seeds.

Cubeba.—A grand remedy when, as generally occurs in some stage, there is great dryness of the membranes, particularly of the larynx and pharynx.

Copaiba.—The action of this remedy on the bronchial mucous membrane is the same as on the urethra. Mucous discharge yellow and puriform; eruption of numerous red spots all over the body and on the face.

Capsicum.—Dry coryza. Tingling and itching in the nose; hoarseness; frequent and short barking cough; pain in the throat, only during coughing; tickling sensation in the throat, bringing on violent sneezings; stitching pain in the side of chest and back when coughing.

Kreasotum.—Fluent coryza with painful sensibility in the nasal fossæ in respiration; dry coryza with frequent sneezing; nasal hæmorrhage; scraping sensation in the throat and in the bronchi, with hoarse voice; dry cough and shortness of breath; sharp pains in the chest and in the region of the heart.

Sabadilla.—Fluent coryza with sneezing, watering of the eyes, and frontal headache; face and eyes flushed; chilliness. Used internally and by olfaction concurrently, with remarkable results, says Guérin-Méneville.

China.—Is of undoubted value in certain epidemics of influenza in which the adynamic and intermittent characters prevail. When both of these conditions are pronounced, and the chances of recovery seem slight, the Sulphate of quinia will do great service.

Carbo vegetabilis.—Comes into requisition in the treatment of old people.

Veratrum album and **Colchicum** are especially applicable to the choleraic form of the disease.

Hyoscyamus, Opium, Belladonna, or **Conium,** will be of avail to quell the persistent irritable cough which often remains after the subsidence of the attack.

Stramonium and **Belladonna** are the chief remedies to combat marked cerebral symptoms.

Iodum and **Stannum** are serviceable in phthisical subjects; the former in pulmonary, the latter in laryngeal phthisis.

Ferrum aceticum.—When the cough comes on after a meal, and the food is vomited.

Kali hydriodicum.—After the febrile stage is passed, and hoarseness or aphonia remains; the breathing is wheezy and rattling. There is a troublesome cough, and a gray, sweetish expectoration.

Sulphur and **Arsenicum.**—When convalescence is prolonged, either one of these remedies may be demanded to hasten this stage and to remove the last dregs of the disease.

PAROTITIS.

BY W. T. LAIRD, M.D.

Synonyms.—Parotitis rheumatica, polymorpha, metastatica, Parotiditis, Cynanche parotidæa, Angina parotidæa; Mumps; (Ger.) Ziegenpeter; (Fr.) Parotide, Parotidite, Oreillons.

Excluding cases which properly belong to surgery,* we may recognize two forms of parotitis—the *idiopathic* and the *symptomatic*. These two varieties, although similar in anatomical characteristics, differ so widely in other respects that they constitute essentially distinct affections, and will therefore be considered separately.

Idiopathic Parotitis.

Definition.—Idiopathic parotitis, commonly known as mumps, is an acute, febrile, infectious and contagious disease, characterized by an inflammatory swelling of the salivary glands, especially the parotid, with a marked tendency to secondary inflammation of the testicles in males, and the vulva, ovaries, or mammæ in females. The contagion is communicable "possibly even before the glands are affected, certainly for two or three weeks afterwards."† The period of incubation varies from eight days to three weeks. The disease occurs but once in the same individual.

Ætiology.—In regard to the essential causes of this affection we know absolutely nothing. The theory that it is due to micro-organisms is plausible, but lacks proof, for although MM. Cabetun and Charrin have demonstrated the existence of micrococci in the blood of persons afflicted with mumps, and have successfully cultivated these germs in "Liebig's broth," all attempts to reproduce the disease by inoculation of the cultivated forms have thus far signally failed.‡

Mumps is rarely sporadic, but usually occurs in epidemics, especially in boarding schools, barracks and crowded tenement houses, and it may affect whole communities. It prevails most extensively during the damp, inclement weather of spring and autumn, and is said by Vogel to be endemic upon the marshy coasts of England, France, and Holland.

All authorities agree that it is unknown during the first year of life, seldom occurs in children under five years of age, and is comparatively rare in persons over thirty years old. It is therefore essentially an affection of childhood and early adolescence. Its rarity in adults is probably due, as Meigs and Pepper§ suggest, not so much to a lessened susceptibility to contagion, as to the fact that the majority of people have contracted the disease during early life, and are therefore exempt from further attacks. Statistics show a preponderance of cases in favor of males.

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* Under this head may be included cases due to wounds of the parotid, calcareous deposits in the gland, and the presence of foreign bodies in the duct of Steno.

† Quain's Dictionary of Medicine, art. Mumps.

‡ Medical Record, vol. xxv., p. 521.

§ Diseases of Children, p. 685.

Pathology.—Since mumps almost invariably terminates in recovery, few opportunities are afforded for post-mortem examinations, and the exact anatomical changes are, consequently, to a great extent, a matter of conjecture. Virchow has demonstrated that in symptomatic parotitis the pathological lesion consists of inflammation of the gland-ducts with consequent œdema of the cellular tissue within and around the gland, and claims that the morbid process is essentially the same in the idiopathic variety. This view is strenuously combated by other writers, who assert that the parenchyma of the gland is principally affected, and that the enlargement is due to an interstitial exudation of lymph.

In the great majority of cases the very slight induration and the rapid and complete subsidence of the swelling seem to confirm the theory advocated by Virchow. In rare instances, however, when the disease is exceptionally severe, there may be a considerable effusion of lymph, which, becoming partially organized, causes a persistent enlargement of the parotid or induces atrophy of the gland-tissue by its pressure upon the ducts.

Symptomatology.—An attack of mumps is sometimes preceded for twenty-four or forty-eight hours by languor, feverishness, restless sleep, anorexia, and vomiting. More frequently, however, the disease begins suddenly with chilliness, or exceptionally with rigors, followed by well-marked fever, headache and pain in the back and limbs. The bodily temperature usually varies from 100° to 101°, and in severe cases may rise to 103° or even 104°; the pulse and respiration are accelerated; the face is flushed; the lips are dry; the tongue is furred, but usually moist; the thirst is intense and the appetite is generally impaired or lost, but in exceptional cases it may remain natural. In nervous children, restlessness, insomnia, and mild delirium may be present; and in very rare instances facial spasms, convulsions, and maniacal delirium occur, and the patient may sink into a typhoid state.

Simultaneously with the appearance of the fever, or in some cases not until twelve, twenty-four, or even thirty-six hours later, pain and tenderness in the parotid region, followed after a brief interval by tumefaction of the gland and stiffness of the jaws, announces the onset of the local affection. The swelling first appears just below the lobule of the ear, rapidly increases in size, fills the natural depression between the mastoid process and the ramus of the jaw, and spreads to the neck and side of the face. It is at first flat, but soon becomes prominent; and its central portion, which corresponds to the site of the parotid, forms a firm, elastic, projecting tumor; the periphery of the swelling is softer, and often œdematous. The overlying skin usually retains its normal color or is slightly reddened; in rare cases it may present a bright scarlet hue. This redness is one of the earliest

symptoms to disappear, and is occasionally followed by superficial desquamation of the cuticle.

Both parotids are usually invaded, but rarely simultaneously or with equal severity, the one first attacked generally suffering the most. As a rule, the inflammation begins upon the left side, and, in the course of twenty-four or forty-eight hours, extends to the right; in some instances the latter is not involved until the swelling has disappeared from the side first affected. In one-tenth* of the cases mumps is unilateral, and the opposite gland may then become the seat of the disease at some subsequent period, if the patient be again exposed to contagion. The submaxillary and sublingual glands are also frequently attacked, and in rare instances the enlargement is confined exclusively to the former, and the parotids remain unaffected. In severe forms of this malady swelling of the tonsils and œdema of the submucous tissue of the pharynx may occur.

The amount of tumefaction varies greatly in different cases. Occasionally it is slight and confined entirely to the parotid region, but more frequently it involves the greater part of the face and neck, and causes more or less distortion of the features. When both sides are attacked simultaneously, the head and neck often assume a pyramidal shape.

The actual suffering experienced during an attack of mumps also varies greatly in degree, but is generally more severe in adults than in children. In many cases the pain and tenderness are comparatively slight, and are felt only on movement of the jaw, the mobility of the head is restricted, and mastication, talking, and yawning are difficult and painful. In others, the pain is constant and severe, and may extend to the chest and shoulders; the slightest movement of the jaw causes such excruciating suffering that the patient refuses to take nourishment; and when the tonsils and pharynx are also involved, deglutition is sometimes impossible, and respiration may be seriously obstructed. The salivary secretion may be increased, diminished, or unaltered.

Both the local swelling and the constitutional disturbance gradually increase until the third or sixth day, when the disease reaches its height. The pain and febrile symptoms now subside, but the tenderness on pressure persists for some days longer. The swelling remains stationary for twenty-four or forty-eight hours, then rapidly declines, and by the eighth or twelfth day the affected parts resume their natural appearance. In some cases, however, resolution is not complete, and a hard, painless, circumscribed tumor may remain for weeks. More rarely, about the fifth or sixth day of the disease, the

* Diseases of Children, by J. Lewis Smith, M.D., p. 310.

swelling becomes excessively painful, its surface assumes a dark-red hue, and an abscess forms, and either discharges outwardly or bursts into the external auditory meatus.

In males, after the age of puberty, the inflammation of the parotid sometimes suddenly subsides and is followed by orchitis, serous effusion into the tunica vaginalis, and œdema of the scrotum. In 495 cases of mumps in soldiers, Granier observed this complication in 115, and in Lauren's collection of 432 cases, orchitis occurred 156 times.* If only one testicle be attacked, this is situated on the side corresponding to the parotid solely or most severely affected; more rarely both testicles are involved. Occasionally this so-called metastasis takes place before the swelling of the parotid has entirely subsided; and the two inflammations may run their course together or may alternate, the parotid again becoming enlarged as the orchitis abates, and *vice versa*.† According to Granier, atrophy of the affected testicle occurs in forty per cent. of the cases. In some instances, also, the disease is followed by persistent hydrocele. In females, a similar inflammatory swelling of the labia majora, uterus, ovaries, and mammary glands has been occasionally observed.

In some instances considerable time elapses between the subsidence of the parotid swelling and the development of the secondary affection. During this interval alarming symptoms of collapse and cerebral irritation may appear; the face is extremely pale, the pulse greatly accelerated, and the bodily temperature correspondingly elevated; delirium, vomiting, and purging may also occur. These symptoms are not due, however, as some writers have asserted, to inflammation of the cerebral meninges, and promptly disappear when the external swelling is re-developed.

Complete deafness, which may be transient or permanent, albuminuria, endocarditis and pericarditis have been noted as exceptional complications.

When other organs beside the parotid are involved, there is probably, strictly speaking, no true transference of the disease from one point to the other, but, as Niemeyer‡ claims, the secondary affection is due to the same morbific cause that induces the primary inflammation of the parotid.

The duration of an attack of mumps varies from four or five days, in mild cases, to twelve days, two weeks, or even longer, in severe cases. The rapidity of the recovery also depends to a certain extent upon the age and previous health of the patient. In old persons and in those debilitated by chronic disease, excesses and bad hygienic surroundings, or in persons predisposed to scrofulous and tubercular

* Flint's Practice of Medicine, p. 457.

† Niemeyer's Text-Book of Pract. Med., vol. i., p. 439.

‡ Loc. cit.

affections, a much longer time is required for restoration to health than in the young and robust.

Diagnosis.—The diagnosis is seldom difficult. In some instances, mumps may possibly be confounded with inflammation of the cervical glands in the region of the parotid; but in the latter affection the swelling has an almost cartilaginous hardness, is round or circumscribed and, unlike that of mumps, does not surround the lobule of the ear or extend to the cheek. A careful examination will also show that the inflamed gland is superficial and often freely movable over the parotid. The tumefaction caused by periostitis of the last molar may also be mistaken for mumps, but a correct diagnosis can readily be established by an examination of the teeth. Symptomatic parotitis is distinguished by the history of the case and the greater tendency to suppuration.

Prognosis.—According to Niemeyer,* a few cases have been recorded in which death resulted from extension of the inflammation to the cerebral meninges; but a fatal termination is so extremely rare that the prognosis may be considered uniformly favorable. The complications and sequelæ which we have described are exceptional, and in the great majority of cases mumps is a comparatively trivial affection.

Treatment.—No treatment is capable of preventing an attack or of aborting it in the early stages; but the severity of the symptoms can be mitigated and the disease conducted to a favorable termination.

In all except the very mildest cases, the patient should be strictly confined to the bed. Neglect of this simple precaution is responsible for most of the complications that arise during the course of the malady. Even after convalescence seems to be fully established, an imprudent exposure may be followed by an acute febrile attack or, in some instances, by violent and persistent vomiting.† The diet must also be carefully regulated. The food should be light, easily digestible and, on account of the difficulty in mastication, consist principally of milk, beef-tea, mutton broth, and other nutrient liquids. In ordinary cases it may be given at the regular meal-times; but when the disease occurs in persons previously debilitated, or when there is marked depression of the vital forces, the nourishment should be administered in small quantities at frequent intervals. The thirst may be assuaged by occasional swallows of cold water, by sucking pieces of ice, or by frequently rinsing out the mouth; large draughts should be avoided, since they distend the stomach and interfere with digestion. The dryness and heat of the skin may be relieved by sponging the surface with tepid water, and the feeling of stiffness and tension in the paro-

* Op. cit.

† Meigs and Pepper, op. cit., p. 690.

tid region may be mitigated by inunctions of olive oil or vaseline. The swollen parts should be protected from the air by a handkerchief or a single thickness of flannel. When the pain is severe, it may be palliated by hot applications; cold applications should never be used, since they tend to repel the inflammation and thus promote the development of secondary affections. If suppuration occur, the pus must be promptly evacuated and a poultice applied.

The remedies most frequently serviceable in this disease are unquestionably Mercurius, Belladonna, and Rhus tox. When the swelling suddenly subsides, and marked symptoms of depression and cerebral irritation appear, the choice will probably lie between Belladonna, Bryonia, and Hyoscyamus. Induration of the parotid generally yields to Baryta carb., *Carbo an.*, Carbo veg., or *Conium;* while suppuration of this gland usually requires Arsenicum, Bromium, *Hepar*, *Mercurius*, Rhus tox., *Silicea*, or Sulphur. When the testicles or mammary glands are involved, Arsenicum, *Belladonna*, Mercurius, Nux vom., or *Pulsatilla* may be indicated. Other complications which arise during the course of the disease should be treated as independent affections.

Special Indications.—Aurum met.—Metastasis of parotitis to the testes; the scrotum is swollen, hard, red and shining, hot, and covered with white scales.*

Belladonna.—Bright-red, shining swelling of the right parotid, the redness extending in rays from the centre: great sensitiveness to pressure; sharp, stitching pains; intense heat of the skin; hot head, flushed face, and congested eyes; hands and feet cold; violent throbbing of the carotids; drowsiness with inability to sleep and frequent starting. Sudden subsidence of the swelling, followed by throbbing headache, lethargy, and delirium.

Bromine.—Suppuration of parotid with excoriating discharge, persistent hardness around the opening, and increase of heat in the gland; scrofulous children.

Bryonia.—Cerebral irritation after the disappearance of the swelling of the parotids; acute pain in the head, aggravated by the slightest motion.

Carbo veg.—Swelling bluish or purple; induration of the parotid; burning and sensitiveness in the epigastrium, with sour, rancid belching; hoarseness; slow fever.

Cocculus.—Faintness, with spasms in the stomach either during or after the attack; digging pain in the lower jaw; dryness of the mouth and throat; lacerating pain in the swollen gland.

Conium.—Excessive hardness of the swelling (Baryta c., Carbo an., Carbo veg.).

Hyoscyamus.—Cerebral irritation characterized by unconscious delirium, red face, staring and distorted eyes, throbbing of the carotids, twitching and jerking of the limbs, great nervous excitability, and constriction of the throat with difficulty in swallowing and loss of speech.

Lachesis.—The swelling begins on the left side and afterwards goes to the right; all symptoms worse after sleep.

Lycopodium.—The disease first attacks the right parotid and then the left; general aggravation from 4 to 8 P.M.

Mercurius sol.—Large, pale swelling of the left parotid; fever with alternate heat and chills; nightly thirst; tendency to night sweats; salivation; offensive breath; flabby, tooth-indented tongue; all symptoms worse at night and in damp weather. (In children predisposed to glandular trouble, Ruddock prefers *Merc. iod.*)

Pulsatilla.—Especially useful when the testicles and mammary glands are involved; thickly coated tongue with dryness of the mouth and bad taste on waking in

* Gilchrist's Hom. Treatment of Surgical Diseases, p. 110.

the morning; chilliness; the pain is worse toward evening and after lying down, better in a cool room.

Rhus tox.—Dark-red swelling of the left parotid, with tendency to erysipelatous inflammation; typhoid condition; tongue dry and rough, with red edges and triangular redness of the tip; patient very restless, constantly changing position; all symptoms worse at night, especially after midnight.

Compare also: Arnica, Calcarea carb., Chamomilla, China, Cistus, Clematis, Coccus cacti, Kali bichr., Kreasotum, Phosphorus, and Phytolacca. Consult also the chapters on Orchitis and Mastitis.

Symptomatic Parotitis.

Symptomatic parotitis lacks the specific qualities which distinguish the idiopathic variety. It is not communicable, and shows no tendency to involve the testicles, ovaries, or mammary glands. Unlike mumps, it generally terminates in suppuration. As the name implies, it is, strictly speaking, a mere symptom, and not a distinct affection. The term "parotid bubo," applied to it by some writers, fitly describes its character.

Ætiology.—It may accompany or follow pneumonia, typhus and typhoid fevers, diphtheria, dysentery, cholera, pyæmia, and the acute exanthemata. When it occurs in connection with these grave constitutional maladies, it is called by some authors "metastatic parotitis."

It may also be induced by ulceration of the larynx and epiglottis, severe forms of stomatitis and sore throat, retro-pharyngeal abscess, and various inflammatory diseases of the head, face, and neck, and is then sometimes termed "secondary parotitis."

Pathology.—As already mentioned, Virchow has demonstrated that the inflammation begins in the gland-ducts, which soon become filled with a tough, whitish or yellowish substance, while the cellular tissue within and around the gland is extensively infiltrated with serum. Occasionally the morbid process terminates in resolution; but more frequently suppuration occurs, and the lobules become the seat of numerous small abscesses. In many instances the tunica propria and the interstitial tissue are destroyed, and the isolated purulent collections coalesce, and form a large abscess which occupies the greater portion of the gland. The pus usually finds its way to the surface or opens into the external auditory meatus; in some cases it has been known to burrow along the sterno-cleido-mastoid muscle or the œsophagus and trachea, and penetrate the thoracic cavity. The gland tissue and the interstitial substance may also be attacked by gangrene. In the worst forms of the disease the inflammation is not limited to the parotid, but spreads to adjacent structures. The surrounding connective tissue and the masseter and pterygial muscles may be destroyed by suppuration; the periosteum of the maxillary, temporal, and sphenoid bones, and even the bones themselves, may be affected; and

finally the internal and middle ear, the cerebral meninges, and the brain may become involved in the destructive process. Phlebitis and thrombosis of the anterior and posterior facial and external jugular veins may also occur; and the disintegration of these thrombi may induce embolism and pyæmia.*

Symptomatology.—When symptomatic parotitis occurs during the course of severe constitutional diseases, like pneumonia, typhoid fever, etc., the swelling is generally preceded by slight chills and an increased febrile action; but during the attack the local pain and tenderness are usually completely masked by the graver phenomena of the primary lesion. When it comes on during convalescence from these affections, or is induced by inflammation of adjacent structures, the symptoms are similar to those of idiopathic parotitis. When suppuration occurs, the swelling is intensely red, uneven and nodulated, and a careful examination will detect fluctuation. If gangrene ensue, the tumor becomes doughy and the surface assumes a livid hue. In the worst cases we may have the well-known phenomena of cerebral meningitis, cerebritis, phlebitis, thrombosis, embolism, and general purulent infection.

Diagnosis.—The diagnosis is based upon the history of the case and the symptoms above enumerated. The distinctions between symptomatic and idiopathic parotitis have already been mentioned.

Prognosis.—Symptomatic parotitis occurring during the course of grave constitutional affections is always a serious, and often a fatal, complication. If it arise during convalescence from these diseases or depend upon inflammation of neighboring parts, recovery may generally be expected. The prognosis is especially favorable when the tumor forms slowly and attains only a moderate size and hardness; in these cases the inflammation usually terminates in resolution.

Treatment.—The hygienic treatment is substantially the same as in idiopathic parotitis. We should first endeavor to secure resolution, but if suppuration be inevitable, it should be promoted by the application of poultices and the administration of suitable medicines. Abscesses should be opened as soon as fluctuation can be detected; and in the performance of this trivial operation we must be careful not to wound the trifacial nerve or its branches. During the early stages the remedies most frequently indicated are Ammonium carb., *Belladonna*, *Lachesis*, Lycopodium, Mercurius iodat., *Mercurius sol.*, and *Rhus tox.* In the suppurative stage, Arsenicum, Bromine, *Hepar*, Lycopodium, *Mercurius sol.*, Nitric acid, Phytolacca, Rhus tox., *Silicea*, or Sulphur may be required. For suppuration of the parotid with fistulous openings, Lilienthal† recommends Baryta carb., Calcarea

* Niemeyer, loc. cit.

† Homœopathic Therapeutics, p. 585.

carb., Carbo veg., Clematis, Conium, Kali carb., and Silicea. If gangrene supervene, *Arsenicum*, Crotalus, *Kreasotum*, *Lachesis*, Phytolacca, and *Tarantula cubensis* will prove serviceable.

Compare also the therapeutic indications given in the preceding section, and consult the treatment of those diseases in connection with which this malady usually occurs.

DIPHTHERIA.

BY JOSEPH SIDNEY MITCHELL, M.D.

Diphtheria is an acute, specific, infectious disease, highly contagious, of a low type, whose chief local manifestation is a deposit of fibrin on the pharyngeal and naso-pharyngeal mucous surfaces, and on those of the upper air-passages. Exceptionally, the exudate appears upon the mucous membrane of other regions and upon the skin.

Synonyms.—Malum Egyptiacum, Ulcus Syriacum, Morbus suffocans, Pestilentis gutturis affectio, Angina maligna, Mal de gorge, Gangrenieux, Angina polyposa, Garotillo, Rachen-croup, Diphtherite, Putrid sore throat, Malignant Quinsy, and Diphtheritis.

History.—This disease has been known and described from early days, though there is much obscurity regarding its ancient history. Homer and Hippocrates are said to have known it as "Malum Egyptiacum." Asclepiades and Celsus were doubtless cognizant of this affection. Areteus, a Cappadocian, speaks of a disease which occurred in the second century, characterized by a *quodam concreto humore albo* (certain thick, white humor), manifestly in connection with the other symptoms which accompanied it, describing diphtheria as we recognize it. Galen says the pseudo-membrane was coughed up when in the respiratory passages. Areteus in the fifth century, with more judgment than many of our recent practitioners, advises against energetic local treatment and the forcible removal of the false membrane. After this, little is recorded on the subject until the sixteenth century. Forrestus describes an epidemic in Holland in 1557; Baillou in Paris in 1576; Soglio in Italy in 1563; Weirus in Germany in 1565. In this century Spain was visited by four epidemics. In the seventeenth century Herrera, Villareal, and others, describe epidemics in Spain. Herrera, in 1615, noted diphtheria of the skin and wounds, and regarded the pseudo-membrane as the main feature of the disease. Heredia, in 1690, called attention to the paralysis of the soft palate. Carnevale, Cortesius, Nola, Aretius, and others, speak of epidemics in Italy.

We have historical reference to its presence in the New England States in the eighteenth century. In Germany, Wiedel, in 1718, described diphtheria, which raged also about the middle of the century in Italy, France, and England. Ghiza, of Cremona, and Scambatti,

Arnault, of Orleans, and Chomel, Starr, Fothergill, and Howe, of England, were the authorities for those cases. Machaelis refers to epidemics in Sweden in 1778. Samuel Bard in America, in 1771, gave an accurate description of the disease. Home sought to establish the non-identity of croup and diphtheria in 1774.

The first case recorded in this country occurred in Roxbury, Mass., in 1659. The earlier histories of the American colonies have occasional reference to epidemics of diphtheria, occurring in Massachusetts, New Jersey, and New York during 1671, 1735, and later in the century. The death of a member of the Imperial family of France in 1807 directed special attention to diphtheria. Bretonneau studied an epidemic at Paris, June 26th, 1821. He presented the results of his investigation to the French Academy of Medicine in a memorable way, in which he named the disease diphtherite, afterwards changing it to diphthérie, thinking its character non-inflammatory. Dr. W. Farr has the credit of introducing it into our nomenclature as diphtheria.

The immense impetus given the study of the subject since its history began with Aretius, may be inferred from the fact that we have already one hundred and forty-two authorities on this single topic. The investigations of Louis, Trousseau, Rilliet, Virchow, Oertel, and Wood have added greatly to our present knowledge of this disease. They differ, not only on the ætiology and nature of the malady, but vastly as regards its therapeutics. The record, though interesting, is beyond the limits of anything but a monograph. In our own land, many cities and towns have their history of fatal epidemics, and there is scarcely a practitioner who has failed to have considerable clinical experience. It would be futile to attempt to specify these in detail. Some further points in the history of diphtheria may, however, be added that are pertinent. Bourgeoise, in 1823, asserted the contagiousness of the disease, as had been done by Mercado in 1608. Bland, in 1827, states the differences between croup and diphtheria, and Des Landes declares them identical. Since then the contest on this point has been most animated. In Europe, West, Virchow, Niemeyer, Vogel, Letzerich, and in the United States, Wood, Barker, Bartholow, and Da Costa favor the non-identity of the two diseases. On the contrary, Des Landes, Mackenzie, and Sir William Jenner, some French physicians, and, in this country, Jacobi oppose this view. For my own part, while confessing to an indisposition to refinements of classification, I can see such clearly defined lines of demarcation (see article on "Croup," vol. i., p. 160) that I must place myself squarely in favor of the non-identity of the two diseases, notwithstanding the weighty authority arrayed against this position. In 1847 Virchow described the catarrhal, croupous, and necrobiotic forms. The general facts concerning microbes will be considered later.

Ætiology.—The disease is essentially a disease of childhood, and

most common between the ages of four and ten. Farr's table shows the following proportional mortality from diphtheria to deaths from all causes for each age.

	1st year.	2d year.	3d year.	4th year.	5th year.	5 to 10 years.	10 to 15 years.	15 to 25 years.	25 to 35 years.
Both sexes.	.5	2.	3.7	6.	8.	9.	6.3	2.5	.32

Children are prone to hypertrophic catarrhs; they have large tonsils and a succulent pharyngeal mucous membrane. Moreover, the great number and size of the lymphatics, and their intimate connection with the inner structures of the throat, may assist in causing and developing the disease. The statistics, both of the United States and Germany, show that more boys than girls are attacked. The greatest mortality is under ten, but there is considerable danger up to the fifteenth year. As a rule, older children do not have the disease so violently, and are more amenable to treatment. Within the past year I have treated four cases in adults, one fatal. All were very severe, contrary to former experience in this regard, which had always given me mild cases in persons over twenty. One recovered with paralysis of the palate muscles, and later of the limbs, with no further effect. The fatal case, which I saw at Muskegon, Mich., in consultation, bid fair to recover, but died later of cardiac failure. There was no case in that city, except that of the brother of the young lady from whom it was contracted. While in the depot at Omaha, Neb., this child was exposed to the diphtheritic emanations from a child suffering from the disease. The period of incubation in this case was four days, as near as can be determined.

Many cases of light form occur in adults in houses where children are affected, attended with only a moderate amount of malaise, mild headache, and moderate exudation, requiring little treatment, and recovering in from thirty-six to forty-eight hours. While statistics show slight mortality in the first year, five-tenths of one per cent. of the cases occur in the very young. Jacobi (*Treatise on Diphtheria*, page 30) says: Tigri reports the disease in a child of fourteen days; a child of fifteen days was seen with diphtheritic laryngitis and œsophagitis by Bretonneau; one of seventeen days by Bednar; of eight by Bouchut; one of seven days by Weigert. Parrot reports several cases, and Siréday reports eighteen cases of diphtheria in the newly born. They occurred in the Hospital Lariboisière in the spring of 1877, and were probably infected by the nurses of the neighboring child's asylum. He has met with three cases of diphtheria of the pharynx and larynx in the newly born.

A recent case in my own experience illustrates the non-suscepti-

bility of infants. A lady, aged twenty years, nursing her first child, was under my charge for a severe case of pharyngeal diphtheria. The attack was one of uncommon severity, approaching the malignant type. Her baby nursed regularly throughout the attack, and escaped any sign of the affection. Some families seem to show a special predisposition to the disease, evidently based upon a clearly-marked scrofulous dyscrasia.

Climate and Season.—While firmly believing that certain atmospheric and telluric influences are operative, it must be admitted that we have, as yet, no definite data to prove this point. The majority of cases occur in winter and spring; dampness and cold combined are most favorable. Some exceptional epidemics have raged in extremely cold weather when the ground was covered with snow. What the quality of the atmosphere is which determines the simple or malignant outbreak is undetermined. We see the same conditions, that is, personal and external filth, running through all the seasons, yet the autumn months give, as a rule, much diphtheria, though a quota not so large as that of the first quarter of the year. Other things being equal, a larger proportion of cases will occur in marshy than in sandy soil. This is as true of diphtheria as of phthisis and malarial fevers. Thursfield (*Jacobi*, p. 33), while finding no connection between the rate of mortality from diphtheria and the amount of the yearly rainfall, points to the variation of mortality in the several portions of the year. The average mortality from diphtheria, in the years 1870 to 1877, in the first quarter, was 733; in the second, 578; in the third, 547; and in the fourth, 750. Wibmer (in *Ziemssen*, vol. i., p. 583) shows a greater prevalence of the disease during the winter, especially from September to December, which period had afforded an especially high mortality in comparison with the months from April to August, when the mortality from diphtheria was at its minimum. Also in an epidemic which prevailed in Berlin from August, 1868, to April, 1869, according to Albu's report, the epidemic reached its height in the rainy month of November. In the United States we have usually the same ratio of fall and winter mortality, quite steadily maintained even for the Southern States. Epidemics have, however, occurred in this country in the winter and continued through the summer, apparently not affected by heat or cold, drouth or rain.

The Relation of Diphtheria to Filth.—Diphtheria is classed among the filth diseases. We have just seen that season, dampness, and climate have an influence, and we know that epidemics of diphtheria approach at certain times with the filth conditions the same throughout the year. It is true that cases and epidemics have been apparently traced directly to bad sewage, contaminated water, or impure milk. It is equally true that vast numbers under the same conditions escape diphtheria or any other filth-disease. Yet, we would in no way lessen precaution in

matters of cleanliness. It is certain that, with the disease endemic as it now is in many of our cities and large towns, its spread is increased by lack of proper sanitation. Filth unquestionably affords a convenient and favorable nidus for the propagation of the specific exciting cause or causes. Ventilation, it is well known, aids us to rid ourselves of the contagium. But we must still insist that other factors, outside of unsanitary conditions, will have to be operative to produce diphtheria, and not typhoid or scarlatina.

Contagiousness.—There is comparatively little difference of opinion on this point. The disease is highly contagious, and the contagium clings with great tenacity to solids, even to spoons and glasses, and to semi-solids. A notable instance illustrating this fact occurred at Grand Crossing, Illinois, which is worthy of record. A child had died of diphtheria; the school was dismissed to allow the children to attend the funeral. Within a few days an epidemic occurred, traceable directly to this case, and resulting in five deaths. The question is frequently asked why, in view of its manifest contagiousness, the disease is not spread by physicians going from a contaminated house to those not infected. There is yet no adequate explanation. A reasonable theory would seem to be that the physician combines in his person so many of the specific causes of different diseases as not to allow any one to be signally operative.

Regarding the infectiousness of diphtheria, using the word in the more limited sense as signifying transmission without the necessity of any direct contact between individuals, there is great question. We do not know how far the contagium can be transported through the air. An instance which may be adduced bears on this point, although, of course, no decision can be reached from a single case. A child was taken with diphtheria in Chicago; the case was very severe; two other children in the family were attacked. The child first taken had fully recovered, when it was thought best to send him to the house of a relative in a neighboring town, twelve miles away. There was no diphtheria there, and there had been none for some time. Three days after the child had been in the house, his little cousin, two and one-half years old, was attacked with the disease in the most virulent form, and died. Previous to the first patient's leaving his home for the country, he was thoroughly disinfected and his clothes were fumigated.

The majority of cases are local, arising from direct contagium. When, however, epidemics are prevalent, the infection is clearly proved to be directly through the medium of the atmosphere.

A very interesting ætiological question is whether one attack furnishes immunity from another. Here we have the same difference of opinion which exists on many questions connected with this subject. Jacobi says (page 32): "Not only cannot such security be expected after one attack of diphtheria, but *ceteris paribus* the disease shows a

preference for those who have survived a previous attack. The statement that only the milder cases with but slight elevation of temperature and freedom from severe constitutional symptoms are likely to suffer a relapse, is founded on error. True, I have more frequently seen relapses after milder cases, which fortunately are in the majority, but the disease is also recorded where, originally, high fever and extensive lymph adenitis proved it to be a severe case." He then refers to two cases of membranous croup upon which tracheotomy was twice performed.

On the contrary, Squier states (Reynolds's *System of Medicine*, vol. i., p. 64): "The recurrence of diphtheria more than once in the same subject is not settled so conclusively in the affirmative as has been supposed. That the same person may repeatedly suffer from the slighter forms of the malady, and that some do so from the slightest exposure, is frequently observed, but when the fully formed disease has been undergone, though relapses are to be feared in convalescence and even during the subsequent period of debility, which may be prolonged for two or three months, independent recurrence is rare. Of the children that recovered from the disease at the commencement of the epidemic and who have been constantly under my observation since, no instance of a second visitation has occurred."

This agrees with my own experience, extending over a period of twenty years, and covering several hundred cases of diphtheria. No instance of recurrence has yet manifested itself in any one the subject of a well-marked case, with fair amount of exudation, considerable fever, and tendency to lymph adenitis.

At the meeting of the State Medical Society of Illinois, held at Freeport, Dr. N. F. Cooke, of Chicago, whose keen powers of observation all who knew him will attest, made a similar statement. It seems hardly possible, therefore, that a disease which has not recurred in the practice of three physicians, extending over forty years, both in this country and in England, should show a preference for those who have survived a previous attack. It appears in this regard to agree more closely with erysipelas than with scarlet fever.

Dr. Gull, of England, reports an attack eleven months after the first, and three similar cases are observed by Dr. Greenhow, one of them proving fatal. Squier observes, very pertinently, that no particulars are given as to the intensity of the first attack. A mild attack of simple diphtheria may possibly recur, but I have no hesitation in saying to my patients who have suffered severe attacks that they may dismiss from their minds all further fear of its recurrence. It is no more likely to attack them the second time than is scarlatina or variola.

Dyscrasia.—It is difficult to decide whether those with marked diathesis are more prone to the disease; we are inclined to think they

are, for it is certain that they furnish the largest contingent of malignant cases. The disposition to rapid spread of the exudation, the necrobiotic character of the malady, the lymphadenitis and tendency to rapid blood-poisoning, are most marked in those of scrofulous diathesis. Many instances in the severe epidemics of diphtheria malignans which I have encountered during the last three or four years have enabled me to determine this point with much definiteness as far as my own observation has gone. Occasionally an instance will apparently disprove this conclusion, but may it not be because our knowledge of the constitution or the debilitating influences is not sufficiently accurate? A mild attack may furnish the contagium for the severest malignant form. The practical physician can early tell what degree of severity a certain case is likely to assume.

The Period of Incubation.—During epidemics there are operative so many sources of infection that the time of incubation may be difficult to determine. Where the disease is in one house and the parties are confined, the matter can be closely sifted. The period is variously estimated at from two to seven days, but, exceptionally, it may be even shorter.

Nature of the Poison.—Buhl was the first to discover microbes in diphtheria. Hueter and Oertel simultaneously detected them in the mucous membrane, subjacent parts, and in the blood of those who were infected with the disease. Oertel believed that he had solved the problem, that is, that the inoculation was by the action of the microbes causing a local disease, which then extended through the organism and became general. It established itself in one locality, which was the centre of infection, and then rotated through the whole system, inducing general blood-poisoning and necrosis of tissue. Nassiloff, Eberth, Klebs, and others, by their experiments help sustain this view. The investigations and teachings of Bassis, Darion, Obermeier, Pasteur, Koch, and others, have all helped to explain the origin of the various infectious diseases through the agency of bacteria. The bacteria theory has become less violent within the last two or three years. It was never established by the most earnest advocates of the origin of diphtheria in bacteria that they constitute the sole cause of the disease, or even that they are the carriers of it directly to the mucous surface. Hiller found microbes in the cadavers of those who had not died of septic disease; he also determined that septic infection is not always worse where microbes are the most abundant.

Panum, Bergman, Schmeideberg (Jacobi, *Treatise on Diphtheria*, p. 38), have isolated poisons which contained no bacteria. Rawitsch and many others prove that septic infection is not dependent on the existence of bacteria. Devein has shown that an infinitely small amount of chemical poison free from bacteria can kill quickly.

Panum, Billroth, Weber, and Hemmer question the chemical nature

of the poison. Hiller, by injecting isolated bacteria in large numbers into the subcutaneous cellular tissue of dogs and rabbits, produced a slight local swelling, but neither abscess nor fever. Even injected into his own subcutaneous cellular tissue it produced but a slight œdema; in subcutaneous wounds, which would not have suppurated otherwise, only œdema was produced.

The most conclusive experiments on this point are those made by Wood and Formad (Supplement No. 7, *National Board of Health Bulletin*). They made thirty-two experiments. Diphtheritic matter was injected subcutaneously and in the mucous membrane of the mouth. Only six animals died, and of these one case alone presented exudations indicating that death might have occurred from diphtheria. The internal organs of the animals were tuberculous. The results of the experiments of Burden Sanderson, who produced tubercles in guinea pigs by inserting cotton threads in the skin, were further confirmed by Wood and Formad in their experiments. In Wood's experiments, which consisted in introducing small masses of innocuous foreign substances under the skin, tuberculosis was found in five after death.

Experiments have demonstrated that ammonia, cantharides, and other chemicals, may induce the growth of a pseudo-membrane, when introduced into the system. It has been shown that Bryonia has this effect. M. Curie (*British Journal of Homœopathy*, vol. 19, p. 455) made the following experiment: He gave a rabbit increasing doses daily of the tincture of Bryonia until he came to 250 drops, when he developed a firm pseudo-membrane extending from the larynx to the bronchioles of the third degree. It would, therefore, seem that diphtheritic matter, artificially introduced within the body, is not so likely to produce the characteristic lesion of diphtheria as some other substances. Experiments were performed with organic matter to see if products of disease other than diphtheritic exudations would give the pseudo-membrane. The material was pus in four instances. Two of these gave false membrane, so this result was better than where diphtheritic matter was used. The conclusion of Wood and Formad is: The contagious material of diphtheria is really of the nature of a septic poison, which is locally very irritating to the mucous membrane, so that, when brought in contact with that of the mouth and nose, it produces an intense inflammation without absorption by a local process. Whilst absorption is not necessary for the production of the angina, it is very probable that the poison may act locally after absorption by being carried in the blood to the mucous membrane. Further, under this theory it is possible that the poison of diphtheria may cause an angina which will remain a purely local disorder, no absorption occurring; or a simple local tracheitis, produced by an exposure to cold or some non-specific cause, may produce the septic material, when absorption will cause blood-poisoning, the case ending in adynamic diphtheria.

Some such explanation as this here offered seems to reconcile the antagonistic opinions concerning the value of local treatment in diphtheria, because it is plain that the value of such treatment must largely depend on whether the angina has, or has not, been produced by absorption. At present it seems altogether improbable that bacteria have any direct action in diphtheria, that is, that they enter the system as bacteria, and develop as such in the system, and cause the symptoms. It is, however, probable that they may act upon the exudation of the trachea as the yeast-plant acts upon sugar, causing the production of a septic poison which differs from that of ordinary putrefaction, and bears such relations to the system as to cause the systemic symptoms of diphtheria when absorbed. Now, these bacteria may always be in the air, but not in sufficient quantities to cause tracheitis, but enough, when lodged in the membrane, to set up the peculiar fermentation, whilst during an epidemic they may be sufficiently numerous to excite inflammation in a previously healthy throat. The investigations and experiments of Wood and Formad are the most complete and conclusive on this subject which we have yet had, and they confirm the view, long held by some, that the bacteria may fall in showers upon the unprepared mucous membrane and not induce diphtheria, and that the real ætiological factor or factors, which render it susceptible to their action, is yet unknown.

Symptoms.—The prodromic symptoms vary from being comparatively trivial to quite severe, and continue one or two days. They are malaise, debility, muscular rheumatic pains, stretching, yawning, sighing, indifference, inability to think, headache, nausea, and vomiting. The latter, if persistent, indicates a severe attack. Then, slight rigors. Sometimes in children a convulsion ushers in the attack.

There are two forms of diphtheria, simple and malignant. In the first we include the catarrhal and lighter fibrous forms; in the second, the septic, necrobiotic, and gangrenous. The SIMPLE FORM has slight prodroma. There may be a sense of malaise and headache for a time; then, moderate rigors, followed by light fever, announce the outbreak of the disease. The pulse rarely rises to 100, and the temperature ranges from 100° to 102°; the gastric symptoms are trivial. Slight thirst and anorexia exist, lasting for a day or two. Examination of the fauces demonstrates that one or both tonsils, or a portion of the palate, or some well-defined part of the mucous surface, is of a bright, vivid red, while the rest maintains its healthy appearance. The whole area of redness may be confined to a single tonsil, with a part of the palatine arch. In rare instances the posterior wall of the pharynx is involved. The exudation is slight in amount. We have, at first, small grayish-white or yellowish-white spots or streaks. The exudate is far more likely to be thrown out in streaks than in the single isolated spots, such as we have in ulcerative angina. In fact, this is one

of the special diagnostic points by which we can early diagnosticate diphtheria. The membrane looks rather as though it had been pasted upon the mucous surface than as if it had sprung out from it. The course of the simple form is, usually, rapidly towards recovery. The spots may increase somewhat and thicken; they grow more yellow, and extend farther from the surface of the mucous membrane; then their edges separate, curl slightly, and soon slough as an evidence of convalescence. The hyperæmia diminishes, while these changes last-named occur. The cervical and submaxillary glands are not much involved in this form; however, the degree to which they are implicated, depends much upon the dyscrasia. In the scrofulous, a mild attack will give us glandular swelling, and even a moderate amount of cervical œdema, while the patient calls attention early to the soreness of the neck. From the second to the fifth day, the pseudo-membrane is found to have separated, leaving a comparatively healthy base and no ulceration. This is the form which we so often meet in practice, and in which relapses occasionally occur.

There are also to be noted cases which, presenting the same general type of symptoms, are more serious, because these symptoms exist in a higher grade of intensity. There is a more extensive deposition of exudate; the constitutional symptoms are more pronounced; the attack comes on with more evident rigors. Well-marked chills are not characteristic of diphtheria. The febrile movement is more intense; the pulse may rise to 120, and the temperature to 103° or 104°; the gastric phenomena are severe. There is vomiting, and the amount and persistence of the vomiting bears marked relation to the subsequent severity of the case. One should always look with more anxiety upon a case ushered in with frequent and severe vomiting. The exudate, which at first may be small, grows with considerable rapidity, is not so likely to be confined to a small portion of the mucous surface, but may extend over both tonsils, involving the uvula, and, perhaps, reaching a little distance on to the hard palate. It has the appearance already described, with a more decided tendency to grow darker, of a tawny yellow, but it never assumes the brown-black appearance of the malignant varieties. The mucous membrane is of a vivid red, and a larger amount of its surface is involved; there may be cerebral symptoms, delirium of a moderate degree, and insomnia. The characteristic debility which belongs to the disease is manifest in this form; the child is weak, indisposed to move, and far better contented without any disturbance. There is a sense of soreness in the throat, the patient complains of sticking pains, and the soreness of the neck is especially noted. The swelling of the submaxillary and cervical glands is well marked, and the œdema of the neck is prominent. The discharge from the nares seems of an ichorous nature; the saliva is thick and ropy, and the breath very offensive.

In the MALIGNANT FORM, the prodromic symptoms, the malaise, backache, headache, and mental weakness are well marked. The attack is severe from the first, evidence of blood-poisoning being early present. The exudation is more extensive, quickly loses its whitish or grayish-yellow color, and becomes of a dull yellow first, then of a dirty brown, and the edges become black. An ichorous discharge exudes, inflames and ulcerates the corners of the mouth, and gives rise to an exudation at these points. It excoriates the external skin wherever it touches, causing an erysipelatous tendency. Beneath the exudate pus forms, and the mucous surface is not only denuded of its epithelium, but ulceration may take place. The general symptoms are those of typhoid fever. There is great prostration; high pulse, ranging from 120 to 140; temperature, 104° to 106°; diarrhœa may be present, and the early gastric symptoms give place to an extreme anorexia, so that the question of nutrition soon becomes one of the greatest importance to the physician. The child absolutely refuses everything, liquids as well as solids. A disposition to hæmorrhages occurs, notably to epistaxis. The glands of the neck are swollen, sometimes enormously, and the œdema is marked; the integument is white, glossy-looking, bloated, waxy, and cold; pallor is extreme; the eyes are glassy and the secretion irritating; the inflammation may extend to the Eustachian tubes; the child lies with mouth open, breathing quickly and often stertorously. The cerebral symptoms are insomnia and delirium, which are quickly followed by stupor.

GANGRENOUS FORM.—This is a severer grade of the septic variety; the membrane rapidly tends to become dark from hæmorrhagic infiltration. The mucous membrane under the exudate in some cases ulcerates, and in some there is quite extensive phagedæna, and pus is freely secreted. There are chills, hæmastatic abscesses, and erysipelatous inflammation of the skin. The nervous phenomena are profound, the patient soon becomes collapsed, and death ensues.

Termination.—Even malignant cases of diphtheria may recover. A favorable turn in the disease may take place, followed by an improvement in the general symptoms; the patient gives some evidence of returning consciousness, rallies from the apathy in which he has been plunged, evinces a very slight desire for nourishment, or, at least, loses the utter repugnance to all food. The febrile movement subsides gradually; the temperature drops, but may be raised again upon slight provocation; the facial expression improves; changes in the pseudo-membrane are quickly observed. There is a disposition to sloughing, leaving a comparatively healthy epithelial surface beneath. The mucous membrane loses its hyperæmic or livid appearance; the saliva becomes less viscid and tenacious, and gives place to a healthier secretion; the sordes on the teeth and mouth disappear, and the general aspect of convalescence is established.

Individual Symptoms.—The appearance of the pseudo-membrane has been described in connection with the pathology of this disease. The character of the disease itself is marked by the pseudo-membrane, although we believe that it is but one manifestation of the general affection. If the case is simple, we have only a moderate amount of exudate. In the severe cases there is a more extensive deposition, and the changes which occur are degenerative. By observing the membrane, one can, from day to day, form a good idea concerning the progress of the case; for the general symptoms proceed *pari passu* with the development of the false membrane. It is of ill omen when, in spite of well-directed therapeutic means, the membrane steadily increases in extent, and assumes a darker color. If the edges curl, spread, and contract, sloughing is near at hand. A general sloughing of masses sometimes occurs without the necessary drawing together and contraction of the edges.

The temperature ranges early from 103° to 104° F.; this early height of the temperature is characteristic of the disease. The higher temperatures of 105° to 107° F., are very rare. Jacobi (page 55) refers to a case where the temperature in the axilla of the patient was 107° F., after eighteen hours 102° F., and in a few days 99° F. He regards this case as one in which, on the second or third day of the disease, there is abundant albuminuria, which evidences rapid elimination of the poison, and speedy recovery. A free exudation may be attended with a depressed temperature, but the elevation of temperature returns again, and proceeds to an even greater height. Defervescence occurs in mild cases on the sixth day, and in severe cases from the twelfth to the fourteenth. During convalescence the temperature runs low, and may be readily depressed. The pulse varies from 100 to 140 beats per minute.

Albuminuria.—To Dr. Wade, of Birmingham, we are indebted for first observing and calling particular attention to the importance of this symptom. The presence of albumin is an early and persistent effect which may occur on the second or third day, and which obtains in light cases as well as in those of a severe type. Its early appearance differs from that of the albuminuria of scarlatina, which rarely comes on earlier than the second week, and usually later than this. Its presence in the urine does not take place so much from blood-changes as from changes in the kidneys, which we have described when speaking of the pathology of the disease. The rapid elimination of the specific poison seems to be connected with the appearance of the albumin and with its amount. Œdema does not usually accompany it. At times its presence evidently indicates a severe nephritis.

Debility is a marked symptom; it usually depends upon the amount of exudation, and accompanies any considerable increase of it; it con-

tinues while the exudation is in progress, and reaches its height about the time the diseased products are being exfoliated. In very severe cases of the malignant variety the symptom is extremely marked, and seems then to be dependent upon the weakened condition of the heart, whose muscular structure is either pale or in a state of fatty degeneration.

Hæmorrhages occur with considerable frequency, especially epistaxis; in some of the severe cases we find hæmatemesis, the occurrence of which increases markedly the asthenia.

Laryngeal Symptoms.—The exudate in the larynx occurs in some instances primarily, but usually it results from an extension of the disease from the pharynx into the larynx. In any case of pharyngeal diphtheria the first croupy cough demands the close attention of the physician. Laryngeal diphtheria causes a large proportion of the fatality of this disease. The spread of the exudation is directly from the pharynx to the epiglottis and epiglottidean folds, and onward even to the bronchioles. We are never in doubt as to the beginning of this complication, for it is unerringly indicated by the hoarseness or weakness of the voice, or by the croupy cough. Both inspiration and expiration are affected so that there is an actual stenosis of the larynx; the face is pale and œdematous, and there is disposition to unconsciousness.

For the symptoms referable to the *nervous system* we have material pathological lesions as their basis. Buhl (*Ziemssen*, vol. i., 656), in one case that died during diphtheritic paralysis, found that the spinal nerves were thickened at their roots, that hæmorrhages had taken place, and that the sheaths of the nerves, and here and there also the strips of connective tissue running between the bundles of nerve-fibres and ganglion-cells of the sensitive roots, were filled with lymphoid nuclei and cells. Oertel, in support of his view that there was an active still enduring action of the disease in the brain, spinal cord, and nerves, observed that in a case of diphtheritic ataxia the diphtheritic products indicated further softening, and that the successive degenerative processes appeared in the organs lying inside of the cavity of the skull and vertebral column; while the destructive process, indicating general infection, continued with undiminished activity in these innermost recesses. The parts were hyperæmic, and there were extravasations of blood; rupture of the vessels was apparent; the meninges were exceptionally hyperæmic, the veins being distended with blood. The substance of the brain was compact, broken by capillary apoplexies, and a clot as large as a cherry-pit lay in front and on the inner side of the optic thalamus. The ventricles were not distended, and contained only a small amount of bloody serum. On the other hand, the choroid plexus was filled with blood; the meninges of the spinal cord were still more affected; in some parts there were fresh

extravasations, in others the traces of earlier ones covered broad strips, especially on the right side where the roots of the nerves were entirely enveloped in coagula. With such severe lesions resulting from the diphtheritic process, we can readily account for the nervous phenomena during the course of the disease.

But it is a question whether the paralyses coming on later in the course of the disease have direct relation with these pathological changes or with the continuance of their effects, or are simply due to functional lesions in the nerves themselves. The tendency after diphtheria is to paralysis of the smaller muscles. The muscles of the eye are affected so that we have paralysis of the muscles of accommodation, and defective vision is not unfrequent. There is often a sluggish and immovable pupil, and strabismus may occur. Taste is sometimes lost; there is regurgitation of fluids through the nose, and there may be a loss of sensibility in the *velum pendulum palati*. It is impossible to sound the letter "a." There may be difficulty in swallowing; paralysis may occur of the deeper muscles of the larynx and pharynx, causing danger to life from inanition or by the entrance of food into the air-passages and lungs; but these forms, happily, are rare.

Some of our sudden cases of cardiac failure are doubtless due to paralysis of the heart. Rarely, the extremities may be affected; there is numbness and tickling in the fingers and toes, extending afterwards throughout the extremities; there may be a sense of coldness and different degrees of anæsthesia or hyperæsthesia. The amount of muscular loss varies very much. In some instances there is complete inability to walk, but ordinarily the symptoms are more those of an ataxic character.

Paralysis of the bladder and rectum have rarely occurred.

We have also, as further sequelæ, the occurrence of dropsy, and chlorosis has been known to follow diphtheria.

Pathology.—The exudation itself claims attention. Its location is by preference on the mucous membrane of the fauces, but it may attack various portions of the organism. After its appearance in the fauces it may extend to the mouth, nares, larynx, pharynx, and bronchi. It doubtless extends many times in the posterior nares when we have no opportunity to observe it. It occurs in isolated patches, in streaks or pasty masses, or as casts of the cavity in which it forms. In the nares the exudation may be primary or secondary; the amount of it may be slight or extensive. I have seen diphtheritic exudation fill the pharynx, extend into the posterior nares through the whole nasal cavity, and project from both nostrils. In nasal diphtheria we have either a moderate amount of discharge, or a profuse purulent or sero-purulent fluid, sometimes sanious and very offensive. It excoriates any part of the integument which it touches. In the larynx the exudation is generally secondary, occurring by extension from the

pharynx. To those who hold the view that pseudo-membranous laryngitis and diphtheria are identical, of course, a primary deposition in the larynx can frequently occur. The trachea and bronchi may also be primarily affected, and in such instances there is a tendency to produce an intense rapid suffocation. Both Zenker and Ziemssen affirm that the exudation stops arbitrarily at the œsophagus, but Jacobi has seen it extend 1½ inches downward. Bretonneau, Bristow, and Virchow note also œsophageal diphtheria.

Diphtheria of the conjunctiva occurs, and is, at times, the only manifestation of the disease. It is very dangerous, may destroy the cornea, and cause prolapse of the iris. The exudation is found in the ear, either through extension from Eustachian tubes or from the external auditory canal; it may also be present in the stomach and intestines. Gastric diphtheria produces very intense symptoms, severe pain and epigastric tenderness, anorexia with constant vomiting of mucus, shreds of membrane, and blood. I speak now of the exudate which occurs in cases of diphtheria, and not of the fibrinous exudation in dysentery, typhoid fever, measles, etc. We may have the characteristic diphtheritic exudation in wounds on the skin and, exceptionally, in the vagina.

The Nature of the Exudation.—It has close relation with the fibrin of the blood, and resembles it in physical properties. (Reynolds's *System of Medicine*, vol. i., p. 74.)

It has an alkaline reaction, swells, and becomes transparent in strong acetic acid, and is disintegrated or dissolved by caustic alkalies. It is unaltered by maceration in water, and yields no gelatine; it is stained brown by tincture of iodine, and assumes entirely the character of pure fibrin. Microscopically it is composed superficially of the epithelial elements of the mucous surface from which it is produced. The cells are in various stages of degeneration. There are also granular bodies, pus-cells, and blood-corpuscles grafted upon masses of micrococci. The outer cells of the epithelial layer, though covered with exudation, do not show much change, but Weber says the cells of the top-layer swell by absorption of the fluids of the tissue. The micrococci appear to exert an active influence in the pathological process, dipping down between the cells and lifting them up and otherwise displacing them; they penetrate the deeper layers. Pus-globules are found at times beneath the exudation. In the more severe cases, when the process continues long, the number of pus-cells increases, and if they pass out beyond the exudation, the extension of fibrin which marks the beginning of the diphtheritic process takes place not only upon the epithelial, but extends into the sub-epithelial, tissue. It is this that is said to constitute the difference between croup and diphtheria; but certainly it is not broad enough when the morphological elements of the exudation in the two forms are so nearly alike.

It is far better for us to depend upon the marked clinical differences which we have. It is fibrillated, and the fibres are very delicate. The masses of fibrin vary in size. They are mixed with micrococci and disintegrated epithelial cells. The pseudo-membrane may extend and develop, or it may be separated by layers of pus-cells which circumscribe it. In the septic form we have usually the rapid development and growth of false membrane. The same process already described continues, and the false membrane increases quickly. It has fibrinous points or threads, epithelial cells greatly degenerated, disintegrated pus-corpuscles, that is: masses of tissue mingled with the fibrin, and micrococci with altered and thickened mucus from the follicles. The micrococci abound in large numbers; by their number they establish a tendency to necrosis, crowding into the tissues, and not only altering the nature of the folds, but producing death by actual pressure. The exudation receives its dirty-brown color from the blood-corpuscles originating in capillary extravasation. The necrobiotic process goes on rapidly, and marked fœtor is produced.

The gangrenous form has all these processes proceeding with yet greater rapidity; the infiltration of fibrin is more extensive; there are numerous growths of bacteria, and the most intense rapid necrosis. A reddish, grayish, foul-smelling discharge surrounds the exudation. Buhl early called attention to the fact that even in severe cases the disposition of the tissue may remain intact under the membrane. This is true of the simpler form which may slough and leave epithelium comparatively healthy. But the septic and gangrenous forms may have alterations more or less extensive underneath. The exudation readily shows such alterations of substance. Caries, in the septic forms, is repaired by cicatricial tissue, and we have already seen how necrosis may occur in this variety. The prostration may be excessive. Louis saw erosion of the cartilages at the posterior nares.

Ashley noticed phagedæna commencing at the tonsils and extending to the carotid, and Greenhow observed post-pharyngeal abscesses.

The cervical glands, unlike similar conditions in scarlatina, do not tend to suppuration. If the disease proceeds towards recovery, the infiltration greatly subsides, the swelling diminishes, and the affected gland returns to its normal condition.

Lungs.—When the diphtheritic process extends into the small bronchi, death occurs from suffocation. The anterior portions of the lungs are anæmic, and the posterior are found full of blood. When there is general blood-poisoning, there may be extravasations, small in size or larger, hepatization of considerable parts, and the air-passages may be impeded.

Heart.—Fatty degeneration of the muscular substance of the heart may occur; it was the cause of the death of the distinguished and lamented young oculist, W. H. Woodyatt. Both layers of the peri-

cardium, after the septic and gangrenous forms, may present extravasations. The heart muscles are friable, soft, and contain also extravasations. The parts may be pale and bloodless. In severe cases, death from cardiac failure has often occurred. We should be careful to warn the patients, for sudden pallor and faintness may come on, the pulse cease, and death immediately occur during the profound asthenia which follows a malignant case.

Kidneys.—The kidneys, though to all appearances healthy, do not prove to be so under microscopic examination; changes occur in the tubuli uriniferi. The tubules are dark, filled with granule-matter and pus-globules; the tubes are bare of epithelium, and present the characteristic fibrinous casts. The kidneys are swollen, sometimes pale and anæmic, or congested in spots; again, they are quite hyperæmic; on the whole, the tendency to nephritic degeneration is not as great as in scarlatina.

The gastric mucous membrane is found soft, friable and thickened, with patches of vascularity and extravasation. The intestines may be injected and ecchymosed, with enlargement of the follicles. Patches of exudation may be found upon the mucous surface, and, beneath the exudation, ulceration. The liver and spleen are not generally involved, even in very severe cases; exceptionally they may be found enlarged and covered with spots of exudation.

Extravasations on the brain and its membranes have occurred. Humphrey reports suppuration of the under surface of the left cerebral hemisphere. Dr. Gull reports suppuration and inflammation of the membrane of the brain and cord.

Eruptions.—Not all cases of diphtheria present an eruption; in fact, the rash is not uniform in appearance like the eruption of scarlatina. Patches like erythema are observed in some cases; again, the eruption is vesicular, and its disappearance is not followed by desquamation.

Diagnosis.—An inspection of the fauces is usually sufficient to determine the character of the disease. The congestion of the mucous membrane of diphtheria is generally circumscribed and intense; that of tonsillitis is usually more diffuse and less vivid. In the early stages of phlegmonous pharyngitis we may have intense congestion upon one side, but the absence of the exudation soon determines the affection.

The exudation of a yellowish or whitish-yellow, soft secretion at the orifice of the tonsils in follicular tonsillitis leads to many early errors of diagnosis, and accounts for a large number of cases some physicians have reported as diphtheria. The whitish points coalesce, and form a patch of considerable size which appears like the pseudo-membrane of diphtheria.

The special feature of the diphtheritic exudation is its disposition to apply itself in streaks or masses rather than in isolated spots, or in

thickened yellowish masses of mucus on the posterior wall of the pharynx, which may easily be detached. The appearance of the diphtheritic membrane with the characteristic hyperæmia is generally distinctive enough. The glandular enlargement is not distinctive, for scrofulous subjects have this tendency in even acute catarrhal affections, but it is more marked in diphtheria. The odor of the breath is significant. I once had two cases which proved fatal where there was no exudation either in the pharynx or larynx, but the characteristic odor of the breath was present, and assisted materially in making the diagnosis.

We have sometimes difficulty in diagnosticating diphtheria from scarlatina, especially in those cases that have the eruption. The redness of the throat in scarlatina is diffuse and the exudation tends to be bilateral. The pulse and temperature are greater in scarlatina.

Herpetic sore throat, *herpes guttural*, has its highest temperature on the second day, and the eruption on the lips marks the nature of the malady. Sanne believes this sore throat to be a form of diphtheria.

We refer to the article "Croup" [vol. i., page 160] for diagnosis between diphtheria and membranous laryngitis.

Prognosis.—In the benign cases there is little danger; the general symptoms are slight, and the local trouble soon subsides, the tendency to extension of the exudation is not great, and consequently, after the first, we have little increase in the severity of the general symptoms.—In the malignant form the danger is extreme, and varies with different epidemics. Some cases seem hopeless from the beginning; they are marked by much glandular swelling and rapid extension of the exudation, much anorexia on the start, and early appearance of septic symptoms. The glandular swelling affords indication of danger when it is extreme, and there is accompanying it much œdema of the throat and a glossy appearance of the skin with an erysipelatous look, in which case there is great gravity. Large deposits are not in themselves bad, but they do not often become very extensive, except in those cases which have malignant symptoms. Cases which from the start present marked nervous depression, with irritability, delirium, or stupor, are likely to terminate unfavorably.

Laryngeal diphtheria is fatal under almost any treatment and all circumstances, the mortality ranging from 90 to 95 per cent. Tracheotomy affords but slight hope of relief.

A differentiation from thrush is hardly necessary. The seat of thrush is the buccal cavity principally, and its constitutional symptoms are insignificant.

Therapeutics.—This part of our subject presents many difficulties. Among the very large number of authorities on the subject there exists the widest difference as to therapeutic measures. At one time the rage was for Cyanide of mercury, at another for Benzoate of soda,

at another for Potassium chlorate, and at another for alcoholic preparations. The true homœopath sees in this fact the necessity of individualizing instead of using general methods. Remedies that were useful in one epidemic may fail in another. There is also a great difference in the fatality attending various epidemics. Twenty years' experience may give good results from the use of certain remedies, when an epidemic during which we encounter many fatal cases shakes our faith in all remedies. Certainly, a specific for diphtheria does not exist.

For the benign cases we require the following remedies:

Aconite.—Of little use, except in the earliest stages when there is still intense hyperæmia.

Belladonna.—Valuable in the early stages; but its use should not be continued after the first twenty-four or forty-eight hours. If there is a high fever and not too much exudation, and the fauces are bright red, it will relieve promptly. Doubtless Belladonna has an influence, if given sufficiently early, to moderate the course of the disease, but when once the diphtheritic processes are fully established, it seems to be without further effect. I am satisfied that valuable time has been lost in continuing Belladonna when some other agent could have been advantageously used.

Kali bichrom.—For nearly every case of the benign variety, and for some of the malignant forms, it is nearly a specific. B. F. Joslyn (*Transactions World's Convention*) says: "In a large proportion of cases this remedy is most specifically indicated." This agrees with my own experience. It strikes at the dyscrasia, and ranks high as a germicide. The special indications are: Mucous membrane deeply affected and ulcerated; pain in the throat; painful, difficult swallowing; great weakness; swollen glands; stringy, tough mucus; the exudation is of a yellow or yellowish-white color, and is of a firm, fibrous nature, thrown out in large quantities, covering both tonsils, and tending to extend into the nares and larynx. There is a measles-like eruption; red, raw, shining tongue; swelling of the cervical and submaxillary glands; desire to cough; the cough is croupy; breath very fetid. The characteristic difference between Kali bichr. and Mercurius iod. is the more fibrinous consistency of the exudate under Kali, while Mercury has a softer and more pasty pseudo-membrane. I am firmly convinced that, if these remedies were used early and continued persistently, our cases of diphtheria would much less seldom progress to the septic form.

Mercurius iodatus.—Great pain in swallowing; marked glandular swelling; fetid discharge from fauces and nares; thick, ropy saliva; œdema of the throat and neck; the exudation is white, yellow, or grayish, soft, and creamy; anorexia is present early; great loss of appetite; profuse, sticky perspiration. In the scrofulous cases which have been previously mentioned, with tendency to glandular enlargement, this remedy will be found efficacious. Some authorities maintain a prejudice against the use of mercurial preparations in diphtheria, but this is owing to the fact that when not indicated, they have a tendency to cause an increase in the amount of the exudation and of the general symptoms. The action of the remedy must be carefully noted, and its use discontinued at once if it fails to have the proper effect upon the exudation. I repeat what has already been said concerning the action of the remedies, that in this disease, if rightly indicated, there is prompt effect shown in the disposition of the exudation to contract and detach itself from the mucous surface, and also by an improvement in the constitutional symptoms. The Cyanuret of mercury has been advised and used with success by many, and, as is well known, it accelerates the absorption of the exudate more effectively than does the iodide.

From recent investigations concerning the value of Mercurius cor. as a germicide, we should expect in diphtheria even better results from the use of this preparation of Mercury than from any other. Clinical experience has shown that it exercises particularly great power. Given low, it is followed by rapid removal of the exudation and loss of fetor.

Nitric acid.—Thin, opaque, milky-white coat as if it had been cauterized with nitrate of silver. In some cases there may be yellowish-white or grayish-white patches; swallowing is difficult and painful; a thick, tough mucus flows from the corners of the

mouth. After the disappearance of the exudation thin ulcerations remain; the discharges are acrid, and there is a tendency to hæmorrhage, excessive fœtor of the breath, and marked despondency. The glands are swollen and the fever is violent. It is particularly indicated in cases grafted upon a syphilitic dyscrasia.

Phytolacca.—This remedy is indicated in many of the benign cases, especially in those attended with severe pain in the forehead of a dull aching character; head hot; face livid; skin dry and harsh; great prostration, with drowsiness; nausea, vomiting, and frequent diarrhœa. There is redness and swelling of the soft palate, tonsils, and roof of mouth; constant inclination to swallow; tongue raw; appetite lost; saliva increases, and breath is offensive. In malignant cases it has no value.

In malignant cases:

Apis mel.—In cases attended with great debility from the onset; diphtheritic patches on the palate and uvula; œdematous, elongated uvula; puffiness of the mucous membrane; dysphagia. The exudation early assumes a dirty-grayish color; puffiness about the eyes; itching and stinging, fever and headache. Cutting pain in the abdomen; the urine is scanty and suppressed, and contains much albumin. There is swelling of the cervical and submaxillary glands and œdema of the neck; burning, stinging dryness and roughness of the throat. In laryngeal diphtheria it will moderate the œdema glottidis which, with the exudation, forms the sources of dyspnœa.

Arsenicum.—Of great value, particularly in the later stages or in septic cases. There is marked debility; disposition to profuse salivation; desire for drinks; pale, sometimes red, face; feeble, quick pulse; prostration great; exudation grayish-white, with burning-pricking of the mucous membrane; hæmorrhage from the nose; acrid discharge; oozing of blood from under the membrane; very fetid odor of the breath, and painful deglutition.

Ammonium causticum.—The effect of Ammonia in producing pseudo-membrane is well known. There is great weakness and prostration, out of proportion to the duration of the disease; deep redness of the velum, pillars of fauces, tonsils, and posterior wall of pharynx, with intense pain in swallowing. The pulse is rapid, feeble, and wiry; exudation white, with marked tendency to extend; hoarseness even to aphonia; mucous stools; the patient is very irritable and fretful. In cases attended with very great dyspnœa, prompt relief has followed the use of this remedy. Its action in the marked prostration so characteristic of the disease is prompt.

Bryonia is little used in diphtheria though, as we have seen, it has the power, when its use is long continued, of inducing the formation of a pseudo-membrane. When indicated, the patient avoids movement, has a feeling of dryness in the mouth, without particular thirst, or desire for large quantities of water.

Baptisia.—Fever marked at night; feels hot; pulse accelerated or slower than in health; there is but little pain in the fauces, but there may be œdema and the membrane of a whitish or yellowish-white color; tongue tends to become covered with sordes, as in typhoid. Very useful in cases early showing a low typhoid condition.

Arum triphyllum.—Excoriating discharges from the mouth and nose, fetid breath, and excessive diphtheritic deposits with ulceration.

Chlorate of Potassium.—This remedy has been so extensively vaunted as almost a specific for the malignant forms that it deserves careful consideration. It certainly has a powerful influence over malignant ulcerations of the throat. Joslyn's use of it in gangrene of the mouth affords valuable indications of its powerful action. We would call attention also to the doses which he used, inasmuch as there is a tendency among physicians of our own school to use it in massive doses. Joslyn prescribed it in doses of 2 to 3 grs. of the salt in 3 oz. water, one teaspoonful to be given internally every two or three hours. A stronger solution, 2 grs. to the ounce, was used as a wash with much success. It is only necessary to consult old-school journals for records of the many fatal cases which have followed the use of this drug in excessive doses. That it tends to the production of a fatal nephritis has been confirmed many times. Jacobi does not advise its use in over half a drachm for a child of two or three years, in the twenty-four hours, while a baby of one year, or less, should not take more than one scruple, and an adult not more than a drachm and a half in the course of 24 hours. To insure effective action, doses as small as those given by Joslyn are undoubtedly all that is necessary, and careful clinical observation will show that the second and third triturations have an equally prompt effect. The special indications are: breath very fetid; violent pain in the throat; exudation grayish-white and

tending to increase rapidly. In using this remedy, I would advise beginning with the second decimal trituration, rapidly running the quantity up to Joslyn's doses. If the latter failed, I should at once discontinue the use of this agent.

Carbolic acid.—When the exudation is whitish or yellowish, and extensive, and tends to re-form after having once sloughed; very great fœtor of the breath; absence of pain; great prostration, dizziness and headache.

Iodine.—The exudation is thick, grayish-white; much salivation; strong odor of the breath, with marked glandular swelling; difficulty of breathing; hoarseness; great disinclination for food; tenderness about the larynx.

Lachesis.—Mucous membrane livid; exudation white or yellow; very great weakness; prostration; swallowing painful; ulceration of the mucous membrane; sensation as of a foreign substance in the throat; the exudation commences on the left tonsil; very great aphonia; constant delirium, bad-smelling stools; expectoration difficult and scanty. There are many cases of diphtheria where the pain in the throat is not intense; the characteristic indications for Lachesis seem to be the extreme difficulty of swallowing and the lividity of the mucous membrane.

Rhus tox.—When a typhoid condition occurs with much sordes about the tongue, lips, and teeth; swelling of the parotid glands and transparent, jelly-like discharges from the bowels; great restlessness and complaints of pain; bloody saliva poured out from the throat.

Salicylate of soda.—This drug has such a depressing effect upon the heart, to which all severe cases of diphtheria tend, that it must be cautiously used. I would especially caution against the use of the drug in its crude form. In cases with a large amount of white exudation, with violent fever, great prostration, and pain upon swallowing, it is of service.

Sulphur.—When there is a large yellowish deposit about the pharynx which is soft and exfoliates without loss of tissue, quick pulse, flashes of heat, frequent sinking spells. Feeling of a lump in the throat; the parts are of a purplish color; great dryness. This remedy is of service in adynamic cases in which the morphological changes are slow.

Sulphuric acid.—Ulcerations of the throat, with large exudations, tonsils bright red, excessive salivation and fœtor of the breath; frequent small pulse.

Laryngeal Diphtheria.—Bromine, Ammonium caust., Iodine, and Kali bichr., according to indications already given.

A cure of laryngeal diphtheria, which is so generally fatal, with *Kali bichrom.* is worthy of special note. A child, two and a half years old, somewhat scrofulous, but presenting a generally healthy appearance, was taken with a severe type of diphtheria, not, however, very malignant. The exudation filled the pharynx, covering both tonsils and the velum pendulum, and extended into the posterior nares. About the fifth day a croupy cough set in and severe spasmus glottidis. The child was exceedingly irritable and bad-tempered. It became impossible for any nourishment or medicines in liquid form to be given, and any attempt to force them brought on a spasm which threatened complete suffocation. I was obliged to administer the 30th of Kali bichrom. whenever it could be given, which was at intervals of from three to six hours; a little milk was taken at smaller intervals. The child made a prompt and perfect recovery, there being but slight paralysis of the palate muscles, which quickly yielded to Gelsemium. Another case of laryngeal diphtheria was cured by taking this remedy, although others were used in alternation with it at different times. In the first case no local application could be used.

Apis and Arsenicum will be useful for the purpose of controlling the œdema which in these cases adds to the dyspnœa. It is probably true that in some instances, if we could moderate the œdema, there would be a sufficient amount of room left for the entrance of air in spite of the pseudo-membrane. I insist, therefore, upon a careful selection of remedies in these apparently hopeless cases. Several recent successes have afforded much reasonable ground for hope even in desperate conditions.

Diphtheritic Paralysis.—For the paralysis of the small muscles, throat and eye, Gelsemium is nearly a specific, and for the larger muscles Nux vomica. For the dropsy, Arsenicum and Apocynum.

Accessory Remedies.—We may consult at times Ailanthus, Arum triph., Cantharides, Capsicum, Chininum ars., Ignatia, Lycopodium, Phosphorus, Plumbum, Muriatic acid, Sanguinaria, Tartar emetic, Lactic acid.

Hygiene.—Close attention should be paid to furnishing the patient with a good supply of fresh air. A large room on the upper floor should be selected, with a grate, which furnishes the best ventilation. The windows should be opened by placing under the sash a strip the width of the window and three or four inches high. The bed should be surrounded with a screen to protect the patient from currents of air. It is of importance to attend to these details. One case of laryngeal diphtheria under my own observation was carried through to a successful termination by the intelligent and faithful attendance of the mother of the child to every hygienic detail. The temperature should be 68° F. for the uncomplicated cases, and from 76° to 80° F. for laryngeal diphtheria. It is important to maintain a uniform temperature in order to prevent spasm of the glottis and to diminish inflammation; the covering should be light.

Diet.—In a disease characterized by rapid tissue-metamorphosis, as evinced by emaciation and the elimination of large quantities of albumin, nutriment should be introduced into the system in considerable quantities. The repugnance to food is often great and unconquerable; even adults refuse all nourishment at times. Milk and beef-tea are the sheet anchors of diet, particularly the former. If the child will take milk, there need be no further concern about nutrition, for under its use the debilitated stomach will again regain its vitality. The milk and beef-tea may be given alternately, a gill every two hours, or smaller quantities more frequently, and any simple nourishing food which the patient craves is to be allowed. In cases of extreme debility with intense anorexia, the strength may be sustained with enemata of milk and beef-tea, unless the patient can take small quantities of beef juice. Stimulants, with children, tend to destroy what little appetite there is; we should resort to their use only when profound adynamia requires them. The best stimulant is wine-whey, which affords some

nutriment as well as stimulus. Eggnog is often too heavy for the weak stomach, but if borne, it may be of service.

Local Applications.—The list of drugs for use by direct application is long. Chlorinated lime, Potassium chlorate, Alcohol, Salicylic acid, Permanganate of potassium, Carbolic acid, Benzoate of sodium, Bromine, Iodine, Boracic acid, Sulphuric acid, Eucalyptus, Bichloride of mercury, etc., are used for their antiseptic, disinfecting, or germicidal powers. Careful observation and clinical experience lead me to the conclusion that Alcohol heads the list. It may be diluted with equal parts of water, or, for very sensitive throats, with two-thirds of water. Under its local use the diphtheritic effusion diminishes rapidly or ceases to take on a malignant growth. Mercury bichloride is a germicide of great power. In two cases of malignant diphtheria this remedy was locally used with promptness and efficacy. The hygienic surroundings were unfavorable. It is worthy an extensive trial. A solution of Liquor calcis chlorine, a teaspoonful to a glass of water, is strongly advocated by Neidhart, and its use is certainly effective.

Potass. permanganate, half-grain to the ounce, is serviceable in controlling the fœtor, being far more effective than carbolic acid. Bromine, after the formula of Rosenhaus,—*i.e.*, 1 grain Bromine, 1 grain Bromide of potassium to the ounce of water, or Bromine-water, 2 drops to 4 ounces of water,—has been lauded in diphtheritic laryngitis. In our judgment it is inferior to Iodine, which has cured diphtheritic laryngitis. The Iodine is used locally; one part of the tincture to six of alcohol. Of this solution three parts to seven of water is used with a sponge in a vessel, and the child is made to inhale through a funnel. Joslyn advises placing small portions of milk and Iodine in an atomizing glass and spraying the affected parts.

It is a cardinal principle that any remedy applied locally must be used gently. The rule should be to treat the membrane tenderly. It seems unwise to use a brush when with the liquid in hand or a steam atomizer we can spray the medicine gently on the surface.

Even now there are advocates of cauterization, although the wisest old-school authorities condemn the practice. We know that the pseudo-membrane forced off will reform, and that the second exudate will be tougher and more uncontrollable than the first.

Prophylaxis.—The patient should be at once isolated. After death, the funeral should be as early as decency permits, and strictly private. The corpse should be kept moist, as there is then less danger of emanations taking place. For disinfecting the room, clothing, etc., Sulphur is the king. It should be burned freely, with closed doors and windows. Metallic Iodine is also powerful. The latter should be burned over a gas-light or spirit lamp, and as near the centre of the room as possible. Alcohol sprayed freely is also of benefit.

Tracheotomy.—This operation has but little to recommend it, ex-

cept in the early stages of diphtheria. It can only be seriously considered when stenosis exists. If, as is usually the case, the patient is dying of sepsis, it goes without saying that it is valueless unless it be to save the child from death by asphyxia. If the physician will carefully select his remedy, use locally with the atomizer diluted alcohol, and watch accurately all the hygienic details, he will happily have less frequent occasion to discuss the propriety of this operation. In favorable cases, viz., when early employed, one out of three cases may be saved. We should bear in mind that when laryngeal diphtheria comes on, during the first week of the disease, there is a tendency to rapid growth of exudation and hence severe stenosis—with the child many times in fair general condition. Such cases call for the operation more frequently, and we should be prepared in such cases to operate promptly.

SCARLET FEVER.

BY GEORGE WILLIAM WINTERBURN, M.D.

Synonyms.—Scarlatina, Febris anginosa; Sydenham's disease Fothergill's sore throat; Garotillo.

Definition.—Scarlet fever is an acute disorder, engendered by a specific contagion, running a definite course, characterized by a typical sore throat and a peculiar exanthem, and leaving as a sequela a condition, more or less pronounced, of acute Bright's disease of the kidney.

History.—Scarlet fever is undoubtedly of very ancient origin; but the earliest records now known date only from the sixteenth century. In 1556 Ph. Ingrassias published an account of an epidemic of this disorder, which was then known among the common people of Italy under the name of Rossalia. A very severe epidemic of malignant angina with scarlet eruption began in Spain in 1610, and gradually extended throughout the south of Europe, appearing in Italy in 1618, and in Germany in 1625. The description given by Sennertus shows its coincidence with the smooth variety of scarlatina. It was first described in England by Sydenham, in 1676, who established its specific nature under the title of Febris scarlatina. Four years later it was mildly epidemic in Scotland. In 1689 there was a severe outbreak of the disease in London, and by the end of the century it was well known to practitioners in every part of civilized Europe. It seems to have made its first appearance in America in 1735, at Kingston, a town about fifty miles from Boston. In 1747 it again appeared as a very fatal epidemic in England, beginning that year in London, and gradually extending over the entire kingdom. It was in Plymouth in 1751, and in Birmingham in 1778. The slowness of its spread was due to the meagreness of communication

between the different shires and the stationary condition of the populace. Scarlet fever first appeared in Iceland in 1827, in South America in 1829, in Greenland in 1847, and in Australia in 1849.

Ætiology.—The causes of scarlet fever are: predisposing and exciting.

I. *The exciting cause* of this disorder is a specific contagion, which readily passes from person to person. This disease is not as contagious as measles and whooping cough, but is far more so than diphtheria. The contagious material is easily diffused to a considerable distance, and may retain its vitality for a very long time. The epithelial scales which are shed by the convalescing patient are, under ordinary circumstances, permanently charged with contagion, and owing to their impalpability diffuse themselves over every article in the room, and settle into every crevice. This contagion lodged upon clothing, or other material, may be conveyed hundreds of miles, and remain infectious for many months. The disease may thus be sent in letters, or in boxes of clothing, or may lurk within the room in which the sick person has been confined, and infect some new-comer many months afterward. Sir Thomas Watson narrates an instance in which a strip of flannel remained contagious for at least a year; and Hildenbrand was infected by a cloak which, after exposure to the disease, had been put aside for eighteen months (Gee). Diluted by the atmosphere, the contagion soon loses its power of infection, and cannot be carried more than a few feet in the open air. There is little danger, therefore, of a physician carrying it from one house to another, unless he has remained a long time with a patient, and then buttons up, or puts on, an overcoat before leaving the sick-room, and thus shuts in contagious particles away from the influence of the outer air.

Usually, the poison enters the system through the lungs, by breathing the air of the room occupied by a scarlatinous patient. If the case be properly quarantined from the first, there is little danger of its spreading to other members of the family. It should not be forgotten that milk and other liquids which have been exposed in open vessels in the sick-room are highly infectious.

It is a debatable question whether scarlet fever ever has a spontaneous origin. That sporadic cases sometimes occur is admitted, and a few authorities hold that it may be produced *de novo;* but it should not be lost sight of in this connection that cats, dogs, and other of the lower animals, are liable to have this disease, and that cases occurring in the human subject may have this as the unexplained origin of infection. Nevertheless, it is quite possible that the disease may originate *de novo* under circumstances similar to those which first called it into being. Proofs that zymoses originate in filth are almost innumerable. Florence Nightingale is good authority here. She says:

"I was brought up, both by scientific men and ignorant women, to believe the smallpox, for instance, was a *thing*, of which there was once a first specimen in the world, which went on propagating itself, just as there was a first dog or pair of dogs; and that the smallpox would not begin itself any more than a new dog would begin without there having been a parent dog. Since then I have seen with my eyes smallpox growing up in first specimens, in close rooms or overcrowded wards, where it could not by any possibility have been caught, but must have begun. Nay, more; I have seen diseases begin, grow up, and pass into one another—with overcrowding, continued fever; with a little more overcrowding, typhoid; with a little more, typhus; and all in the same ward or hut."

The following instance is curious and, perhaps, instructive: In February, 1881, I treated a little girl, ten or eleven years old, for a sore throat. There was nothing specially noteworthy about the case except its intractability. There was no cough, the tonsils were only slightly swollen, the mucous membrane somewhat reddened, throat dry, moderate coryza, and temperature (mid-afternoon) about 101° Fahr. It ran a course of six or seven days, apparently not much affected by the remedies administered. Four days after this girl had begun to complain, her little brother, about five years old, had a sore throat, which developed into a regular scarlatinous appearance, but there was no skin eruption. The axilla-temperature for several days was 102°–103° Fahr., and that of the buccal cavity some .5° higher. Four days later, another child, seven years old, showed the usual prodromal stage of scarlet fever, and on the following day had an eruption on the neck and chest, which spread subsequently to the abdomen and back. In other words, she had a mild attack of scarlet fever, with the usual symptoms of invasion, eruption, and desquamation, the whole running its course in about eight or nine days. Four days later, the baby, aged three years, had a severe attack of scarlet fever which came very near carrying him off. The last three children had albuminous urine.

The painstaking study of all the surroundings developed no probable means of contagion. There were no other cases in the house; these children had not associated with any other children; and, in fact, none of them were out of the house after the elder was taken sick; and they had had no visitors. This remarkable procession of cases, on every fifth day, certainly indicates a common origin; but while the last was a typical, severe, uncomplicated scarlatina, the first had only the ordinary characteristics of a pharyngitis from exposure to cold.

II. *The predisposing causes* are the constitutional condition, sanitary surroundings, the age and sex of the patient, and the season of the year.

Although scarlet fever may be epidemic at any season, it is here, in New York, most frequent in the spring or late winter. In England, it

is yet, as it was in Sydenham's day, most prevalent from September to November.

Up to the tenth year boys are more apt to have scarlet fever than girls, but after puberty the reverse is the rule. It may be that the only reason why women are more subject to the disease than men is that they are more exposed to the contagion by being with the children who are the sufferers from it. Infants, up to a year old, are generally exempt from an attack, and it will often happen that in a whole family the baby is the only one to escape the infection. The majority of cases occur between the ages of eighteen months and six years. After the fifth year the liability to the disease rapidly diminishes, and is practically extinct at forty. The younger the patient, the more serious is the prognosis. The percentage of deaths to cases, at different ages, according to Dr. Richardson, is :

Under 5,	5 to 10,	10 to 20,	20 to 40,	Above 40,
67.63.	24.43.	5.52.	1.73.	0.66.

While the death-rate is insignificant after the twentieth year, yet the attack is often severe and protracted. Thus, the writer had the disease at the age of thirty-seven, and was an invalid for four months.

Untoward sanitary surroundings tend to increase the severity of the attack, and the concentration of a number of cases in a single (tenement) house augments the virulence of the epidemic. Scarlet fever, like smallpox, typhus, and diphtheria, is essentially a filth-disease, and as we have the experience of Florence Nightingale concerning the effect of a disregard of hygienics in causing *some* of these contagious diseases, we may readily believe that the rule holds good in all; a conclusion which clinical experience seems to verify.

Scrofulous children, and others who are poorly nourished, show a greater aptitude to infection than the able-bodied and vigorous. This is no more true of scarlet fever than of other zymotic disorders; but we may take it for granted that if all children were born healthy and without hereditary taint, and were brought up under proper hygienic methods, scarlet fever as well as all other epidemic diseases would cease from lack of material upon which to feed.

As a rule, those who have passed through one attack of scarlet fever are not liable to a recurrence; but double attacks are not unknown, though less frequent than of either measles or smallpox. Subsequent attacks are rarely fatal, but Eustace Smith reports a case which was. The patient, a little girl aged seven years, had a significant history of scarlet fever, followed by desquamation and dropsy, two years previously. She was at this time a patient in the East London Children's Hospital, suffering from general amyloid disease, dependent upon spinal caries, resulting from the previous scarlatina. While in this

hospital she again contracted scarlatina, and was sent away to the Fever Hospital, where she died.*

Scarlet fever occurring in those partially protected by a previous attack, is just as contagious as a more severe type, even though the skin be not at all affected. In every epidemic abortive cases of scarlet fever will be met with in persons who have previously had the disease, the only objective symptom presented being the characteristic scarlatinous sore throat. Such cases often spread the disease through the neighborhood, or even to distant places, because the infectiousness of the condition is not recognized.

Incubation.—The period of incubation of scarlet fever is shorter than that of any other zymosis, and is, as a rule, about four or five days. It probably rarely exceeds six days, although cases are on record in which the disease apparently lay dormant for as many as forty days. On the other hand, Trousseau mentions a case in which the period of incubation seems to have been only about twenty-four hours. In this, as in all stages of this treacherous disease, the unexpected is what generally happens. The course of the disease is irregular in all its periods, both as to duration and severity; and not only do different epidemics vary greatly as to virulence, but similar variation is witnessed in coetaneous as in widely separated cases.

Pathology.—The most obvious lesion in scarlet fever is upon the skin and mucous membrane. Other morbid changes take place in the kidneys, liver, spleen, parotid and submaxillary glands, synovial sacs, eye and ear, and in the blood.

The Skin.—The cutaneous affection is not a mere hyperæmia, but is the result of an exudation into the rete mucosum and papillar layer particularly. In the invasive stage the corium becomes swollen with an inflammatory œdema, the result of excessive cell-proliferation, and the papillæ are enlarged and more prominent. These changes extend even as deep as the subcutaneous (sebaceous and sweat) glands, which become stuffed and swollen. Later there is less general œdema, and it becomes localized in the stratum lucidum and stratum corneum. The rounded and columnar cells of the upper derma, which in a healthy state are soft and opaque, become now hardened and granular. Serous effusions, with migration of leucocytes, have been observed. At a still later period the epidermis becomes loosened in patches of considerable size, and desquamates. This process generally lasts for about four or five days, and involves only the epidermis formed previous to the invasion of the fever; but it may continue for weeks, recurring in the new-formed epidermis a second or third time. The rash first appears as scarlet-colored points of the size of pin-heads, which, however, are not elevated above the surface; between these the skin retains its nat-

* A Practical Treatise on Disease in Children, New York, 1884, p. 32.

ural tint. As the process goes on, the whole surface becomes swollen and uniformly pink, with these congested points dotted thickly over it. The color of the eruption varies; the higher the temperature, the more intense will be the coloring. In mild cases the eruption is often quite discrete, and is then generally somewhat elevated; such cases may be mistaken for measles, but the coryza and pharyngeal symptoms ought to prevent error. The scarlatinous eruption is, at times, accompanied with other forms of skin disorder—acne, herpes, or urticaria, and, in malignant cases, with purpura and cutaneous hæmorrhages. Small, isolated petechiæ occasionally occur in cases otherwise showing no special intensity; but even here they are significant as evincing an altered state of the blood.

The Mucous Membrane.—The entire membrane of the digestive tract is involved, but more particularly that covering the tonsils, pharynx, stomach, and small intestines. As in the derma, these tissues early become œdematous, and later present small reddened elevations. The secretion in the throat is plentiful and viscid, and beneath this the membrane softens and ulcerates; gangrene supervenes in malignant cases. The follicles at the base of the tongue and the tonsils become surcharged with thick yellow matter, which exudes and covers them with a uniform layer, or, if it does not escape, liquefies, and causes abscesses about the sixth or seventh day. The pharynx often presents a condition resembling diphtheria, being more or less covered with ash-colored patches; but this is merely the dried secretion smeared over the surface of the tissue.

The sub-epithelial layers of the gastro-intestinal mucous membrane are hyperæmic and hypertrophied. The cell-proliferation is enormous, and the tubules become engorged and obstructed. Casts of the gastric tubules may be observed in the matters ejected from the stomach. In the intestines, the solitary glands and the patches of Peyer are infiltrated, reddened, and softened; the appearance presented is very similar to that during the first week of typhoid.

The Kidney.—Next to the skin and mucous membrane the effect of the scarlatinous poison is evidenced in the kidneys, where a condition of acute Bright's disease develops. The entire parenchyma is congested, and morbid changes take place in the glomeruli and the convoluted tubes. In the mildest cases even there is catarrhal inflammation of the uriniferous tubules, with considerable epithelial desquamation; this inflammatory process is sometimes croupous. According to Dr. Klein, the pathological changes may be detected during the first week of the fever. They begin in the Malpighian tufts, with proliferation of the nuclei, with cloudy-swelling of the epithelial cells of the tubules of Ferrein. At the same time there is a thickening of the muscular walls of the arteries, as well as hyaline degeneration of the intima. Infiltration takes place around the tubules, which become gorged with

the clouded and swollen epithelial cells, or with the granular product of their disintegration. This cloudiness and swelling of the tubal epithelium goes on increasing, and the tubules themselves become choked with hyaline casts, until at last fatty degeneration and absorption take place. Sometimes abscesses form in the medullary substance, and death results from pyæmia.

The Liver.—The liver is frequently hyperæmic, enlarged, and softened. The pathological condition somewhat resembles that of typhus fever. In fatal cases, under the microscope, there has been perceived an abundance of oil-globules and of granules, and some pus-cells.

The Spleen.—The spleen, post-mortem, is sometimes found pulpy in consistency, and enlarged considerably beyond its natural volume; this usually when death has occurred toward the end of the second week. Even in mild cases the spleen, as a rule, is somewhat hypertrophic.

The Pancreas may also be enlarged and softened. In the arterioles of all these glands, and in the mesenteries as well, a hyaline thickening occurs, with a proliferation of the cells of the endothelium and of the nuclei in the muscular coats, and an accumulation of the lymphoid cells in the connecting tissues.

The Parotid Gland.—Parotitis, as well as inflammation of the submaxillary glands, though more rare than conditions already noted, is by no means unfrequent. In malignant cases the surrounding cellular tissue may be invaded, followed by extensive and destructive suppuration. Such cases are invariably fatal.

Synovitis may frequently be observed at the commencement of desquamation; it attacks by preference the small joints, and is usually a rather grave complication, as denoting a disposition on the part of the disease to locate in obscure and distant parts of the body. Pus may form in the joints, and death supervene from pyæmia.

Eye and Ear.—The pathological changes in the organs of hearing and sight are sequelæ, and preventable. The otorrhœa is either from the middle or external ear. Hæmorrhage from the internal carotid may occur. The lesions of the eye are suppurative inflammations of the conjunctiva, choroid, retina, or cornea.

The Blood.—After death from scarlet fever the blood is fluid and but slightly coagulable, though pale, fibrinous clots are sometimes found in the right ventricle. In cases of death with symptoms of uræmic poisoning the blood has been found to contain an enormous excess of urea. D'Espine reported one case where the excess was nearly eleven times the normal quantity; the potash salts were increased to three times the proper amount, and most of this excess was in the blood-serum. Feltz and others seem to think that this latter condition, rather than the retained urea, accounts for the uræmia.

Eklund has described certain micro-organisms existing in the blood

of scarlatinous patients, consisting of flat, oval, or rounded, colorless or yellowish-white sporoidal cells, enclosed by a cell-wall, and containing nuclei. They multiply by binary fission, more in a rotary fashion, and do not arrange themselves after the manner of ordinary ferments. They are called flax scindens, are said to be unique to scarlet fever, and are claimed to be the cause of the disease. We have as yet no results of culture-experiment on these bodies, so that their life history is unknown; nor have we a particle of scientific evidence as to whether they are the product of disease or its formative principle.

The blood of a scarlatinous patient is infectious, as has been proved by inoculation.

Symptoms.—Scarlet fever may be either mild, ordinary, or malignant.

Mild Scarlet Fever.—Scarlet fever is sometimes so mild, and its symptoms so evanescent, as to actually escape observation as such; but no matter how ill-developed it may be, or how ephemeral the fever, it is not only capable of infecting others in the severest form, but may, also, itself be followed by the gravest sequelæ. When discovered, the same care, medicinal, hygienic, and quarantinal, should be observed as in dealing with the ordinary disease. Scarlet fever is the most treacherous disease with which we have to deal, and one of its peculiarities is to simulate mildness, only to break out afresh in some unexpected complication.

Among the populace here, and this is probably true of other parts of the country, scarlatina is supposed to be a term designating a mild and innocuous form of scarlet fever. The only importance of correcting this popular error lies in the fact that parents will not exercise due care in preventing exposure, excesses in diet, and the like, so long as they do not stand in dread of the disorder, and will indeed expose their children purposely to the contagion, reasoning that from a light case they also will have it lightly, and so escape from a severer epidemic. This mistake has been fatal to many children.

Ordinary Scarlet Fever.—Scarlet fever divides naturally into three periods or stages: the invasive, the eruptive, and the desquamative.

I. Invasion.—This is the intermediary period between the incubatory process and the appearance of the rash. Its onset is usually so well-defined that it is often possible to almost fix upon a certain minute at which the disease became manifest. It is usually ushered in with a sudden chill, or chilliness alternating with burning heat, but this never amounts to a rigor, and the temperature will be about 101°–101.5° Fahr. In children usually the first symptom noticed will be the vomiting, which may recur several times, and be very severe, without denoting an unusual intensity of the ensuing fever; diarrhœa may also concur. Vomiting is not so general with adults, among whom

the first symptom complained of may be the soreness of the throat, which is slightly reddened about the uvula and tonsils; stiffness of the neck soon follows. The face at first is pale, but it quickly becomes flushed, the pulse rises to 130 or 140, or even to 160, and the temperature to 103°–104.5° Fahr. A pulse remarkably frequent and out of proportion to the temperature is a diagnostic sign of this fever at the invasive period. The tongue is furred at the back and down the centre, with a red tip and edges. Appetite is lost, but the thirst is frequently intense. The respiration keeps pace with the pulse. There is neither cough, coryza, nor lachrymation; but the eyes are brilliant and glistening. The skin has a peculiar pungent dryness, and, as in pneumonia, gives an impression to the hand of being much hotter than it really is. The nervous symptoms presented are languor, frontal headache, usually not very severe, aching of the limbs, restlessness at night, with sleepiness during the day, and possibly delirium, convulsions, or syncope.

These symptoms usually follow each other with great rapidity, and the whole stage may not last more than twelve hours. As a rule, its duration is about thirty hours, the rash coming out, generally, toward evening. It may be prolonged to four or five days, and Trousseau observed a case in which the rash did not appear until the eighth day.

II. Eruption.—With the appearance of the rash the invasive stage ends and the eruptive begins. Usually, on the second day of the fever the rash appears on the sides of the neck and in the clavicular regions, and in the course of twelve hours, gradually creeping down the breast and back, it extends over the entire surface of the body. Occasionally the eruption appears first on the legs, and in rare cases it seems to come out over the whole body at once. As first seen, this eruption consists of small, scarlet dots, varying in size from a line to a line and a half in diameter, the color most intense at the centre of the dot, fading gradually toward the margin. These dots, which are not at all elevated above the surface, are closely set together and rapidly coalesce into patches, so as to produce the appearance of a uniform pink ground, thickly sprinkled over with scarlet points. On the third day of the fever the entire cutaneous surface, except perhaps the face, hands, and feet, presents a bright scarlet appearance, or, in some cases, a deeper red, like a boiled lobster; the color is usually most intense upon the back and loins. The rash is rarely confluent on the face, and may, indeed, be very nearly absent altogether; in this respect quite the reverse of measles.

As the eruption advances, the skin, more particularly of the face and extremities, becomes slightly, but evidently, œdematous, and there is more or less burning itching over the entire cutaneous surface. If the finger nail be drawn with moderate pressure over the rash, say upon the abdomen or inner aspect of the thigh, it leaves behind it a

white streak, which lasts somewhat less than a minute, and then disappears; a quick, sharp stroke brings out a middle red line with two parallel white streaks; simple pressure causes the redness to disappear, but it instantly returns, from the periphery to the centre of the spot, when the pressure is removed. This phenomenon seems to be pathognomonic.

The rash usually attains its maximum development by the evening of the fourth day of the fever, retains its intensity for about forty-eight hours, and then slowly begins to fade, leaving the skin stained a yellowish-brown. It is usually visible altogether about six days; but it may last until the tenth or twelfth day of the fever, or, in very mild cases, may have disappeared by the morning of the fifth day.

Various anomalies of the rash are to be noted. The eruption may not be confluent; or it may be confluent in some places and not in others. If discrete, the puncta are usually larger than in a typical case, and are elevated above the general surface; in other words, the skin is affected with numerous local œdemæ, instead of a general one.

Again, the color of the rash may vary from the usual bright rose tint. It may be so pale as to be discoverable only after careful scrutiny, or it may be of a dusky purple. If the puncta are isolated, exaggerated in size and irregular in shape, elevated, dusky in tint, and at the same time the soreness of the throat is not very marked, and the temperature about 103° Fahr., the case might be mistaken for measles. Again, the rash, instead of being composed of scarlet puncta, may consist of papules, or vesicles (*scarlatina papulosa*, *s. vesicularis*, *s. pemphigoides*). I have had a case, otherwise running a typical course, in which the eruption consisted solely of small, purple blebs, beginning just below the right clavicle and spreading from the edge of the hairy scalp to the ankles, everywhere discrete, but very thick over the chest and abdomen, rather scant on the limbs, none on the face. Again, the rash may be entirely absent (*scarlatina sine eruptione*), and the disease otherwise run a normal course.

The normal scarlatinous rash may be associated with other forms of eruption. The most common of these is miliaria, their frequency seeming to be coincident with the age of the patient; scarlatina is rarely intense in an adult without being accompanied by this disorder of the sweat-glands. It is usually most developed on the upper part of the body, but may be universal; does not result from excessive sweating, but seems to be proportional to the scarlatinous eruption; and may be so thickly set as to cause detachment of the epidermis on rough handling. As in the ordinary prickly heat, it is extremely fitful in character, appearing and disappearing, perhaps, two or three times in course of twenty-four hours. It rarely continues beyond the acme of the scarlet rash.

Urticaria sometimes complicates the scarlatinous rash, at the height of the fever; but this is generally so ephemeral as to be of little importance, save as it adds to the discomfort of the patient. It evidences the gastric and intestinal irritation existing. In other cases dark-red nodules appear, the size of a pea, or larger (*erythema nodosum*); these never suppurate, but disappear by absorption, or turn to petechiæ. Herpes, pemphigus, and other anomalous conditions, are reported as rarely occurring. I have never seen these last, as complications, and they are certainly extremely unfrequent in this latitude.

The sore throat is a constant symptom, even more so than the rash. In a typical case, the entire mucous membrane of the fauces is highly injected, and the papillæ bright-red and prominent. This redness involves the soft palate, tonsils, uvula, posterior wall of the pharynx, and the tip of the epiglottis. On the third day the tonsils become the seat of a more or less intense parenchymatous inflammation, and the swelling is often so great by the fourth or fifth day that the tonsils meet at the middle of the palatic arch, and thrust the uvula forward. They are gorged with viscid, yellow matter, which exudes from the mouths of the tonsillar crypts, and, unless relieved, break down by suppuration on the sixth or seventh day. A thick, ash-colored exudation, rather loosely attached and easily hawked up, but constantly re-forming, is found upon the tonsils. This differs from the diphtheritic exudation in not being membranous, in its easy separation from the tissue beneath, from the more diffuseness of the redness in the throat, usually from the absence of the peculiar fœtor attending diphtheria, and the superficiality of the ulceration. In ordinary scarlet fever ulcerative angina occurs, if at all, rather as a sequela, during the eruptive stage; and never here, unless this be unduly prolonged.

Not alone the tonsils, but all the soft tissues of the throat may be much swollen; and this tumefaction may be due to hyperæmia alone, or to this in conjunction with œdema. The uvula may become spatulate from the serosity settling in its lower segment. I have even seen the tissues over the hard palate so swollen by œdema as to render a satisfactory view of the pharynx impossible. Kennedy once saw a child carried off by œdema glottidis within thirty hours from the onset of the disease (Gee); and in one of my own cases, on the third day of fever, inspiration became suddenly impossible while lying down, almost so even when the child was held erect, a condition which was fortunately relieved by the prompt administration of Sanguinaria.

Most children complain, during the entire eruptive period, of pain on swallowing, and deglutition is sometimes almost impossible. The lymphatic glands at the angle of the jaw are inflamed, and the connective tissue surrounding them may become involved, preventing a

proper opening of the mouth; but in ordinary cases suppuration does not occur—certainly not until the ninth or tenth day. They often remain indurated, however, for some weeks after the disappearance of the rash.

The soreness of the throat abates with the beginning of desquamation of the skin, the collection of viscid mucus ceases, the tissues return to their natural color, or are, perhaps, a trifle pale, and with the exception of some glandular hardness (tonsils, etc.), the disorder, so far as the throat is concerned, is at an end. In ordinary cases this occurs on the seventh day.

The Temperature.—The degree of fever, as registered by the thermometer in the axilla, is, as a rule, moderate. It is higher than in measles or diphtheria, but very much below that of rheumatic fever, intermittent, typhoid, or pyæmia. The pungent dryness of the skin often misleads the casual observer and gives an exaggerated idea of the thermic degree. At the onset of the eruptive stage the temperature is usually about 103° Fahr. It rapidly rises to 104.5° Fahr., rarely goes beyond 105° Fahr., and never, in ordinary scarlet fever, above 106° Fahr. Of seventeen cases the thermometric crisis occurred: in five on the fourth day, in seven on the fifth, in four on the sixth, and in three on the seventh. During the eruption of the rash the fever is continuous, showing only a slight morning remission, and being at its greatest height about 8 o'clock in the evening; but this variation is no greater than that occurring in health. As soon as the eruption begins to fade, the temperature falls; and it may reach the normal in twelve hours. In ordinary cases the fever should cease at the beginning of desquamation. If the elevated temperature is maintained, troublesome complications are denoted. Under some circumstances the patient drifts into a typhoid state, and an elevated temperature, corresponding to the typhoid cycle, continues for fourteen or twenty-one days. Even without any obvious cause, the temperature may remain one or two degrees above the normal level, until after desquamation is complete.

The Pulse.—The frequency of the pulse is a marked symptom in both the invasive and eruptive periods of scarlet fever. It rises with the temperature, but out of proportion to it, and may continue at 160–170 during the entire eruption without denoting anything serious. Its usual rate at this period is about 140, and it should be full and compressible.

As long as the fever continues, the pulse is as frequent as 130, at least, and slackens only as the temperature falls.

The Respiration.—The frequency of respiration will be proportional to the height of the temperature. If there is much œdema of the throat, the respiratory movements become labored and difficult, but ordinarily they are natural. Cough of moderate severity and huski-

ness is common; coryza may supervene, but is rare; bronchitis and pneumonia come at a later period, if at all.

The Digestive Tract.—The yellowish-white fur upon the tongue continues to thicken during the second and third days, and then clears off rapidly from before backwards, leaving the tongue deep-red, broad, and shining, the papillæ enlarged and projecting, and presenting a rough resemblance to a ripe strawberry; whence the designation, "strawberry tongue." While almost always present, this peculiar appearance of the tongue is hardly pathognomonic, as both the earlier furred and the later papillated condition is sometimes missing, and the latter condition may be met with in other diseases. The tongue should become normal in appearance at the beginning of desquamation.

Thirst and *anorexia* are generally both well marked during the eruptive stage. Vomiting ceases, in the ordinary variety of scarlet fever, as soon as the rash begins to appear. The bowels are slightly constipated, though sometimes entirely natural. Diarrhœa and tympanitis may occur, but are unfrequent.

The Urine.—The urine is decreased in amount, and may be very scanty. The specific gravity runs from 1025 to 1040; the chemical reaction is acid; the sediment lateritious, and containing hyaline casts and free renal epithelium. The amount of urea is normal or slightly deficient. The chloride of sodium is very much diminished, this diminution ceasing suddenly at the apyrexia. Albumin and bile are usually present, sometimes in considerable quantity.

The Skin.—The skin should be dry. Much sweating is a bad sign, especially when it supervenes on slight exertion. The itching and burning is proportionate to the dryness and the amount of rash. A peculiar odor is emitted from the skin of a scarlatinous patient, something like that of rotting cheese; though not always present, when once recognized it furnishes an important diagnostic hint.

The Nervous System.—Restlessness, sleeplessness, and apprehensiveness are apt to be more or less marked. A moderate frontal headache is an early and almost constant symptom. Delirium at night has no special significance. Great debility as an early symptom is a sign of a prolonged attack.

III. Desquamation.—This period begins with the fading of the rash, and is characterized by evidences of nervous prostration, a subsidence of all the symptoms heretofore described, and the formation of a new cuticle.

In the ordinary form of scarlet fever the temperature and pulse fall to normal on the seventh day, provided no complications occur. Thence for a week or ten days both pulse and temperature incline to sink slightly below the natural rate. The urine becomes copious, of low specific gravity, of alkaline reaction, deficient in phosphoric acid,

depositing earthy phosphates on cooling, and containing micrococci. These conditions all evidence the severe strain which has been put upon the vital forces.

In two or three days the epidermis begins to flake off, beginning at the neck, and following the same order of progression as did the eruption in forming. Where the skin is thin and delicate, the old cuticle is shed in fine, branny, glistening scales; where the skin is thicker, the particles are exfoliated in larger flakes, and in some places, such as the hands and feet, large pieces of epithelium are cast off unbroken. The process of denudation is as follows: A bleb or vesicle forms, the crown of which then sinks in, leaving a minute circle which gradually extends until it meets other similar circles. If the epithelium is thin, these easily break up into flakes; but where it is thick, the process may extend by coalescence to cover quite large areas, which are detached entire. As a rule, the younger the patient, the more impalpable will be the desquamation. When the flakes are minute, it is termed furfuraceous desquamation; when these are large, it is called membranaceous—but the distinction has no clinical import. The amount of exfoliation will depend on the intensity of the preëxisting rash. If this has been light, the desquamation may be unimportant or delayed. Dr. Page has stated that after a mild case he has known desquamation to be delayed as much as five weeks (Eustace Smith). On the other hand, when fever and rash have been rapid and intense, desquamation may begin while the skin is still tinted with the remains of the eruption and the thermometer yet indicates that the pyrexia has not altogether subsided. In such severe cases the hair is also simultaneously shed. Miliaria, when present, shortens the period and increases the amount of desquamation.

This process of exfoliation may be completed in ten days, that is, by about the eighteenth day of the fever; but it often lingers for weeks, and may reappear after the process seems complete. It is especially tardy in disappearing from the fingers and toes, but not until the last flake of epithelium has been exfoliated and the entire derma and mucous membrane have returned to their normal appearance, can the patient be said to be actually convalescent and completely free from infection.

It will thus be seen that the duration of ordinary scarlet fever cases vary greatly. The successive stages may follow each other with swiftness, and convalescence be fully assured by the fourteenth day. More usual is a period of twenty-one days. Other cases run for six weeks or two months. The intensity of the attack and the rate of progression bear no relation to each other.

In the details given above of the course of the ordinary form of scarlet fever, much stress has been laid upon the irregularity of its

Typical Scarlet Fever.

Nature	Epidemic. Contagious. Infectious. Self-limiting.		
Attacks	Children mainly; eighteen months to six years. One attack protects for life.		
Incubation	Four to six days.		
Stages	Invasion.	Eruption.	Desquamation.
Term	Thirty hours.	Four to six days.	Ten to sixteen days.
Temperature	101° to 103°	103° to 105°	Falls slightly below normal.
Pulse	120 to 130	130 to 160 Feeble and skipping.	Normal.
Skin	Dry and pungent.	Rose-colored rash, beginning on neck and breast. Most intense on abdomen and back.	Cuticle peels off in scales or patches, according to location.
Throat	Redness and soreness of tonsils, uvula, and fauces.	Ash-colored exudation. Inflammation of tonsils and cervical glands.	Subsidence of symptoms.
Tongue	Whitish fur in centre, red tip and edges.	Strawberry.	
Stomach	Vomiting.	Anorexia.	
Bowels	Constipated.	Normal.	
Urine	Dark-red.	Scanty and dark; contains albumin.	Abundant, pale, albuminous.
Eyes	Glistening.	Injected.	Normal.
Head	Frontal ache.	Nocturnal delirium.	Normal.
Duration	Two to four weeks.		
Sequela	Acute Bright's disease.		

development and progress. In the form of the disease now to be described this irregularity takes on a more sinister expression.

Malignant Scarlet Fever.—Malignant scarlet fever does not mean merely *severe* scarlet fever. The ordinary form of the disease may be very severe, and frequently results in the death of the patient without possessing the elements which characterize the malignant varieties. The habit of exaggeration leads many to class all cases of unwonted intensity under this division, but this is confusing, and prevents a just discrimination.

The malignant form of scarlet fever may be due to either of three causes: (*a*), the paralyzing influence of the virus upon the nervous system; (*b*) primary vital debility; (*c*) tendency to necrotic processes.

a. The malignity of scarlatina, especially in children of three years of age and under, is evidenced by its paralyzing influence upon the brain and nerve centres, and through these upon the heart and circulatory apparatus. In these cases, even at the beginning of the invasive stage, we find an extremely rapid (170, or more), uncertain, and very compressible pulse. The uncertainty of the pulse consists of a peculiar skipping movement which is always a grave sign when occurring in the course of septic disease. The unusual frequency of the pulse cannot be due to the molecular changes found in the heart-muscle on necropsy following the ordinary type of scarlet fever, as this sets in with the onset of the disease before this degeneration could have been produced; it seems rather to be the result of paralysis of the pneumogastric. The hands, feet, and nose are cold, although the thermometer shows an axilla temperature of 103° Fahr., or higher. Sometimes the fingers and toes are slightly livid on account of the venous stasis caused by the weakness of the heart. Usually, such a rapid collapse occurs in children who were previously in absolute health, and who become suddenly pale and are seized with vomiting, perhaps diarrhœa, great restlessness, severe headache passing quickly into somnolence and delirium, from which, however, they can be easily aroused. The pulse disappears in twelve to fourteen hours, perhaps even sooner; the respirations are irregular, and sweat breaks out at intervals. The child sinks into coma, and dies without any eruption having appeared; convulsions rarely occur. Post-mortem examination reveals nothing characteristic.

The malignity of the attack is not due to the intensity of the fever. The temperature is rarely higher than in the ordinary variety, and it is not proper to say that the fatality was due to the hyperpyrexia. The thermometric range is much higher and lasts much longer in several kinds of fever without causing death. In these rapidly fatal cases the temperature rarely exceeds 104.5° Fahr., and may not rise above 103° Fahr. The following case was typical:

Joe Bannon, aged three years, was taken ill February 7th, 1885. I attended his mother in the confinement (this was the ninth), and had known him, and had seen him at frequent intervals, all through his brief life. He had never had an hour's sickness, and was an exceptionally healthy and robust child. He was noticed at breakfast to have no appetite and to be very pale, although on the previous day he had seemed as well as usual. About nine o'clock he vomited, and soon after fell asleep on the lounge. I saw him at noon. The temperature was 102° Fahr.; pulse, 160, weak, uncertain, compressible; respiration, 30. The skin was dry and hot, no evidence of any rash. Bowels had moved twice, the discharge being watery. He had vomited several times. He complained of sore throat, and craved water continuously. An unsatisfactory examination of the throat showed some redness about the tonsils and uvula, but nothing diagnostic. The tonsils were somewhat swollen, and the tongue covered with a yellowish fur. He was very drowsy, and restless and fretful when aroused. There being no reason to suspect contagion, I gave Aconite[6].

Saw him at 6 P.M. Temperature, 103.4° Fahr.; pulse, 190, almost uncountable, it was so weak. Hands and feet cold, but the rest of the body very hot. Somnolence continuous, but easily aroused. No movement from the bowels since noon, urine suppressed. When disturbed, sweat would break out over the skin, but soon dry up. Complains of nothing, will not swallow. Gave Belladonna[30], dry.

7 P.M. Temperature, 103.9° Fahr.; pulse so weak as to be undeterminable. Completely apathetic. Gave Belladonna[200], dry.

8 P.M. Temperature, 104.2° Fahr.; pulseless.

9 P.M. Temperature, 104.5° Fahr.; extremities cold; breathing begins to be stertorous.

10 P.M. Temperature, 103.4° Fahr.; coma profound; extremities cyanotic.

11 P.M. Temperature, 101.8° Fahr.

12 P.M. Temperature, 100.1° Fahr.

1 A.M. Death. Post-mortem refused; but after death a faint, rose-colored eruption could be detected on the neck, chest, and abdomen.

All such cases are absolutely and necessarily fatal. The disease has already reached the inner citadel of life before its presence is suspected, and remedies fail to exert any restraining influence.

If it be asked why this affection shows such malignancy in a child of unusual physical vigor, and amid surroundings the most favorable to health, we must shamefacedly admit that we know almost nothing concerning the nature of this virulence. In many cases the diagnosis remains obscure until scarlet fever develops a few days later in some other member of the family.

b. Scarlet fever sometimes attacks a patient whose vitality has been undermined by some previous disease, or whom it finds amid such deleterious and unsanitary surroundings that nature succumbs after a more or less prolonged struggle. When the malignity of the attack is largely due to primary vital debility, there is apt to be high fever, delirium, and convulsions. The disease sets in with a very severe chill, and the temperature rises in twelve hours, or so, to 104° Fahr. Vomiting is frequent and violent; the face looks haggard, and the child seems stupefied. The rash appears promptly; it may be natural in appearance, or it may be diffused and dark-red, or it may show

various shades of color (*scarlatina variegata*), or it may be coppery in hue. The temperature on the second day is 106° Fahr., and it may go to 108°. The delirium is constant, and not merely nocturnal as in the ordinary fever; but this delirium, like the former, is probably due to stasis in the sinuses, and does not imply an extension of the inflammation to the cerebral meninges. The child lies apathetic, with its eyes half-closed, the conjunctiva much reddened, the lips dry and cracked, and the respiration shallow. But even with all these unfavorable symptoms, so long as the pulse is only moderately frequent (130–140 in children), and symptoms of heart-failure do not appear, the prognosis need not be fatal. If, however, the pulse becomes continually feebler and more rapid, and convulsions set in, death is not far off. In these fatal cases the temperature often remains high up to the moment of death. I have seen one child die on the fourth day of the fever with a temperature of 105.2° Fahr.

If at the beginning of the attack the temperature be high, the eruption come out early and profusely, and the child becomes somnolent, apathetic, or delirious, the urine suppressed, and the skin alternately dry and moist, the prognosis is certainly very grave. But if the angina be moderate, and the pulse of good quality and not too frequent, and no other serious complications arise, even so malignant a case will often reach a crisis on the fifth or sixth day; the temperature falls, the cerebral symptoms disappear, and the disease from that time on presents only the ordinary conditions.

Convulsions during the eruptive stage are of very serious import. The disease may run an ordinary course for two or three days, when suddenly it assumes a malignant type, with convulsions from uræmic poisoning. The scarlatinous virus may attack the kidney with considerable virulency, and develop a severe nephritis. Or, the convulsions may be purely from cerebro-spinal irritation. Or, at a later period, septic poison from cervical or other abscesses may cause convulsions. In either event a fatal termination is portended, and will hardly be long delayed.

c. The fever may begin as in the ordinary type, and so continue for five or six days without showing signs of special malignancy; but now the throat becomes excessively tender, and deglutition very difficult (*scarlatina anginosa maligna*). Not only the tonsils and the submaxillary glands, but all the glandular structures of the neck, become swollen, this swelling spreading to the cellular tissue, and forming the so-called "collar of brawn" from ear to ear. The inflammation extends along the Eustachian tube into the cavities of the ears, and upward into the nasal fossæ and sinuses. Meanwhile there has formed, about the fifth day, on the tonsils, velum palati, and uvula, grayish-white, lard-like patches of tough mucus, which, on opening the mouth, stretch in tenacious strings from the tongue to the palate.

In a few days these patches exfoliate, leaving shallow, easily bleeding ulcers on the tissues which they covered. The extension of the inflammation to the nose gives rise to an offensive, ichorous, sanious, sometimes gangrenous, coryza, which dribbles continuously from the excoriated nostrils, eating away the skin of the upper lip and contiguous parts, which now become œdematous. The breath is horribly offensive, the tongue dry and brown, the teeth and lips clogged with sordes, and the face haggard and livid. By the tenth or eleventh day the pharyngeal erosions are duplicated in the buccal cavity (*stomatitis scarlatinosa*), and the mouth is so painful that the child can hardly drink, and cannot protrude the tongue. Occasionally the inflammation extends up the lachrymal passages to the conjunctiva, with catarrhal ophthalmia, adhesion of the lids, and, rarely, ulceration of the cornea and complete destruction of the eye. Tonsillar, retropharyngeal, and other abscesses form, but the morbid process is limited to the buccal and pharyngeal cavities, and does not extend downward into the trachea or œsophagus. The dyspnœa and dysphagia are due to the enormous swelling of the tonsils and adjacent tissues.

When the angina is thus malignant, the prostration is excessive, but there may be no delirium. The pulse is almost always rapid and feeble, but the temperature is variable; in some cases it does not rise above 103° Fahr., while in others it reaches 108° Fahr., and Currie mentions one case in which it rose to 112° Fahr., and Wunderlich one at 115° Fahr.

Deep sloughing may occur in the pharyngeal cavity even when the cervical glands are not greatly swollen; and, on the other hand, there may be serious sloughing of the subcutaneous tissues of the neck, without any corresponding necrosis on the mucous surfaces. In either case fatal hæmorrhage may occur from rupture of the larger bloodvessels.

If the angina is severe during the invasive period, the appearance of the rash may be delayed several days, and this delay may cause it to come out in an ineffective and patchy manner. Instead of the bright-red dotted eruption there may be coloring matter poured out from the capillaries into the rete mucosum, giving the skin a mottled, purple appearance; the tinting thus produced only partially fades on pressure. In other cases there is a species of purpura hæmorrhagica (*scarlatina hæmorrhagica*), with purpuric extravasations into the skin, and bleeding from the nose, tongue, rectum, or other parts. It is in these hæmorrhagic cases that the temperature remains below the range of the ordinary fever.

The duration of malignant scarlet fever is very variable. As we have seen, it may terminate fatally in a few hours; usually death occurs on the fifth to seventh day; but sometimes the necrotic process progresses

tardily, and the patient may linger several weeks. If typhoid supervene, death may be delayed to even six weeks; recovery then is the unfrequent exception.

Diagnosis.—The best practitioners occasionally err in diagnosis of scarlatina, either mistaking anomalous cases of the disease for some other fever, or the reverse. The great irregularity of scarlatina in all its stages, and the frequent lack of proportion between its various symptoms, make it often impossible to give an off-hand decision. The ordinary type of scarlet fever is easily distinguishable; but very many cases are not typical, and these may be so obscure as to puzzle the most experienced and careful diagnostician. The diseases with which it is most liable to be confounded are measles, diphtheria, rötheln, small-pox, and typhus; but cases have also been mistaken for erythema, roseola, erysipelas, miliaria, urticaria, pharyngeal herpes, intermittent, rheumatic fever, typhoid, and cerebro-spinal fever.

In making a diagnosis of scarlet fever it should be borne in mind that the characteristic symptoms, and these have already been minutely described, are the sudden onset of the disease, the angina, the exanthem, the strawberry appearance of the tongue, the quickening of the ratio of the pulse beyond the ratio of temperature, and the rapid increase of pyrexia. Until the rash appears, an absolute diagnosis is almost an impossibility; but as scarlet fever rarely occurs singly, the presence of an epidemic in the neighborhood is always significant. Yet, it must not be overlooked, in deciding adversely to a diagnosis of scarlet fever, that it may be carried in letters, and by multiform other means, into the midst of any family without a note of warning.

The vomiting and high temperature, with restlessness, sleeplessness, and apprehensiveness, succeeded by delirium and coma, are a series of symptoms suggestive of poisoning, but, whether from the scarlatinal virus or some other noxious element, these taken alone are in no wise diagnostic. Nor should it be forgotten that whooping cough and other disorders may coexist in the same person with scarlet fever, and that many chronic disorders cause unwonted and unexpected aberrations in the manifestations of this disease. The importance, therefore, of taking cognizance of all collateral and concomitant conditions cannot fail to impress itself upon the attention of the practitioner.

Measles.—When the puncta are scattered and irregular, showing healthy skin between their margins, they are apt to be slightly elevated and the epidermis roughened. If they are also of a dull red instead of rose color, the disease may easily be mistaken for measles. The absence of sneezing and lachrymation, and of coryza and cough, and the presence of a scarlet redness of the throat, with an inordinately rapid pulse, will usually suffice to distinguish the disorder. On the other hand, the morbillous eruption, in certain anomalous cases of

measles, may be preceded by a ruddiness of the skin which closely simulates the scarlatinous rash.

Diphtheria.—The invasion periods of scarlatina and diphtheria present more variation than similitude, and the constitutional symptoms of the two diseases are very different. In diphtheria the throat presents a brickdust-like flush; the exudation is membranous, putrid at once, resembles wetted chamois, and is not easily detached; in bad cases there is early pharyngeal paralysis; the pulse is slow; and the erythema (a rare symptom) does not extend beyond the neck and breast. Still, the two diseases have many conditions in common, and it is not surprising that the variety called scarlatina anginosa and diphtheria are occasionally confounded, especially in large cities where epidemics of both rage side by side. It is important, however, not to overlook the possible intercurrence of diphtheria as a complication of scarlatina. It is not often thus found; but it may set in during the incubation of the fever, or during either of its three stages, or just as convalescence is about to begin. If at any of these periods the pulse suddenly becomes slow, and symptoms of great depression appear, the voice changes to a gruff and husky tone, and the breath becomes putrid, an examination of the throat will probably reveal the changed condition of the exudation.

Rötheln.—A discrete and mild scarlatina might easily resemble the rash of rötheln; but this latter is preceded by a mild catarrh, is accompanied by only a moderate fever, evanescent redness of the fauces, and a good pulse. The glands of the throat are not as deeply involved as in scarlet fever, but the glandular structures elsewhere are likely to show more irritation in rötheln.

Small-pox.—When small-pox is epidemic, cases of the hæmorrhagic form are sometimes confounded with scarlatina. It may be distinguished by the difference in the throat symptoms; by the absence of the pain in the back in scarlet fever, an almost constant symptom in small-pox, and by the slower progress of the disease. The roseola which precedes small-pox does occasionally cause an error in diagnosis.

Typhus.—The mulberry eruption of typhus has been mistaken for the scarlatinous rash; but this can hardly occur in careful hands. Scarlet fever is rarely seen in adults; typhus is rarely seen in children. The typhus rash is on the abdomen and extremities, comes out on the fifth day of fever, the temperature having been for days in the neighborhood of 106° Fahr.; the pulse is strong and not very quick (100–120); and pulmonary complications are the rule.

Erythema.—Erythema may readily be distinguished from scarlatina by the damask color of the eruption, the smaller size of the patches, the brief duration of the disorder, and the absence of fever.

Roseola.—Roseola is often mistaken for scarlatina, and the differential diagnosis is occasionally a matter of some difficulty. The

rash of roseola is of the same color, and often simulates that of scarlatina. Headache and vomiting frequently accompany the outbreak of both disorders; but the fever of roseola is never high, rarely reaches 102° Fahr., and more often is only just above normal; the tonsils are not swollen.

Erysipelas.—Erysipelas can be differentiated from scarlatina by the very pronounced œdema of the connective tissue. The eruption of ordinary scarlet fever always begins on the neck and upper part of the chest; but erysipelas rarely, if ever, starts there.

Miliaria.—The minute vesicles of miliaria have been at first sight mistaken for the rash of scarlet fever; but these look just like drops of water, and ought not to be misleading.

Urticaria.—The febrile form of urticaria is preceded by shivering, headache, furred tongue, and vomiting, like scarlatina; but there is no angina, and the temperature is never high.

Intermittent Fever.—Sometimes, in the case of children suffering from the effects of exposure to malarious influences, during the hot stage of the fever the body may be suffused with a rose-colored rash. If the patient be seen at this time, and the temperature is high and the throat slightly injected, it will be very easy to make a mistaken diagnosis. With the apyrexia, however, the rash fades, and the real nature of the attack is manifest. Dr. Cheadle has reported two such cases. "In one—a child aged two years and nine months—the illness began at 9 A.M. with a sharp rigor. A hot bath which was immediately given brought out a bright red rash all over the body. At the same time the skin was dry and burning, the temperature 102° Fahr., and the pulse 110. At the end of three hours the rash faded. On the third day an exactly similar attack took place, and later the phenomenon was again repeated a third time." (Eustace Smith.)

Rheumatism.—There is at times a considerable degree of swelling about the smaller joints during the first day or two of the fever; and if the eruption delays or comes out imperfectly, the disorder might be mistaken for rheumatic fever.

Cerebro-spinal Fever.—Scarlatina may in some instances show a rough resemblance to cerebro-spinal fever. When the child is suddenly seized with vomiting, high fever, convulsions, and stupor, the differentiation may not be easy; but the eruption in cerebro-spinal fever is herpetic and petechial, and very different from the scarlatinal efflorescence. The absence of throat symptoms will be determinate.

Prognosis.—The prognosis in scarlet fever is a matter of great uncertainty, and depends upon (*a*) preëxisting conditions, (*b*) type of the prevailing epidemic, (*c*) the severity of the local lesions, and (*d*) character of the treatment.

a. Scarlet fever is no respecter of persons, but attacks the children of the rich with the same virulence and fatality as it strikes down the

Scarlatina.	Measles.	Rötheln.
Contagious.	Extremely contagious.	Moderately contagious.
Incubation: 4 to 6 days.	*Incubation:* 7 to 14 days.	*Incubation:* 10 to 14 days.
Prodroma: chill, vomiting, restlessness, headache, sore throat, occasionally convulsions.	*Prodroma:* lassitude, shivering, sneezing, coryza, harsh cough, seldom vomiting.	*Prodroma:* shivering with heat, headache, pain in back and limbs, short cough, sneezing, coryza, sore throat, nausea.
Eruption: appears on 2d day.	*Eruption:* appears on 4th day.	*Eruption:* appears on 2d day.
Rash consists of densely packed, minute red points, on a rose-colored, hyperæmic ground.	Rash consists of papules forming crescents on a white ground of normal skin.	Rash consists of pea-sized, slightly elevated patches.
Papillæ enlarged.	Papillæ not enlarged.	Papillæ not enlarged.
Rash appears first on sides of neck and in clavicular region, and spreads very rapidly.	Rash begins on forehead and cheeks, and extends gradually to the ankles.	Rash first appears on back and chest.
Rash lasts about seven days.	Rash continues three days.	Rash lasts two or three days.
Skin has an old-cheesy odor.	Skin has no peculiar odor.	Skin has a slight musty odor.
Severe sore throat characteristic.	Slight sore throat.	Slight sore throat.
Bright-red color of the fauces; tonsils swollen and sore.	Dark-red, irregular spots on the palate.	Fauces reddened, but much less than in scarlatina.
Strawberry tongue.	White-coated tongue.	Tongue slightly furred.
Temperature: 104° to 108°	*Temperature:* 102.5° to 105°.	Slight fever for few hours only.
Pulse: 130 to 180; feeble.	*Pulse:* 100 to 140.	*Pulse:* moderately acceler'ed.
Fever maintains the same rate during entire eruption.	Fever rather increased by the eruption.	Fever abates when eruption appears.
Secondary fever rare; as an accompaniment of necrotic inflammation or parenchymatous nephritis.	No secondary fever.	No secondary fever.
Cerebral symptoms usual, important, and frequently fatal.	Cerebral symptoms slight, and, as a rule, unimportant.	No cerebral symptoms.
Coryza and bronchitis extremely rare.	Coryza and bronchitis an important and constant characteristic. Severe catarrhal symptoms.	Occasionally catarrhal symptoms, with a dry, hacking cough.
Pneumonia very rare; pleurisy rather frequent.	Catarrhal pneumonia a very frequent complication.	Very unusual.
Duration: 2 to 3 weeks.	*Duration:* 12 to 16 days.	*Duration:* 5 to 7 days.
Most common in young children.	Most common in children.	Mostly in children, but attacks adults more frequently than scarlet fever; more prevalent among females than males.
Average mortality: thirty-five in a hundred cases.	*Average mortality:* twelve per cent.	*Average mortality:* four per cent.
Sequelæ: Bright's disease, dropsy, eye and ear disorders, glandular enlargements.	*Sequelæ:* chronic bronchitis, phthisis, eye diseases.	*Sequelæ:* enlargement of the cervical and post-cervical glands.
Desquamation: very profuse, in scales, flakes, and large patches.	*Desquamation:* only occasionally, and then in very minute scales.	No desquamation, or very slight.
No backache.	Pain in back and in the limbs.	Severe pain in back and limbs.

Small-pox.	Roseola.	Cerebro-spinal Fever.
Very contagious.	Not contagious.	Not contagious.
Incubation: 14 days.	No incubation.	*Incubation:* 1 to 3 days.
Prodroma: rigors, with vomiting, and severe lumbar pains.	None.	None.
Eruption: appears on 3d day.	*Eruption:* appears on 1st day.	*Eruption:* appears on 2d day.
Rash consists, first of papules, then of vesicles, finally of pustules.	Rash consists of minute rose-colored papules, on white ground.	Rash varies, chiefly herpetic and petechial.
Papillæ not enlarged.	Papillæ enlar'd only at edges.	Papillæ usually not enlarged.
Rash appears first on the forehead and about the mouth.	Rash begins on the chest.	Rash begins generally on upper or lower lip, and extends to the nose, cheeks, etc.
Rash lasts about twelve days.	Rash lasts two days.	Rash lasts many days.
Skin emits a sickly odor.	Skin has natural odor.	Skin has no particular odor.
Very slight sore throat.	Slight sore throat.	Throat not sore.
Pustules on the posterior wall of the pharynx.	Slight redness on the edge of the soft palate; tonsils not inflamed.	Pharynx normal.
Furred tongue with red edges.	Tongue slightly furred.	Tongue moist and soft.
Temperature: 104° to 106°.	*Temperature:* 101°; often only just above normal.	*Temperature:* 99° to 102°; lower than any other inflammatory disease.
Pulse: 100 to 130.	*Pulse:* slightly quickened.	*Pulse:* very often normal; sometimes preternaturally frequent or unfrequent, subject to sudden and great variation.
Fever greatly reduced as soon as eruption appears.	Fever never important.	Fever has no relation to eruption.
Secondary fever always present.	No secondary fever.	Temperature may fall gradually, and then rise abruptly in fatal cases.
Cerebral symptoms often grave, especially in children.	No cerebral symptoms.	Cerebral symptoms characteristic, various, and severe.
Coryza and bronchitis rare. Suffusion of eyes the only catarrhal symptom.	No catarrhal symptoms.	Bronchial catarrh common.
Pneumonia and pleurisy unfrequent.	Never present.	Pleurisy and croupous pneumonia of very common occurrence.
Duration: 3 to 6 weeks.	*Duration:* 3 or 4 days.	*Duration:* 4 to 7 days.
Most common among unvaccinated children, or vaccinated adults.	Generally young girls.	More males than females; more young persons than adults.
Average mortality: eighteen in a hundred cases.	No deaths.	*Average mortality:* sixty per cent.
Sequelæ: glandular enlargements, chronic bowel disorders, and eye diseases.	None.	Relapses are common.
Desquamation: very copious, scabs, crusts, and thick scales.	No desquamation.	*Desquamation:* rare, or in thin scales.
Excruciating pain in the lumbar region.	No backache.	Severe lancinating pains in the spine.

denizens of the tenement-house districts. The constitutional peculiarities of the patient and the family characteristics have, however, a great deal to do with the favorable or unfavorable termination of the disorder. Scrofulous children are bad subjects for scarlet fever; and although the type of fever may be mild, and the case seem to progress favorably, at some point, before convalescence is fully established, a retrograde action will begin, and the case probably terminate disastrously. Eustace Smith relates the case of a young girl who had suffered for years from scrofulous bone disease. She was taken with scarlatina. The symptoms, slight at first, for a fortnight caused no anxiety. In the middle of the third week all this was changed. The patient began to complain of rheumatic pains, and then had in succession albuminous nephritis, pericarditis, and double pneumonia. Ulcerative endocarditis led to cerebral embolism, with hemiplegia, and afterwards to renal embolism, with return of the albuminuria and casts which had previously disappeared. The girl eventually died suddenly on the eighty-ninth day, apparently from clotting in the pulmonary artery.*

If in the same epidemic, or previously, one or more members of the family have succumbed to an attack of scarlet fever, it should make us very guarded in our prognosis; while, on the other hand, if several of the family have previously had the disease and recovered, it is a good augury. Scarlet fever oftens weeps off an entire family of children, one after another.

Previous ill health, other than scrofulous, does not seem to predispose to malignity of attack. Age and sex have no important bearing, although most of the cases, and consequently the deaths, are in the second to the fifth years of life. Scarlet fever occurring during the puerperal state is likely to be very malignant.

b. Different epidemics vary greatly in virulence, and the mortality in different years ranges from sixty per cent. to seven. Malignant scarlet fever is almost invariably fatal, especially when the cerebro-spinal symptoms are severe. Convulsions occurring even at considerable intervals are a very grave complication. If the delirium is continuous, and the patient has passed from a state of protracted sleeplessness to one of profound stupor, there can be little hope for a favorable issue. If the temperature still continues to rise after the rash is well out, it is a very evil omen, and points probably to an impending anginal necrotic inflammation.

c. The character of the local lesions has much to do with the final outcome from the attack. If these be numerous and severe, the situation is one of great gravity. Necrotic inflammations in the glandular structures of the neck and pharynx, and purulent coryza, are the most

* Diseases in Children, p. 42.

formidable symptoms from the third to the twelfth days; synovitis and albuminuria during the third week; multiple abscesses and renal dropsy in the fourth and fifth weeks. Uræmic symptoms are not likely to be severe in children, and they rarely die from uræmic poisoning; but this complication is not unfrequent in adults.

Most authorities declare that a dark-tinted rash is not significant of severity of the other factors in the disease; but this does not accord with my experience. When the rash in any particular varies from the ordinary appearance, grave symptoms will arise either in the throat, kidney, or cerebro-spinal system. The rash sometimes comes out inefficiently, and the weight of the attack falls upon the mucous membrane of the alimentary tract, with the following unfavorable symptoms: a brown and cracked tongue, persistent vomiting, colliquative diarrhœa, stupor.

Favorable symptoms are: a regular rate of development in the various stages of the disease, not too rapid nor yet too prolonged; a fully developed rash of a bright rose color, not associated with any other form of eruption or staining of the skin; the gastric, anginal, and cerebral symptoms all mild and occurring in their normal sequence; a pulse, firm and responsive to the touch, and not exceeding one hundred and forty beats per minute (in children); and a temperature not exceeding 104.5° Fahr., falling to normal by the sixth or seventh day.

d. The character of the treatment has much to do with the significance of severity in the various symptoms. Homœopathy offers much in the way of relief and permanent cure. Under homœopathic treatment the death-rate is reduced more than one-half, besides abridging, and in many cases preventing altogether, the untoward sequelæ soon to be described.

Treatment.—The treatment of scarlet fever demands the most skilful and discriminating use not alone of remedies, but of all the appliances and methods which tend toward health. One must be well versed in the materia medica to select the appropriate remedy at the critical juncture; and every stage of the disease is critical, from invasion to convalescence, and in treating scarlet fever it may well be said that we know not what a day may bring forth. But, no matter how deftly the remedy be fitted to the symptoms, one will often fail to control this capricious disease if the resources of hygiene, discreet dietetics, faithful nursing, and hydrotherapy are not marshalled to the aid of the homœopathic remedy. The treatment will be considered under the heads of (*a*) prevention, (*b*) hygienics and dietetics, (*c*) therapeutics, and (*d*) auxiliary measures.

Prevention.—Whenever scarlet fever is epidemic in a neighborhood, those children who have not had the disorder should receive a powder of potentized Belladonna every night on going to bed. Doubtless, Belladonna exerts a stronger prophylactic influence in some epidemics

of scarlet fever than in others; but at first, and until cases occur in children who are taking Belladonna, we should give all those who are in any way exposed to the epidemic the advantages which this remedy, so administered, may exert in preventing the absorption of the contagion into the system. Even when it does not act prophylactically, it seems to curb the malignity of the disease. I usually give it in the sixth potency; and in only two instances have children taking it thus fallen victims to the epidemic, save where the brevity of the interval before the outbreak of the invasive symptoms denoted that the disease was already incubating. No child, in my practice, who has taken Belladonna for three days previous to the appearance of the rash, has died of the fever. It seems, therefore, to have a genuine mitigating and controlling influence.

Other drugs have been recommended as preventives; the most important of these are the Sulpho-carbolate of sodium, and Arsenic. Neither of these drugs is claimed to possess any special antidotal power over the scarlatinous miasm, but to put the tissues of the body into a state antagonistic to all miasms, thus removing any condition which might have been favorable to the development of fever germs. It is claimed that they are equally serviceable in scarlatina, measles, and diphtheria. Dr. Brakenbridge gave the Sulpho-carbolate of sodium, in five-grain doses, three times a day, to twenty-two persons exposed to scarlet fever, fifteen persons exposed to diphtheria, and eight persons exposed to measles; and in every instance it was effective (Edward Ellis). It seems probable that Arsenic, also, has real prophylactic virtue; but to secure this protection it must be pushed until it causes slight puffiness under the eyes. When so used, it has an evident counteracting influence against infective matter; a person who is being treated with palpable doses of Arsenic cannot be vaccinated. Dr. Walford gave Arsenic to nearly one hundred children exposed to scarlet fever, and only two of these had it, and they but mildly (Eustace Smith).

Despite our exertions, should scarlet fever appear in a family, the patient should be at once isolated, if possible, and the Health authorities informed. In selecting a room within which to quarantine the patient, preference should be given to an upper room, or, at any rate, one as far removed from the common sitting-room as possible. It should be large, sunny, and capable of good ventilation. The carpets, curtains, all stuffed furniture, and, in fact, everything that may not be needed for the daily wants of the patient or the use of the nurse, should be at once removed. Sheets should be tacked over the entrance into the room, on both sides, so as to hang down like double curtains; these should be kept constantly moist with Platt's chlorides or some other odorless, disinfecting solution. Carbolic acid, chloride of lime, and other strong-smelling disinfectants should be kept out of the sick-room.

The fæces and urine should be received into vessels containing disinfectants. The hand-towels, body and bed-linen, should be changed daily, and *at once* disinfected and then boiled.

In severe cases the air can be ozonized by putting into a saucer half an ounce each of oxalic acid and permanganate of potash and an ounce of water; a little water can be added occasionally to make up for evaporation. An open hearth with a brightly burning fire not only adds much to the cheerfulness of the apartment, but greatly assists ventilation.

During desquamation, inunctions, several times daily, exert a marked prophylactic influence by preventing the dissemination of the fine flakes of cuticle.

After the patient leaves the room, either by recovery or death, it should be thoroughly fumigated. This is best performed by burning sulphur in the room. Mix five or six ounces of the flowers of sulphur with an equal amount of powdered charcoal; put this in a suitable iron pan; set the pan on a brick, in a tub containing a little water, in the middle of the room which is to be disinfected; close all the windows, and other openings, tightly; lay a red-hot coal on the sulphur, and hasten out of the room. Keep the room closed several hours and then ventilate it thoroughly. The wood-work about the room had better be washed down and repainted; and if the walls are papered, the old hangings should be scraped down and replaced with new. The mattress and pillows should be baked, and then well aired.

As a rule, it is not well to send the other children of the family away from home. The probabilities are that they are already incubating the fever. If they are to be ill, they are surely better off at home; and if they have not been infected, the measures indicated will prevent their taking the disease. The attendant or nurse should be sequestrated from the rest of the family, especially from the children, and her clothing should be thoroughly fumigated before she rejoins them. To many parents all this paraphernalia of prophylaxis will seem useless and absurd. They reason that it is only natural that children should have children's diseases, and that the sooner they have them (scarlet fever included), the better. Especially when there is a mild epidemic running through the neighborhood, parents will recklessly expose their children. But so uncertain and capricious is this fever that it may at any unexpected hour change from a mild to a virulent form. I have seen it epidemic for several weeks in so mild a form as to cause but few deaths, when suddenly, without any apparent reason, the epidemic would become exceedingly virulent, and death be the rule.

Physicians very rarely carry the disease; but they should at all times be scrupulously careful, when attending upon scarlatinous patients, not to go directly from them to a house where there are young children.

Hygienic and Dietetic Treatment.—The suggestions made under the previous heading to guard against the spread of the fever, are also of advantage to the patient himself. The room, if possible, must be large and well ventilated, the temperature even and about 65° Fahr., and everything should be arranged to secure the most complete seclusion and cleanliness. The bed-coverings should be light and not too warm, and of a nature to admit of frequent change.

However mild the symptoms may be, the child should be kept in bed until desquamation has ceased, and should not be allowed to leave his room for three or four weeks from the beginning of the fever. The body should be sponged with tepid water several times a day, and afterwards dried by being patted with a soft towel. This greatly relieves the heat and irritation, and is usually very agreeable to the patient. It is especially serviceable for the promotion of sleep at night, and should always be administered at about the regular bedtime. The water may be softened by the addition of bicarbonate of soda, if desired. Little patients are often amused and benefited by being allowed to paddle their hands in basins of cool water.

Cooled water (about 55° Fahr. or, during winter, as it runs from the faucet) should be offered to the patient at short intervals; and if there is no gastric complication they should be permitted to drink freely. No form of liquid nourishment can replace pure water, and it is mistaken policy to deprive a fever patient the gratification of a good drink. The scantiness of the urine, so universal in this disorder, shows how grudgingly nature parts with the fluid of the blood; and it only needs the copious use of water to bring the urine to a normal standard in this respect. If from gastric irritability, or other reason, it seems desirable to curb the desire for drink, still give water frequently, but in limited quantities. Where it is desired to control the amount of water taken, it is better to offer say half an ounce in a small glass, than to present a full goblet and then check the patient when he has got well started adrinking. Usually the little patient will be mentally better satisfied if allowed to *drain* the glass containing a small quantity, than he would have been with twice the amount from a full glass, if compelled to give it up while it still contains a portion of the coveted draught. On the other hand, if the child is not thirsty, it should not be coaxed to drink. Vomiting, if persistent, is often quickly relieved by ice swallowed in the lump. Pieces of ice held in the mouth are not only grateful to the patient, but afford the most marked relief when the throat is very sore or swollen. Ice, thus given, is always beneficial in anginal troubles, scarlatinal or other.

The diet should be easily digestible, and mainly of a liquid form. Nothing is better than milk, if this is agreeable to the patient. It may generally be improved both as to flavor and digestibility by adding to two ounces of milk twenty grains of beef peptonoids. This makes

a tasty and very nourishing meal, and is quite sufficient during the pyrexia. It should be given every two or three hours; cool, but not ice-cold. If, when food is offered, the patient rebels against taking it, do not contest the matter. Set it aside for ten minutes or so, and then offer it again. Perhaps now it will be taken greedily and enjoyed, where before it would have been accompanied by tears.

Other combinations with milk can be made according to the taste of the patient and the necessities of the case. Milk with the addition of ten drops of limewater to the ounce will often agree when nothing else can be retained. Skimmed milk, when fresh and pure, is better than new milk, as containing less fat. Buttermilk and koumyss are valuable varieties of the milk diet, the latter particularly when stimulation seems desirable. A highly nutritious and stimulating diet is made as follows: cut a nice piece of choice, juicy beef into small bits, removing all fat, gristle, and bone; place in a champagne bottle, or any container of convenient size, and seal tightly; stand this in a pot of cold water and gradually let it come to a boil; keep it boiling three hours; to the juice contained in the bottle add twenty grains of beef peptonoids to every ounce; an ounce is a good meal. To rewarm, put it into a clean bottle and set in a vessel of boiling water for a few minutes.

Clam broth, clear soups, gruel, toast-and-water, and, later, during desquamation, milk-toast, buttered-toast, light puddings, broiled chicken, and cocoa give sufficient variety. If appetite wane, as it often will in the apyrexia, a little bird nicely broiled will be eaten with avidity. The idea of eating a whole bird will stimulate the child's imagination, and the meal will be relished, and thus the habit of taking food reëstablished. Infants at the breast should be kept to the breast, and if the mother can be prevented from worrying unduly it is the best pabulum an unweaned child can have. A cheerful doctor makes a contented mother and nurse. I have said that the sick-room should be light and well ventilated; it should also be sunny when the physician is there. We can at least carry the brightness of human love into every stilled chamber, and make our coming the acme of the day to its anxious occupants, even though we lack in diagnostic or therapeutic skill. No man is fit to attend upon children who is not a philanthropist in the generic meaning of the term.

The question of the usefulness of alcohol is a broad one, and cannot be settled off-hand. As a rule, I withhold it during ALL fevers, reserving it for that apathetic stage which is apt to come after the crisis and before convalescence has begun. Even when used here, I watch critically its effects, increasing the size of the dose if it does good, decreasing the amount taken if it causes restlessness or stupor. In other words, I treat it as a medicinal food, and never as a relish. But whenever given, or at whatever stage of the fever, I cannot sympathize with or

tolerate the injunction that "brandy or whiskey should be administered in teaspoonful doses every hour or two until the system becomes saturated"; the crisis is never critical enough for that, in my estimation.

In the ordinary type of scarlet fever alcohol is not needed at any stage. In the malignant form, ten drops of absolute alcohol can be added to each ounce of milk administered. If the pulse be very feeble, or if there is gastric irritability, give iced champagne by the teaspoonful every ten or fifteen minutes until its beneficial effects are observed. The patent bottle clip will preserve the effervescence; a very important item. During desquamation and convalescence, I have used with satisfaction Tokay, Speer's port wine, vin. Mariani, and Burgundy. The carbonate of ammonia, a couple of grains in a tablespoonful of milk, is useful when the heart is weak and the temperature inclines below normal; but it should always be remembered that when continuously given it tends to impair the condition of the blood. A stimulating effervescent drink can be made with lemon-juice, in the proportion of four grains of carbonate of ammonia to a teaspoonful of the juice. In impending collapse I have seen a few spoonfuls of black coffee, and in another case drop-doses, every five minutes, of Rubini's camphor, tide the patient over the ebbing period, and insure reaction. Various expedients will suggest themselves to the watchful practitioner at such times; and, if one is a born physician, intuition will often lead him in the right direction, and he will save his case from disaster if from the flickering vital spark the sustaining power of the Divine hand be not withdrawn.

Convalescence from scarlet fever will demand the exercise of much firmness on the part of the physician, and of an equal amount of patience in the attendant. The child must be kept in the sick-room until desquamation has completely ceased, even if this lasts for two months. This regulation is due to others as a prevention of the spread of the contagion, and is a matter of safety to the child as tending to prevent severity in the nephritis, present or impending. And yet, usually there will be apparently so little need for caution, and the child will seem so well, that he will grow restive, and the mother will relax her watchfulness; the child goes out, takes cold, and dies. Convalescents need to be warmly clothed, have a generous diet, and when strong enough, say in six weeks, have the benefit of a change of air and scene.

Therapeutics.—While we should always select the remedy to meet the condition of each individual patient, and never prescribe for a pathological name, yet the prevailing conditions are so similar that in the ordinary run of cases there will be a sameness in the remedies chosen; it is only the atypical cases which demand minute study. The remedies oftenest indicated are:

During Invasion.—In mild cases: Aconite, Belladonna, and Sulphur.

In severe cases: Bryonia, Gelsemium, Belladonna, Rhus toxicodendron, Sulphur, and Calcarea carbonica.

In malignant cases: Arsenicum album, Lachesis, Camphora, Ailanthus, Apis.

During Eruption.—The rash is smooth: Belladonna, Gelsemium, Ammonium carbonicum, Apis mellifica, Mercurius solubilis, Sulphur, Muriatic acid, Stramonium.

The rash is rough: Aconitum, Rhus toxicodendron, Bryonia, Lachesis, Ailanthus, Arsenicum, Phytolacca, Arum triphyllum, Nitric acid, Carbolic acid, Baryta carbonica, Calcarea carbonica.

The rash is pale: Bryonia, Arsenicum, Camphora.

The rash is scarlet: Belladonna, Ammonium carbonicum, Aconitum, Bryonia, Calcarea carbonica.

The rash is intensely red: Muriatic acid, Sulphur.

The rash is dark-red: Lycopodium, Carbolic acid, Aconite.

The rash is coppery-red: Stramonium.

The rash is bluish-red: Zincum.

The rash is bluish: Lachesis, Opium.

The rash is bluish-black: Argentum nitricum, Muriatic acid, Anthracin.

The rash is livid: Ailanthus, Muriatic acid, Arsenicum, Hydrocyanic acid, Rhus toxicodendron, Lycopodium, Solanum.

The rash is petechial: Arsenicum, Rhus toxicodendron, Ailanthus, Muriatic acid, Arnica, Phosphorus, Anthracin.

The rash is violet: Veratrum album, Camphor.

The rash is brown: Nitric acid, Carbo vegetabilis, Ailanthus, Hyoscyamus.

In mild cases: Belladonna, Rhus toxicodendron.

In severe cases: Bryonia, Apis mellifica, Cuprum, Rhus toxicodendron, Zincum, Sulphur, Calcarea carbonica, Hyoscyamus.

In malignant cases: Arum triphyllum, Ailanthus, Arsenicum, Lachesis, Ammonium carbonicum, Muriatic acid.

During Desquamation.—In mild cases, usually nothing required. An occasional dose of Sulphur or of Kali sulphuris may prevent sequelæ.

In severe cases: Arsenicum, Hepar sulphuris, Baryta carbonica, Calcarea carbonica, Silicea, Kali bichromicum, Asclepias syriaca, Scilla maritima, Terebinthina, Phosphoric acid, Helleborus, Lycopodium, Colchicum.

Belladonna is doubtless the most homœopathic remedy in the simpler form of scarlet fever, and may be used steadily through the invasive and eruptive stages. The nearer the attack approaches to

the typical form, as described under the title "Ordinary Scarlet Fever," in the sequence and quality of its symptoms, the more clearly is Belladonna indicated. It may be replaced with advantage by *Solanum* in teething children when the nervous erethism leads on to convulsions; the eruption, instead of being an even flush of color all over the body, comes out in large red or livid spots. I have noticed a number of times the truth of the observation made by Jahr, that if, during the premonitory period, when the throat merely is sore, Belladonna be given, it seems to impede the breaking out of the rash, and holds the disease, as it were, in suspense. In this way I have seen the invasive stage prolonged to four or five days, until, Belladonna being withheld, the rash came out finely.

The value of *Sulphur* in the invasive stage is hardly appreciated. A few doses, in not too low a potency, will bring out the eruption and give a quietus to the individual dyscrasia, upon which much of the virulence and capriciousness of the attack depends. I have several times treated these cases with Sulphur, or with Sulphur followed by *Calcarea*, being led thereto by the *personnel* of the patient, without any other remedy, and with great satisfaction to myself.

Gelsemium is a remedy which we cannot afford to overlook in the initiatory fever. The condition is altogether different from that requiring Belladonna, but it will be met with frequently among the poorly-nourished, tenement-house class. It may be described as an intense languor of the entire muscular system. *Veratrum viride* has been highly praised, but I cannot see its applicability except in palpable doses, and then I should dread its effect upon the heart, which, as we have already seen, suffers severely from the stress put upon it by the scarlatinal virus.

If the eruption comes out scantily, looks pale, or recedes again, especially if this complication seems due to exposure to cold during the incubation or invasion, *Bryonia* will generally bring the rash out properly; but if serious cerebral symptoms impend, *Cuprum aceticum* may be a better prescription; or *Camphora*, if the extremities are cold and blue.

Next to Belladonna in frequency of usefulness in scarlet fever is *Rhus toxicodendron*, but there will never arise a doubt as to a choice between them. When Rhus is required, the skin is rough and the general condition of the patient typhoidal. *Baptisia* will replace Rhus when there are offensive discharges and the throat is more implicated than the skin. *Arnica*, though unfrequently used, has a unique place in typhoidal scarlatina when there are hæmorrhages from mucous surfaces and blood-boils upon the skin.

Convulsions before the appearance of eruption denote a demand for *Belladonna* (starting from sleep with a wild look, the body is thrown forward and backward; sopor after the spasm). *Cuprum* (the convul-

sive movement begins in the fingers and toes; child lies on its belly and spasmodically thrusts the breech up; after the convulsion the child screams, and turns and twists in every direction until another spasm occurs). *Hyoscyamus* (sudden shriek and then insensible; convulsive jerks; long-lasting spasms; frothing at the mouth). *Aconitum* (convulsive startings; twitching of single muscles; the child gnaws its fist, frets, and cries). Convulsions during the eruption, or when it recedes, may need *Apis* (the child gives a terrible shriek; trembling and jerking of the limbs; boring the head backward into the pillow). Cuprum, Belladonna, *Arsenicum* (the child lies as if dead; breathless for some time; a violent jerk passes through the whole body, and respiration and consciousness gradually return). Bryonia, *Zincum* (cross before the attack; spasms during sleep; right-sided spasms; fidgety feet). *Ipecacuanha* (vomiting before or during the spasm; the child is spasmodically drawn in some direction). *Opium* (screaming during the spasm; stupor between spasms).

Convulsions during desquamation may call for any one of the above, or for *Moschus* (sleeplessness; suffocative feeling). *Ignatia* (spasms return at the same hour every day; screaming and violent trembling). *Terebinthina* (suppressed urine; picking of nose; dry, short cough). *Coffea* (grinding of teeth; coldness of limbs; child extremely weak and excitable).

When the case assumes a critical aspect from the severity of the anginal symptoms, the five A's should be remembered: Apis, Ailanthus, Arum, Arsenicum, and Ammonium carbonicum. *Apis* is indicated when the œdema progresses rapidly, and is accompanied with sharp bee-sting-like pains; *Ailanthus*, when the throat is livid, almost purple, studded with angry-looking ulcers, from which flows a scanty, fœtid discharge; *Arum*, when the buccal cavity and throat burn so that the child is unable to drink, and cries if anything is offered; there are putrid ulcers in the throat, and an acrid discharge from the nose; *Arsenicum*, burning and dryness in the throat, especially when swallowing; food goes partly down and is then ejected; blisters on the tongue; *Ammonium carbonicum*, gangrenous tonsillitis and parotitis, worse on right side. Malignant sore throat may also call for *Lachesis* (especially when the eruption is declining), *Mercurius* (when the cervical glands are also involved), *Carbolic acid* (white circle around the mouth, tongue black, liquids return by the nose), *Mercurius cyanatus* (simulated or actual diphtheria), *Phytolacca* (severe stiffness of the neck), *Carbo vegetabilis* (sunken features, cold breath; the child seems moribund, yet must have air and wants to be fanned all the time.)

Delirium will usually be controlled by *Belladonna* (fear of imaginary things from which he tries to hide; strikes, bites, or spits upon the attendant), *Hyoscyamus* (when spoken to, answers correctly, but unconsciousness and delirium immediately return), *Stramonium* (with

graceful gesticulations; singing, laughing, whistling; great loquacity), *Cuprum* (afraid of every one who approaches the bed; shrinks away, and tries to escape), *Gelsemium* (as soon as he falls asleep, half waking, incoherent talk), *Bryonia* (very irritable; visions when shutting the eyes; worse at night). Dull sopor and stertorous breathing indicate *Opium;* threatened hydrocephalus, *Helleborus;* extreme restlessness, *Coffea;* diarrhœa, *Arsenicum* (stool pappy, putrid; wants to lie with the head low), *Veratrum album* (profuse, watery; severe pinching colic; violent thirst), *Mercurius corrosivus* (bloody; purulent; severe tenesmus); pleurisy, *Mercurius*, *Bryonia*, or *Rhus toxicodendron;* pericarditis, *Tartar emeticus;* synovitis, *Ledum*, *Rhus*, *Lycopodium*, *Kali carbonicum;* nasal complications, *Kali bichromicum*, *Muriatic acid*, *Aurum muriaticum;* collapse, *Camphor*. *Hepar sulphuris* exerts a favorable influence if given as soon as traces of albumin appear in the urine.

The more particular indications which will guide the practitioner to the correct prescription are as follows:

Belladonna deeply affects not only the superficial layers of the skin, but the subcutaneous tissues as well, setting up a rapid and violent inflammation. The face, upper extremities, and the entire trunk exhibit a diffuse scarlet efflorescence, studded with innumerable papillæ, very closely resembling the rash of scarlatina. The skin is so hot that it imparts a burning sensation to the hand. In some cases, there is a sensation of burning heat in the whole face, but without redness. The skin is painfully sensitive to contact, and this hyperæsthesia involves all the special senses; even ordinary noise, light, and odors offend and annoy. The tongue, the entire surface of the buccal cavity, and the pharynx are devoid of moisture, actually as well as sensationally. A drink of water, instead of giving relief, seems only to increase the viscidity of the saliva, which clings to the tongue like glue.* The thirst is violent, and there is usually a longing for lemonade, which agrees. The throat feels raw and sore, and looks red and shining. There is a painful feeling of constriction, as if the passage was narrowed, so that nothing would pass down. The tonsils are inflamed, deglutition becomes difficult, and fluids are returned by the nose (*Kali bichr.*, *Lach.*). The inflammation is liable to be worse on the left side; the pains are burning and stinging (*Apis*). The head symptoms are severe. The head is hotter than other parts of the body (*Arnica*). The senses seem all confused; he knows not what he does; hardly knows whether he is awake or asleep; is drowsy, but his sleep is broken by starts (*Carb. ac.*, *Sulph.*) and frightened outcries. This may go on to delirium, in which he sees imaginary things, generally of a horrible sort, which frighten him, and he makes motions as if to escape. In the next stage he lies unconscious or in convulsions; the face pale, puffy (*Hellebore*), or sunken. The convulsions come on during sleep, or the patient lapses into a dull sleep immediately after the spasm. The pyrexia is sudden and severe. The heart's action is greatly accelerated, with a sense of pressure in the cardiac region, which may even arrest respiration and cause anxiousness. The pulse is at first throbbing, full, and tense, but becomes later very rapid, feeble, and small.

Gelsemium is, also, of great value in the smooth variety of scarlatina; occasionally it will prove the only remedy when the eruption is measles-like, or variegated.† The fever sets in with less violence and suddenness than that of Belladonna, and will probably show a more marked morning remission. The pulse responds quickly to bodily movements. When the child is lying still it may not be more than 120, but if

* The tongue is covered down the centre with white clammy fur; the edges are red (*Gelsemium*); or red all over with elevated papillæ.

† During the prodromal stage there is great nervous excitement, with cold hands and feet, and a dull flush over the face.

it moves about, or is merely lifted up, the pulse jumps to 140–160. Sudden sweating on slight exertion is a bad omen in this disease, and a valuable "key-note" for Gelsemium when the pulse is thus variable, soft, weak, filiform, and easily compressible. The expression of the face is heavy and dull, and flushed in all positions (*Aconite*, red face, turns pale on rising); the eyelids droop, and close involuntarily when the patient looks steadily at anything; the eyeballs are suffused, the pupils dilated, sensitive to light (*Belladonna*), and objects are frequently seen double. Although languid and drowsy, he may not be able to sleep (*Belladonna*), but lies in a half-awake state, and when spoken to, replies inconsequently or incoherently. He desires to be let alone, and is irritable if disturbed. Delirium comes, if at all, during sleep (*Belladonna*), and is mild and muttering (contra *Belladonna*). There is not the heat of the surface, nor the jerking of muscles so indicative of Belladonna; but the whole condition is asthenic, with profound muscular prostration (*Ars.*, *Carbo veg.*). The tongue is thickly coated yellowish-white, with red edges, or it may be all over red, raw, and painful. Speech is thick, and the tongue seems partially paralyzed; he can hardly put it out, it trembles so (*Lachesis*). The buccal cavity and fauces are dry, but thirst is slight, or altogether absent. The redness of the throat is more dusky than that of Belladonna. The tonsils are swollen and sore, and the throat feels as if filled up (*Belladonna*); worse on the right side (*Belladonna*, left side). Gelsemium is frequently the right remedy when the eruption retrocedes and all the viscera evidence the presence of the virus.

Rhus toxicodendron is the leading remedy when the skin is rough and the itching violent. In both mild and severe cases of scarlatina miliaria, Rhus usually acts promptly and efficiently. The rash is darker than in a typical case, and accompanied with an intolerable, burning itching. Rheumatic symptoms may be present, worse when at rest, and causing great restlessness; these symptoms will be aggravated at night. As a rule, Rhus, Gelsemium, or Belladonna will be indicated in the invasive stage; rarely Aconite, Bryonia, or Sulphur. The choice will mainly depend upon the mental and moral states of the patient; the eruption has not yet appeared, the anginal characteristics hardly sufficiently accentuated for a nice discrimination, and the fever still only moderate. Give *Rhus* if the little patient is listless and absent-minded; weeps rather than cries; is averse to all exertion, yet markedly restless; gets fits of trembling; complains of pains and weariness in the lower limbs, and dreads the cold air. Give *Gelsemium* if the child, when carried, is so dizzy that it seizes hold of the nurse, fearing a fall; or it staggers as if intoxicated, and seems blinded; or it lies immobile as if muscular power were all spent. Give *Belladonna* if the patient is very excitable and talkative; complains principally of the head; seems very sick, and then in a little while is bright and lively, but soon has a sudden relapse; this goes on all day; is easily vexed, and cries vigorously, very different from the lonesome-like weeping of Rhus.

Rhus is also homœopathic in the malignant variety of this disease, when the fever continues to rise after the eruption appears. The eruption may at first have been smooth, and the condition indicative of Belladonna; but now the skin roughens, miliaria or vesicles appear, the tongue becomes dry, brown, cracked, with a triangular red tip, and takes the impress of the teeth. The tonsils are swollen, with stinging or stitching pains, and are covered with a tenacious, yellow mucus. The whole pharynx feels stiff or bruised, and is involved in an erysipelatous inflammation. Later, the parotid and submaxillary glands swell (first the left, then the right), suppurate, burst externally, and discharge freely an offensive pus, and the entire neck is swollen by a cellulitic inflammation. Or, the anginal symptoms may be more moderate, with synovitis, œdema of the scrotum and penis, bleeding from the nose or other passages, petechiæ, or profound cerebral symptoms. The mind finds difficulty in grasping an idea; he answers tardily as if the mental process were slowly performed; or he neglects to answer, apparently from inability to hold the mind to one subject long enough to frame the answer. The delirium is mild, is associated with drowsiness (*Ailanthus*), and is chiefly concerned with exertions; he is running, carrying heavy loads, swimming, plodding over difficult lessons, or roaming along byways or over fields. Says W. H. Burt, no remedy known to the profession can equal Rhus in Scarlatina; it will cure seventy-five out of a hundred cases.

Aconitum is doubtless often given during the invasive stage, and in alternation during all stages, when it is worse than useless; and yet, Aconite has its own little niche even in the treatment of scarlet fever. The injunction copied from one book into another—"*give Aconite early*"—is nonsense. Give Aconite when it is indicated, early or late; and do not trifle with the life of your patient by giving Aconite *on gen-*

eral principles at any time. The practice of giving Aconite "first to subdue the fever," and then some other remedy to "meet the case," is not homœopathic, no matter what the potency. There is a group of symptoms so characteristic of Aconite that Hahnemann said, "Aconite should not be given in any case which does not present a similar group of symptoms." These are restlessness and anxiety of mind, with uneasiness of body (*Arsenicum, Rhus*), causing sighing, forebodings, and tossing about. The rash is miliary and dark; the face fiery red while lying, turns pale when the patient sits up; the countenance expresses fear, and the patient is unwilling to be left alone; the skin all over prickles as from electricity; and the symptoms are all aggravated by warmth, motion, and at night.

Bryonia has been found useful when the scarlatinal eruption delays, comes out imperfectly, or suddenly recedes (*Ipecacuanha, Arsenic*); but it should never be prescribed merely on this negative condition. It will only be useful when indicated by positive symptoms; the most important of which are when the sensory organs are benumbed and depressed, without perversion of their functions. The head is confused, with an ache, dull and pressing, involving the occiput. An occipital headache in scarlatina is usually a characteristic symptom for Bryonia, especially if the pain extends through the base of the brain from the forehead, and is aggravated by motion or exertion. In young children it is rare that we obtain such niceties of subjectivity, but I have seen children, of not more than six or eight years of age, who would describe their sensations with perspicuity and vividness.

The face is crimson, sometimes spotted, hot and puffed, this puffiness in some cases being sufficient to close the eyes; the lips are swollen and dry (dry and cracked, *Carb. ac.;* corners cracked, *Arum*), sometimes burning; the tongue is dry and brownish; thirst is excessive, and the little patient grasps the glass, and drinks greedily and hastily (*Sulphur, Terebinthina*); the demand is usually for iced drink, but sometimes warm drinks are desired, and assuage thirst most effectually.*

Bryonia is useful at any stage of the fever when meningitis, pleuritis, or dropsical effusion supervene (*Helleborus*), when the above symptoms are present. In the Bryonia case the nervous symptoms dominate the vascular.

Sulphur is often of the first importance in cases of scarlatina grafted on the scrofulous diathesis. The child rapidly grows intensely red all over (Muriatic acid) with pungent heat in the skin; vomiting (early in attack), followed by sopor; the face becomes bloated, shining, with a white circle about the mouth; the tongue is dry, cracked, and red, and it, and the entire buccal cavity, is covered with a salty, brownish mucus. In other cases, the efflorescence, instead of coming out evenly all over, appears in large patches as red as a boiled lobster, the skin around these spots being abnormally white. Cerebral symptoms are prominent; vision is perverted and the eyes distorted; the mind lethargic and bewildered; memory weakened; and hearing obtunded.† Again, the eruption, which at first was bright-red, soons grows purple; the bowels become affected with the characteristic early-morning diarrhœa; the child lies with its eyes half open (*Bryonia, Carb. ac.*), or wakes with a start (*Belladonna, Carb. ac.*).

While Sulphur should not be used, any more than any other drug, without a careful comparison of the symptoms of the case with those of the drug, yet in scarlatina, as well as other acute diseases, Sulphur frequently serves to arouse the reactive power of the system when apparently carefully selected remedies have failed to produce a favorable effect.

Calcarea carbonica is also of value in scrofulous constitutions. It is not often indicated at the beginning of the attack; but when the eruption is already fading, after Belladonna, Rhus, or Sulphur have been used, and parotitis is severe, the swellings about the neck extensive (*Baryta, Mercurius*), the mouth aphthous, breathing and deglutition both difficult, loose rattling in the tracheæ and bronchi, paralysis of the lungs threatening, accompanied by præcordial anguish, Calcarea is effective. In some of these cases the face becomes very much bloated, and the expression anxious.

Arsenicum album is of service in a more malignant type of scarlatina than any of the above varieties. The pulse is irregular, rapid, and intermittent;

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* The temper is exceedingly irritable, everything makes the child angry (*Chamomilla*), and the bowels are constipated (*Lycopodium*).

† The cerebral congestion causes delirium, which takes the form of a screaming wildness, in which the child knows not where he is, and seeks to flee he knows not whither.

often very quick and at the same time small (*Ailanthus, Veratrum album*), or weak and trembling; or even imperceptible (*Gelsemium, Zincum*). The fever assumes a rough resemblance to typhus (*Apis*). There is persistent burning heat of the skin with unquenchable thirst. Though the heat, both objectively and as registered by the thermometer, is intense, yet the patient experiences an undefined sense of chill, which makes him desire to be well covered. Though thirst is violent and continuous, when cool drinks are offered instead of grasping the glass and drinking greedily, he only takes a sip; if he takes much, it causes chilliness, cramps, and instant vomiting. The rash fails to appear and the invasive stage is prolonged beyond its proper period (*Bryonia*) with intense prostration (*Carbo vegetabilis, Gelsemium*), restlessness (*Muriatic acid, Rhus*), and anxiety; or, the eruption comes out well enough, but is accompanied by mild delirium, vomiting, diarrhœa, and great weakness; or, the rash suddenly grows pale, turns livid, is intermixed with petechiæ (*Muriatic acid*), or little blisters form, and fill with extravasated blood. The throat symptoms begin with stinging as from a splinter, the tissues dry, and swallowing difficult. Soon the tongue and fauces become very much swollen, and burn like fire. The tonsils and pharynx are covered by an accumulation of grayish or yellowish mucus, beneath which small, dirty-red spots may form. Later, the throat becomes gangrenous (*Lachesis*), deglutition impossible, or, if drink does pass the occluding tonsils, it rolls audibly into the stomach.

Arsenicum is frequently not denoted until the pyrexia has passed its acme and the desquamative stage is about to begin. It will be needed here if petechiæ appear; the tongue becomes dry, brown, and cracked, or stiff, blistered, and blackish, or smooth as if varnished; grinding of the teeth during sleep (*Helleborus*); breathing hurried, labored, or rattling (*Phosphorus, Muriatic acid*); urine scanty, dark-colored, and bloody, and passed with difficulty, or involuntarily (*Hyoscyamus*); puffiness of the eyelids; paroxysmal pains in the ears; and œdematous swelling and coldness of the extremities: even in these desperate cases, Arsenicum will sometimes save; I have seen one such.

Lachesis in the profound nature of the invasion resembles Arsenicum, but differs widely from it in the train of symptoms presenting. Lachesis occupies a position intermediary between Arsenicum and Carbo vegetabilis. It has not the deep asthenia of the latter, nor the vascular and nervous erethism of the former, while sharing much in common with both. Lachesis is rarely indicated in the invasion of scarlatina, although even here it has made for itself a place and a name, but in the advanced stages, when the system is staggering under the influence of the poison, it will often win our gratitude and deserve our eulogy. When indicated early, it will be rather by the general condition of the patient than by any unusual severity of the local symptoms. The principal effect of the venom is a general prostration of the most appalling character; the heart and nerve centres are suddenly and overwhelmingly enfeebled, so that irritability is lessened, and is finally lost earlier (in snake-poisoning) than in any other form of death (Mitchell). At a later period Lachesis is indicated when the blood shows evidence of liquefaction and decomposition, gangrene threatens, the local inflammations take on additional malignancy, abscesses form, and ecchymoses and hæmorrhages occur. The tongue is dry, red, and smooth, or black and cracked (*Arsenic, Rhus*), bleeding, patched or mapped, trembling so that it strikes against the teeth when an attempt is made to protrude it, or heavy and stiff (*Muriatic acid*), so that articulation is difficult. The tonsillitis began on the left side and extended to the right (this I have verified unnumbered times). The throat is dry and raw, without thirst, liquids causing more difficulty in swallowing than solids (*Belladonna*). The external neck is swollen (*Iodum*), but not usually painful; yet it is very sensitive to pressure (*Apis*). The urine is black; the stools offensive (*Nitric acid*); the hæmorrhages dark, but fluid; and the eruption becomes bluish, purplish (*Muriatic acid*), or almost black. The mind falls into a stupor, with muttering or loquacious delirium (*Apis*); dried mucus accumulates in the nose; the saliva is tenacious and scanty; the organs of deglutition and of speech become paralyzed; fluids regurgitate through the nose; and, finally, the peripheral circulation recedes, the surface becomes cool and bathed with cold sweat. When symptoms seem to indicate a choice of remedies, Lachesis is to be preferred if there is a characteristic aggravation of all the conditions after sleep (*Apis*); or a marked exacerbation of the fever in the afternoon (*Gelsemium*). Mercurius iodatus is frequently indicated after Lachesis.

Camphora is exquisitely homœopathic to a rare condition which is always fatal unless relieved instantly. The patient at the onset of the attack, or perhaps on the second or third day, passes into an algid state. The rash refuses to come out, or suddenly retrocedes. The body becomes icy-cold all over; the face blue and hippocratic; yet the child will not remain covered (contra *Arsenicum*). Sometimes the surface of

the body becomes very cold, without any accompanying change in appearance, but with a hot sweat upon the forehead (cold sweat, *Zincum*) and desire to remain uncovered. In either case the breath is hot (contra *Carbo vegetabilis*), and local spasms (hands, feet, jaw) soon supervene. The pulse becomes scarcely perceptible (*Carbo veg.*); mucus accumulates in the air passages (*Ipecacuanha*), causing rattling breathing and suffocative dyspnœa (*Carbo veg.*, *Lycopodium*); but though there is præcordial anxiety and great prostration (*Cuprum*), the mind is conscious and serene, yet the eyes are staring, immovable, or turned upward. With the symptoms there may be great sensitiveness of the abdomen, with involuntary blackish stools. In this state of collapse, unless improvement sets in within a couple of hours, recourse must be had to other remedies (*Carbo veg.*, *Cuprum*, etc.), for Camphora acts quickly or not at all.

Ailanthus owes its recognition as a valiant aid in malignant scarlatina to the accidental proving by the little daughter of our venerable colleague, P. P. Wells, of Brooklyn. In the invasive stage of the fever, though the thermometer does not indicate a high grade of temperature, the general appearance of the patient is alarming. The initiatory chill, which is not profound or long-lasting, is followed by flushes of heat, urgent thirst, severe pain in the head, intolerance of light (*Belladonna*), and violent vomiting (*Nitric acid*). In a few hours, sometimes in an hour, there comes over the patient a sense of sudden and extreme prostration (*Lachesis*) and torpor; the pulse becomes very weak and irregular, and so rapid as scarcely to be counted (*Zincum*); the skin is not pungently hot as in the normal fever, but dry and cyanotic. The mind is at first restless and the head dizzy, but the patient soon passes into a drowsy or semi-conscious state, in which he evidently cannot comprehend what is said to him. The eruption delays, and comes out in an irregular, patchy manner, of a dark (*Rhus*), almost livid, or purple color, the color returning slowly when expelled by pressure (*Hydrocyanic acid*). Sometimes the rash is plentiful enough, but of a bluish tint, or it may be interspersed with small vesicles, or with petechiæ, or with large bullæ filled with claret-colored serum, or with patches of a dingy, opaque appearance. During the eruptive stage the mind changes from a condition of stupor (*Cuprum*, *Opium*), to active delirium with constant muttering (*Rhus*), and a distressed expression of the countenance. The throat is the seat of a very malignant inflammation; like the skin, it is very dark, almost purple in color, very much swollen, and so sensitive that even the admission of air hurts. The tonsils are infiltrated and covered with small but deep ulcers, from which oozes a stinking, scanty pus. Externally, the neck is swollen and sensitive (*Lachesis*). The bowels are apt to be loose; the stools watery and offensive, and passed unconsciously with the urine.

Apis mellifica stands, in therapeutic action, midway between Belladonna and Rhus, but its practical applicability in scarlatina is far inferior to either; yet, the cases to which it is homœopathic are commonly fatal under old-school treatment, and it is, therefore, when skilfully applied, an important addition to our *armamentarium*. The Apis fever has little of the pungent heat of the skin so characteristic of Belladonna, nor does the integument assume the same bright, rose-red color; yet the actual temperature, as verified by the thermometer, may rise much higher than in the ordinary fever. It is characteristic of Apis that even though the eruption comes out promptly and evenly, the temperature goes on increasing, instead of remaining stationary at about 104° Fahr. The Apis fever resembles that of Rhus in evincing an adynamic tendency, but the eruption is smooth, and neither vesicular nor miliary. But the most significant, and the really diagnostic, feature in the Apis case is acute œdema of the dermal and pharyngeal tissues; and in the treatment of erysipelo-scarlatina it is our mainstay, especially when the anginal condition is, in a marked degree, œdematous rather than ulcerative. Another important symptom is the variability of the skin condition. Sweat alternates with dryness, some parts of the skin are cool and others hot, or some parts gradually become cooler as others become hotter. The pulse, also, is variable; now quicker, now slower, becoming trembling and scarcely perceptible, and again quick and wiry. Even while the temperature is high, the patient complains of chilliness, induced by the slightest motion, and singularly enough with the chill comes thirst. The throat is rosy-red, and swollen inside and out; at times this œdema involves the tongue, the hard palate, the epiglottis, and all the buccal and pharyngeal tissues, causing a burning tingling sensation like a bee-sting or as if the mouth and throat had been scalded. The tongue is red, dry, and glossy, and swollen, perhaps, so as to occlude the pharynx, and cause suffocation. If dyspnœa occur, there is great restlessness and trembling (*Arsenicum*). The patient, as a rule, cares neither to eat nor drink, though occasionally very thirsty; the urine is scanty (*Carbolic acid*, *Lycopodium*); the bowels, loose; and the anus sore.

There is another variety of scarlatina in which Apis is curative. In these grave

cases the system is thoroughly poisoned by the virus (*Ailanthus, Gelsemium*), though the stress of its malignancy falls with direct results upon the nervous system. At the onset there are stinging pains all over the body, stinging in the throat, and thirstlessness; the brain, even, tingles, as if it had "gone to sleep." The Schneiderian (*Sulphur*), buccal, and pharyngeal membranes are dry. The head becomes confused, then stupid, and finally consciousness is lost, and delirium sets in (*Cuprum, Opium, Stramonium*). The little patient gives vent to piercing shrieks (shrill screams, *Zincum*), rolls his head from side to side (*Bryonia*), squints his eyes (*Helleborus*), and grates and grinds his teeth. The tongue is dark-red and blistered; the breath offensive; the tonsils swollen (*Baryta carb., Nitric acid*); the nose clogged; deglutition difficult or impossible (*Belladonna, Hyoscyamus, Nitric acid*); breathing labored; the whole abdomen sore to the touch; the bowels loose—the discharge slimy or bloody; the urine suppressed; the rash, if it appears, a deep, intense red (*Belladonna*). And then, the last scene of all, coma (*Zincum*), convulsions (*Cuprum, Stramonium*), death. The whole process lasts, in some cases, but twenty-four or thirty hours; and without Apis these cases are necessarily fatal.

Ammonium carbonicum is, I think, never indicated in the invasive stage of scarlatina: but in the latter part of the eruptive period, just as the rash begins to fade and desquamation should set in, it will often be of the greatest service. It bears therapeutic relation to Apis and Rhus, Belladonna and Sulphur, Arsenicum and Lachesis; is especially needed in the treatment of scrofulous children. The rash may be smooth or miliary. In the former case it is faint, pale, erythematous; in the latter, rough, measles-like, and mixed with vesicles and pustules. The first mentioned may be merely an undeveloped second. The patient who is receiving Ammonium carbonicum should not be given with his food any of the vegetable acids or fixed oils, nor should Apis, Rhus, or Lachesis be followed by Ammonium carb. without an intervening antipsoric.

When the rash, instead of fading, continues beyond the ordinary period; when the enlarged and livid tonsils are covered with a sticky, offensive mucus; when the engorged parotid and submaxillary glands give forth a sticky saliva; when the nasal passages are clogged by a sticky coryzal mass; when, with pain in the nape of the neck, the cervical lymphatics are swollen, and tend to suppuration and gangrene; when the patient loses breath the moment he falls asleep, and asphyxia seems imminent from paralysis of the pneumogastric; when the heart's movements become audible, the breathing stertorous, the patient speechless, the hands tremble, cold sweats break out, and he seems as if dying; when the stools become involuntary; when the scarlatinal virus poisons the blood, dissolves the red corpuscles, and dark hæmorrhages appear from the nose, gums, and bowels, Ammonium carbonicum has saved the patient when all the concomitants agreed, and will whenever indicated. It is here, in these desperate emergencies, that Homœopathy proves its right to be.

Arum triphyllum is the homœopathic correlative to one of the worst forms of malignant scarlatina; a variety, however, so dissimilar from the Belladonna or Rhus fever, that we may well hesitate to ascribe the difference merely to the dyscrasia of the patient. I think we may better admit that the scarlatinal poison is not an *unicum*, but various in its origin, subject, however, to a certain amount of intensification or amelioration in malignancy, according to the surroundings amid which, and the constitutions of the persons within whom, it may generate and multiply. The Arum scarlatina is peculiarly anginal in character. The exanthem is atypical; it may be a smooth scarlet rash, it may be in patches, with white or dull-colored spaces between, or it may be dark and livid, or papular and petechial; in any event there is much itching and restlessness. The fever, while not exhibiting the thermometric regularity of range noted in typhoid, resembles that condition in many of its concomitants. There is apathy, drowsiness, stupidity (*Ailanthus*) passing into delirium; or sleeplessness alternating with delirium; he tosses restlessly about in the bed and wants to escape. There is aversion to light (*Belladonna*); bloating of the face; sore, moist spots about the abdomen, genitals, and thighs; dark, painless, papescent stools, becoming more and more watery; and suppression of urine (*Phytolacca*). [Dr. Lippe has noticed that as soon as the urine increases after arum is given, in scarlatina, the patient gets better.] All these points should be noted before deciding upon the remedy, but it is not until we come to examine the condition of the buccal and pharyngeal cavities and of the nasal passages that we perceive the terrible ferocity of the disease. From the nose is discharged a burning, ichorous fluid which excoriates the nostrils and the upper lip; it is so irritating that the child picks at them until they bleed. *Ammonium carb.* has acrid discharge from the nose, during scarlatina; but that is gummy, while this is

fluid. *Ammonium mur.* has an acrid coryza, in scarlatina; but the nose is sore internally, with constant irritation to blow it, and a stuffed-up feeling at night (only). *Arsenicum* has a burning, corroding discharge from the nose: but the aggravation is at night, while that of Arum is in the forenoon. *Kali iodatum* has a coryzal discharge, in scarlatina, very similar to that of Arum; but the other concomitants are very different. *Lycopodium* has a similar burning, ichorous discharge from the nose, in scarlatina, with swelling of that member, but with this peculiarity: at night the stoppage in the nose arrests breathing, so that the child can only breathe with the mouth open, and even then breathing is sometimes stopped for as much as fifteen seconds at a stretch, during sleep, even with the mouth wide open. *Mezereum* has a constant, fluent, excoriating catarrhal discharge, in scarlatina, which causes soreness of and scabs in the nose, and soreness and burning of the upper lip, but this discharge is streaked or tinged with blood. *Nitric acid* has a similar discharge from the nose, in scarlatina, with much sneezing during sleep, and the coryza is almost always accompanied by cough and hoarseness. *Phytolacca* has a fluent, acrid nasal discharge, in scarlatina, flowing from one nostril while the other is stopped. *Sanguinaria* has a fluent coryza from the right nostril, in scarlatina, with almost constant sneezing. *Secale* has a watery discharge from the nose, and yet a stoppage of the nose; the urine is bloody; the patient cannot bear external heat, and will not remain covered. *Silicea* has an alternately dry and confluent coryza, in scarlatina; obstructed in the morning, fluent during the day; much sneezing, and the nose bleeds readily.

In the Arum patient will be seen at the corners of the mouth, and within the cavity, bleeding fissures, which itch greatly. The child will often pick and bore into these raw surfaces, though doing so gives great pain, which makes him scream, but he keeps up the boring. The mouth and throat are so sore—a burning soreness—that he is unwilling to drink, and cries if anything is offered. The tissues are livid in appearance, and are studded with deep, angry-looking ulcers, from which oozes a putrid discharge (*Ammonium carbonicum*). There is a painful sense of constriction in the pharynx, and a constant desire to swallow; but actual swallowing is unendurable. The glands of the neck, most notably the submaxillary, are swollen, particularly those on the left side. The neck is stiff (*Phytolacca*).

These two groups, of seven remedies each, make up the materia medica of scarlet fever, save in those rare and anomalous conditions which one meets but once in a lifetime. But as Dunham so cogently said, the remedy which cures but a single case for us is as much entitled to our scientific regard as that which serves us every day. To meet these abnormalities one of the following may be essential:

Lycopodium is sometimes indicated at the very onset of the fever. The manifest aggravation of the little patient's symptoms and suffering at four in the afternoon (compare *Lachesis*) and continuing until eight or nine in the evening (*Sabadilla*), will direct attention to this remedy; but, of course, no one would think of giving the remedy merely on the symptom of aggravation, unless all the conditions of the case concurred. A valuable symptom to remember is that the child is very drowsy during the day, more so than at night. Though dead drowsy, sleep is not continuous. The little patient awakes suddenly, frightened (throws arms about and screams, *Silicea*), clings to the crib, and seems to know no one. Soon it drops off to sleep again, only to reawake in the same confused condition. When so aroused, it is very cross and feverish (*Aconite*), kicks and fights if taken up, but quickly drowses off when put back into its bed; but does not want to be covered warmly (*Secale*).

At a later stage in the fever, Lycopodium becomes useful when the rash suddenly pales, the face becomes bloated and yellowish-gray in color (*China*), the glands swell, hearing becomes duller (*Nitric ac.*), the nose stopped, there is rattling in the throat (*Camphor, Carbo veg.*), the urine is scanty (*Carbolic acid, Apis*), and all the symptoms denote profound blood-poisoning. The anginal symptoms are worse on the right side (contra *Lachesis*); I have seen a case in which there was not a particle of uncomfortable sensation on the left side of the throat, while on the right side the inflammation and pain were intense. This case had also that other pronounced characteristic of Lycopodium, an excessive accumulation of flatulence in the abdomen.

Hyoscyamus may sometimes be needed when the appearance of the rash is delayed, and great nervous excitement supervenes. It has not the erethism of Belladonna,

nor the torpor of Stramonium, but stands midway between the two. The eyes are sparkling, red, and prominent (*Bell.*), or else stare at vacancy. The face is dark-red and bloated (*Baptisia*), or hot and distorted (*Bell.*). The patient does not sleep, but lies in a sort of somnolence resembling the stupor of drunkenness. The delirium is never complete, but consists of a confused farrago of fantastic nonsense and quarrelsomeness. The proneness to loquacity in expression and immodesty in gesture or language is determinate. The patient exhibits a constant desire to get out of bed; has a sense of constriction in the throat, with inability to swallow (*Bell.*); the stools pass unnoticed in the bed; the urine is suppressed (*Opium*), and there are muscular twitchings here and there.

Stramonium is very like Belladonna, but the fever is less and the convulsions more severe. These convulsions are rarely general, usually partial, and affect the arms rather than the legs, and single muscles rather than groups. The spasms are induced by touch, or by looking at bright and shining objects; though, sometimes, the eyes are insensible to light. The eruption is less bright than that indicating Belladonna; in fact, it is coppery-red, shows a disposition to fade or recede, and is associated with considerable itching of the skin. The skin is burning hot, especially the head and face (*Bell.*); relieved somewhat by the application of cold water. The tongue is swollen, so that it hangs out of the mouth, with dribbling of glairy saliva down the chin. Sometimes the tongue is paralyzed and the patient speechless. The throat is very dry, with violent thirst, especially for acid drinks (*Bryonia, Secale*). This is peculiar, as acids are antidotal to poisonous doses of Stramonium. The suppression of all excretions and secretions is a marked and significant characteristic; yet in some cases the stools pass involuntarily and the urine dribbles feebly and slowly. Visible trembling, as if from fright (*Gelsem.*), often betokens the Stramonium patient; but, beyond this, the mind is in a condition to be easily alarmed, and the child, awaking from sleep, starts at the first object that meets its eye (*Bell.*), and wants to flee away.

Cuprum has probably no relation to the scarlatinal virus. Its pathogenesis shows not the slightest resemblance to this disorder as ordinarily seen. Yet where, instead of the usual headache, vomiting, pungent heat, sore throat, and rash, another, and totally dissimilar, series of phenomena appear, from cerebral oppression, Cuprum may translate the disease to the surface, relieve the oppressed brain, and the case thence onward follow a regular course. We have here to treat the cerebral disorder, according to the symptoms presented, irrespective of the cause of the attack. Copper beautifully illustrates the precision of the homœopathic law of practice, that it has induced, by its poisonous action, almost every form of cerebral mischief not organic. This disorder of the nervous centres expresses itself by delirium, cramp, paralysis, and collapse. The delirium is a species of waking nightmare. The patient is afraid the bedclothes will catch fire; is afraid of falling, and clings tightly to the nurse; is afraid of every one that approaches; and is afraid in moving lest he injure himself. The cramps are in the calves and in the abdomen, with pinched expression or distortion of the face and cyanotic lips; the spasms are followed by a painful sense of weakness and weariness. Unless relieved, the patient dies in coma, without any of the ordinary symptoms of scarlatina being manifest.

Zincum was introduced by Dr. Elb, of Dresden, for that threatened paralysis of the brain which sometimes occurs in scarlatina, whether before, during, or after the eruptive period.* Zinc is somewhat analogous to copper; but the latter is usually indicated, if at all, previous to the appearance of the rash, while the former is of most service as the eruption retrocedes. Previous to the appearance of the graver symptoms there is a condition of erethism, in which he is especially sensitive to the talking of others around him. This is followed by a condition in which mental operations are performed with difficulty (*Gelsemium, Opium*). Then he sinks into a state of complete unconsciousness (*Apis*), in which he lies motionless, except the feet are twitching. Or, he may pass into convulsions followed by stupor; the spasms are preceded by screaming (shrieks, *Apis*), in an altered voice, and followed by tremblings; the forehead is cold, but the occiput very hot; the breathing is short and quick, but no rattling; the pulse is thread-like and scarcely countable; the bowels and bladder are emptied involuntarily; and the surface of the entire body becomes bluish-red, except the face, which is pale, wan, and distorted.

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* Brit. Jour. of Hom., vol. vii., p. 40.

Phosphoric acid may be just the right remedy when scarlatina overtakes a child who has been growing quite fast recently. The diagnostic condition is one of perfect indifference (*Lycop.*), and incapacity for thought (*Gelsemium*). The child answers questions reluctantly, and seems to comprehend with difficulty. He is profoundly prostrated, and this is peculiarly evident in the morning. The abdomen is meteoristic (*Aconite*), with rumbling and gurgling. Thirst is unquenchable (*Arsenic, Bryonia*). The urine is like milk, and may even coagulate. Hearing is difficult (*Sulphur*), though noises, and especially music, are intolerable (*Aconite, Bell.*). The mouth and tongue are dry (*Nux*); down the centre of the tongue runs a reddened strip, which widens as it approaches the tip; he bites the tongue involuntarily. The pulse is frequent, small, and feeble. There is bleeding from the nose (*Ledum*); the parts upon which he lies become bluish-red in spots; and ecchymoses form.

Muriatic acid will never be of service in scarlatina except when the condition of the patient resembles typhus. When the disease sets in with this complete prostration of the vital forces; with intense redness breaking out rapidly all over the body in the first hours of the attack, or else with a scanty, dark-red, or purplish eruption, interspersed with petechiæ; with burning heat of the body; with a rapid and very feeble pulse, which intermits at regular intervals, usually at every third beat (fourth beat, *Nitric acid*); with severe anginal symptoms, the throat livid and swollen, and covered with a grayish-white exudation; with putrid breath; with the discharge of a thin, acrid coryza, which excoriates the upper lip; with sighing respiration; with profuse urination; and with sudden coma, Muriatic acid will be indicated. The Muriatic acid patient gives every evidence of failing vitality. The eyelids droop, not from local paresis, but from failure of systemic strength, the lower jaw hangs down, and the patient, not having strength to keep upon the pillow, slides downward in the bed. Phosphoric acid is sometimes indicated after Muriatic. Its closest analogue is Nitric acid; but they should never follow each other without an intervening remedy.

Nitric acid, although generically a close analogue of Muriatic acid, is of very much less applicability in the treatment of scarlatina; but when that disease is implanted on a syphilitic or scrofulous basis, it may be demanded. The breath, the coryzal discharge, the sweat, the urine, the fæces, in fact all the excretions and secretions, have a foul odor.

Carbolic acid deserves mention in this group of acids, but its true position in relation to scarlatina is as yet undefined. It has been used successfully in a condition similar to that described *sub voce* Arum, and its area of usefulness will doubtless widen as experience with the remedy increases.

Hydrocyanic acid has been suggested by Dr. P. P. Wells, when the rash at first is dusky, soon becomes livid, and when by the pressure of the tip of the finger the color is expelled, it returns but tardily; pulse is very rapid and feeble.

The other remedies which have been used in anomalous cases, and which may serve upon occasion, are: Baptisia, Bromium, Capsicum, Carbo vegetabilis, Iodum, Ipecacuanha, Kali bichromicum, Kali carbonicum, Kali permanganicum, Lachnanthes, Mercurius, Mercurius cyanatus, Mercurius iodatus, Opium, Phosphorus, Phytolacca, Secale, Silicea, Terebinthina.

Auxiliary Measures.—These, to be efficient, must be well-timed. A measure may be in itself a desirable one, but, administered without discretion, may do harm, and may even prove fatal. In order to speak with due particularity, therefore, auxiliary measures will be considered in relation to the three stages of the fever.

During Invasion.—Pure air, cool temperature, and cleanliness have already been urgently recommended under the head of hygienics; the maxims there inculcated cannot be too rigorously enforced. If the disease be ushered in with severe and obstinate vomiting, sucking

pieces of ice will frequently quickly relieve; a dose or two of Ipecacuanaha may be given, as an auxiliary or intercurrent, if nausea be continuous and gastric irritability unusually severe. If the skin be very hot, it may be sponged off every three or four hours, but this should not be repeated unless it gives evident relief. Until the rash comes out I prefer hot water to cold, carefully avoiding all opportunity for chill. In conjunction with the hot sponge-bath, hot drinks may be given, preferably lemonade, not too sweet. These adjuncts bring the blood to the surface, induce moderate sweating, and thus lessen temperature and facilitate the appearance of the rash. A very robust child, if the heart's action be fairly moderate in rate, and tension strong, may be plunged into cold water, and then immediately dried with soft towels and rolled in a blanket. The flushing of the capillaries, which accompanies the reaction from the exposure to sudden cold, initiates the process of elimination, which cannot begin too soon, and thus relieves the oppressed brain and viscera.

During Eruption.—If the fever continues high, and especially if it shows a tendency to increase after the rash has appeared, cold baths may be desirable; but the question here is not so much as to the actual temperature as it is the amount of distress occasioned by the pyrexia. The general symptoms of discomfort and agitation are, in this respect, better guides than the thermometer. The method of giving the bath is important, and should be duly considered in every case. Water is a powerful adjuvant, and its ease of application and its plentifulness should not be made the occasion of thoughtless carelessness in its use. The simplest form of bath, and the one in most cases to be preferred, is to sponge the entire body every three hours with cool water, to which is added an ounce of good cider vinegar to the pint. A bath of this sort, if given deftly, does not cause a chill, effectually removes all cutaneous impurities, and so acts beneficially as a depuratory, antipyretic, and nervine. It is especially serviceable, at the ordinary bed-time, for the promotion of somnolence. Should the temperature rise to 105° Fahr., or beyond, the patient become delirious, and the viscera show signs of distress, more powerful refrigerant measures may be deemed necessary. This may be accomplished by means of the wet pack or the cold affusion. The pack is best administered in this wise (and I consider its proper administration so important that I never leave it to the nurse, but give it myself, unless she has been trained under my own eye). A narrow cot is brought into the room, and several blankets are spread over it with their edges hanging downward to the floor, and over these a sheet wrung out of cool (70° Fahr.) water. The patient, naked, is placed on the cot and wrapped snugly in the sheet. The edges of the blankets are then brought up, one by one, and crossed over the patient in such a way as to exclude all air. The celerity with which this bath will

sometimes reduce the temperature, quiet and steady the pulse, and dissipate restlessness, is really marvellous. If delirium be excessive, a cold compress may be wrapped around the head, or the cold cap used. This latter is made by stitching upon a muslin cap a coil of rubber tubing, arranged spirally, several feet of each end of the tubing remaining free. This cap is wet and placed on the patient's head. One end of the tube is placed in a bucket of cold water, suspended above the level of the patient, and the other in an empty bucket on the floor. The water will flow from the upper to the lower bucket, the relative position of which may then be reversed. In adynamic cases the blanket bath can be used instead of the wet sheet. Prepare the cot as before, but without the sheet. Wring out the upper blanket in hot water and quickly wrap it about the patient. Arrange the other blankets as before. The patient may be allowed to remain as long as he feels comfortable, and, on being taken out, should be well rubbed down with soft warm towels.

The cold affusion is more rigorous. The patient is seated naked in a small bath-tub brought close to the bed. Several bucketfuls of water (about 70°–75° Fahr.) are poured quickly over him, so that the affusion does not last longer than half a minute, and he is then rolled in a blanket and laid in bed. Some practitioners put the child directly into the cold bath and let it remain until the temperature falls to 101° Fahr., or until the child begins to chatter. It is then taken out, dried, and returned into bed. If the temperature again rises to 104° Fahr., the bath is repeated; and so on. A milder method of employing this treatment is to wrap the child in a wet sheet, lay him upon a hard mattress, covered merely by a blanket thrown loosly over him. As soon as he shivers, the wet sheet is removed, and he is made comfortable in bed. Each of these methods notably reduces the temperature; the more rigorous the bath, the more distinct the effect. The temperature must, however, be closely watched, not only to prevent a too rapid fall, but, also, because in some cases it actually rises. If this latter *contretemps* occur, the child must at once be returned into bed, have drop-doses of Rubini's camphor every two or three minutes, and be rubbed down, under the bedclothes, with hot alcohol; but such cases are seldom saved. Although practically hopeless, here, as in every extremity, no effort should be spared, for it should be remembered that it is the unexpected that often happens. The moribund case *is* saved sometimes.

With the exception of the sponge-bath, the cold water treatment is certainly attended with considerable danger in the primary adynamic form of scarlet fever. It drives down the temperature and brings back the wandering senses, it is true; but the benefit derived is merely momentary, and the bath has to be supplemented by energetic stimulation to counteract the tendency to fatal collapse. From the days of

Currie this form of the disease is the very one in which these heroic measures have been considered as especially indicated. Says that eminent practitioner, Dr. Samuel Gee: "Of the remedies employed in the treatment of scarlet fever, there is one which stands out from among the rest, the cold affusion."* I am free to confess that I am afraid of it. In scarlatina, as has been already pointed out, there is ever present a tendency to heart-failure. No influence is more certain to precipitate this untoward result than cold injudiciously applied. Henoch observes, "In several of these cases I have seen dangerous, and in one case fatal, collapse develop during a bath."† In all severe cases of scarlet fever the nervous system of the heart labors under the paralyzing influence of the scarlatinal virus. This it is which gives the peculiar feebleness and irregularity to the pulse. And anything which produces a sudden shock upon the system is certain to act deleteriously upon the heart itself. While, therefore, cold as a therapeutic force is neither to be despised nor neglected, it is an agent to be used with caution and discretion. Where, as in the adynamic type of scarlatina, cold applications seem injudicious, moderate warm sponging and warm affusion to the head, may be used without danger, and usually with evident benefit. The mustard bath has been recommended, but I have never used it.

The anginal inflammation, even when moderate, causes considerable distress. Crunching bits of ice, which the patient may do freely, and the application of a cold compress about the neck, will sometimes in a few hours, in the ordinary scarlatina, produce a very considerable improvement. Even infants can be allowed to suck ice, by wrapping a small sliver of it in a handkerchief. In older children, and in adults, when ice is not craved or does not benefit, inhaling the steam of boiling water will often produce a rapid amelioration in the throat symptoms.

When the buccal, pharyngeal, or nasal cavities are the seat of necrotic inflammation, various local measures may be deemed expedient. The object of these is simply to clear the passages of deleterious and decaying excretions; no reliance is to be placed upon them as curative agencies, nor should any substance be employed which might interfere with the action of the indicated remedy. The cure is to be wrought, if cure be possible, by the remedy homœopathic to the case, and its action must not be obscured nor modified by unwise, unnecessary, and therefore fatal, local applications. The use of caustics, carbolized sprays, and medicated gargles is not auxiliary to homœopathic treatment, but rather subversive of it; and their use is now deprecated by the more advanced thinkers of the dominant school.

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* Reynolds's System of Medicine, vol. i., page 96.

† Lectures on Diseases of Children, page 276.

Alcoholized water, equal parts of alcohol and water, either warm or cold, may be used in a spray-producer or as a gargle. A solution of common salt, three teaspoonfuls to the pint, may be used in the same manner. If the patient is very weak, and the action of the heart irregular, the less the patient is disturbed the better. As a matter of fact, I use the spray and gargle, in scarlatina, with extreme unfrequency, and in primary adynamic cases never. I have no reason to be dissatisfied with my practice in this particular when I compare my ratio of fatal cases with that of the pronounced advocates of local treatment.

A word in regard to those rare cases in which coryza develops about the seventh day without other symptoms of a specially dangerous kind. This coryza is often profuse, and the discharge drying clogs the nostrils. These plugs cause a "back-set," and the discharge eats its way into the internal ear, leading to destruction of the tympanum and a very obstinate form of otorrhœa. To prevent this accumulation of acrid matter is generally to prevent the otorrhœa and loss of hearing. Except in very young children, and I have successfully operated on one as young as four years of age, the excellent method of washing out the nostrils introduced by Dr. Thudichum may be employed;* save that I use a fountain syringe. A pint of rather warm water, in which about two heaping teaspoonfuls of common salt has been dissolved, is poured into the receptacle of the syringe, and the tube introduced into a nostril, preferably the one least stopped by the crusts. The patient is strictly charged not to swallow, breathes with the mouth slightly open, and the solution then passes from the posterior nares down the other nostril. Or, the passages may be cleared by a post-nasal syringe.

The glandular swellings in the neck and the accompanying cellulitis are sometimes enormous. Abscesses can generally be prevented under good homœopathic treatment. When, however, fluctuation is discovered, a free incision should at once be made. Poulticing should not be resorted to prematurely. Necrotic inflammation is due, in some cases, to the injudicious use of the poultice. When deemed necessary, it should be only just large enough to cover the gland or part intended to be acted upon. When it is intended to liquefy the core of an indolent abscess, I prefer to use flannel wrung out of boiling water, the pieces to be changed every few minutes, so as to preserve a nearly uniform, heightened temperature. The heat is retained by dry flannel bound over the hot. In this way an abscess can be evacuated in three or four hours more thoroughly than by a two-days' poulticing as usually performed. It is a little more trouble for the nurse, but its beneficial effect equals the cost. A post-pharyngeal abscess can generally

* Lancet, Nov. 26, 1864.

be evacuated externally, and this should always be done when possible. Should this seem impracticable, an incision must be made through the posterior wall of the pharynx, in the line of the vertebra, by means of a pharyngotome. This operation is devoid of risk when cautiously performed; but the incision must be made as low as possible, to prevent subsequent burrowing of the pus. An extempore pharyngotome may be made, which answers the purpose, by taking an ordinary straight bistoury with a good point, and guarding the blade with a piece of india-rubber tubing, just long enough to reach the length of the blade. The bistoury is then introduced against the tissue to be cut, and the tubing retracted, by pulling it up on the handle, sufficient to free the point of the blade. The abscess must be opened early, as soon as suppuration has occurred, both because this abscess may cause such tumefaction as to interfere with respiration by pressing upon the upper part of the larynx, and also because the necrotic inflammation quickly involves the upper cervical vertebræ and the base of the skull. When sufficiently developed, unless spontaneous rupture has occurred through the mucous membrane into the pharynx, the abscess will be found pointing forward from under the sterno-mastoid muscles. Even though the bone be not necrosed, the pus will always, when evacuated, be of a putrid odor and taste.

The rheumatic pain and swelling of the joints may be relieved by wrapping them in dry cotton wool, covered by a firmly applied flannel bandage. When rheumatism attacks the hands and feet, I apply the cold compress. Take a piece of flannel of sufficient size, dip it into cold water, wring it out until it will just not drip, roll the swollen member carefully in it, cover absolutely air-tight with rubber sheeting, and secure with safety-pins or tapes.

During the stage of desquamation measures should be taken to hasten the separation of the infected epithelium. As the child must remain housed until this process is completed, while at the same time its system requires change and fresh air, and above all, as the obstructed cuticle throws additional work on the weakened kidneys, the sooner the skin resumes its normal state, the better will convalescence proceed. Lukewarm baths should be given as soon as desquamation begins, night and morning. These should be preceded by thorough inunction with vaseline, or some similar emollient. Every precaution must be taken to prevent chill, but if the room is warm, and the inunction and bath be given with deftness, there will be little danger.

Complications.—Whether two distinct infections can run their course in the system at one and the same time, is still a mooted point. I think we must admit that in rare cases complications do occur. So far as I am aware, the only fevers which have been met with concurrent with scarlatina are measles and diphtheria; neither of these has been seen in my own practice. It is a usual, but unwarrantable, prac-

tice to describe as diphtheritic the necrotic inflammation of the throat occurring in severe and malignant forms of scarlatina. If by this is meant that these partake of the nature of diphtheria, the use of the term is unfortunate. They are not diphtheritic in the sense of being the result of a specific contagion, separate and distinct from the scarlatinal virus, any more than the adynamic condition is typhoid fever. It is not denied that the pathological products of the malignant angina in scarlatina exhibit a close similiarity to those found in true diphtheria, nor will it be disputed that the general condition of the patient from the third to the tenth day of a prolonged adynamic scarlatina bears a wonderful similitude to the second week of true typhoid fever, but this does not argue that in either case the morbid processes are identical. On the contrary, both our pathology and therapeutics will be clear if we hold to the idea of unity in the cause of these multiform manifestations of infection. Nevertheless, I by no means deny the possibility of cases of *scarlatina cum diphtheritis.*

The case of measles and scarlatina detailed by Jahr* seems rather to have been one of rötheln. It afforded no protection against measles two years later, though this, as negative testimony, is unimportant, for second attacks of measles are by no means uncommon.

Sequelæ.—None of the exanthemata are followed by such serious sequelæ as is scarlatina. Small-pox and measles sometimes leave behind them sad reminders of their visit; but this is exceptional, save after prolonged and severe sickness. Mildness of attack means nothing in scarlet fever, the simplest cases being sometimes followed by the most severe sequelæ. These after-effects of the systemic poisoning by the scarlatinal virus may be much modified by good homœopathic treatment and proper regimen, but they cannot be altogether averted. Any of the concomitant conditions already discussed, such as the parotitis, otitis, necrotic tonsillitis, post-pharyngeal abscess, synovitis, or parenchymatous nephritis, may delay until desquamation be nearly or quite complete, and then appear as sequelæ. Nor can any one determine by the moderation or severity of the pyrexia, or of the rash as it appears upon the skin and in the throat, or of the cerebro-spinal symptoms, what the nature of the sequelæ may be. Sometimes the virus seems to exhaust itself in a virulent onset, and the symptoms succeeding desquamation are trivial and ephemeral; but in other cases the mild invasion and pyrexia, which lull anxiety and bring a sense of security and safety, are followed by corroding ulcerations and serous infiltrations, inflammations of the viscera and destruction of the organs of sense, which cripple or destroy future usefulness, or even life itself. Against such a visitation, unforeseen usually, terrible always, it behooves us to be on our guard; to prevent

* Forty Years' Practice, p. 257.

if possible, to ameliorate when prevention is no longer within our power. It is under these circumstances that the truth of our law of practice becomes manifest; not without study, never in the hands of the routine practitioner, but always, or nearly always, as the result of the accurate adjustment of the remedy to the case. The desperate emergency is homœopathy's opportunity.

These various sequelæ will be discussed in the order of the frequency of their occurrence, beginning with the inflammation of the kidney, which is always evident, to a greater or less extent, at this period of the disease.

Parenchymatous Nephritis.—In some cases, even after severe scarlatina, the disturbance of the function of the kidney may be so slight as to escape observation. It is my purpose here to describe in detail the serious affection usually present, and which may be called the *fourth* stage of the disease. Its symptoms are sometimes obscured or modified by other conditions present in the case. These will be, for the moment, set aside, and a severe typical scarlatinal nephritis discussed, with suggestions for treatment.

The nephritis of scarlet fever does not differ essentially from that induced by diphtheria, by irritant poisons, such as corrosive sublimate or turpentine, or from that which results from exposure to cold. Bouchard considers its cause to be the infectitious elements in the blood, which, in the course of their elimination, irritate the kidney and alter its structure. Eklund discovered micro-organisms in the urine of scarlatinous patients, which he named *plax scindens.* These are also found in the blood at this time. The inference is that they pass from the blood into the urine, and are responsible for the disorder of the kidney. I do not know whether we can unqualifiedly assent to this, as it would seem, if this position be true, that the nephritis should develop at the height of the pyrexia, while, as a matter of fact, it rarely does so. Usually there is a brief interval, during which all seems to be going well; then, with some slight premonitory symptoms, the local inflammation blazes up. The interim is variable; albumin may appear in the urine on the fourth day of the fever, or it may delay until the twenty-first. There may be an ephemeral albuminuria without nephritis on the second or third days of the fever, but this disappears with the fall of temperature.

In one of my own cases, after desquamation, erysipelas intervened, and the albuminuria was postponed until the forty-first day, and was then intense, intractable, and prolonged.

The condition here indicated is that generally called acute Bright's disease, and is variously known as tubal or croupous nephritis. It is essentially a condition resultant from exudation into the connective tissue of the kidney, with secondary changes in the epithelia, the formation of tubal casts, and the leakage of albumin. The symptoms

are those common to acute Bright's disease, but vary greatly, according to the degree of inflammation; they in general begin about the eighth day, and last from one to four weeks, and in severe cases may be described under three groups or stages.

1. The nephritis usually sets in with chill-sensations, which are succeeded by pyrexia, with dry skin, parched lips, nausea, vomiting, constipation, and pain in the lumbar region. The temperature varies greatly in different cases. When the attack is mild, it may not go above 100° Fahr.; ordinarily it ranges from 102° to 104° Fahr.; it may even reach 105.5° Fahr. This rise in temperature is not prolonged, and is limited to the first stage of the nephritis. Some uncomplicated cases run an apyretic course. The quantity of the urine is lessened, and, as a rule, greatly diminished. There may be complete anuria. Charcot gives the following explanation of this diminution: "This scantiness of the urine is, moreover, explained by the dropsy which is here an habitual phenomenon; by the anæmia of the cortical substance of the kidney, which is not, in this order of facts, the occasion of a work of compensation on the part of the heart; perhaps, also, by the abundance of urinary casts, which, in certain cases at least, may act as tubular infarctions and hinder secretion.* The specific gravity is increased in proportion to the diminution in quantity; the chemical reaction is usually acid; the amount of urea is greatly lessened beyond the proportion of reduction in the amount of water; there is the usual amount of uric acid, but chloride of sodium is greatly deficient; albumin is present; the urate of sodium is precipitated; the color of the urine is nearly normal, and it is not at all smoky. At first the microscope reveals very little; perhaps a few casts, rarely any epithelium or blood-disks. But as this stage verges into the second, soon to be described, renal epithelium, epithelial casts, and blood-disks become more plentiful. As a rule, the greater the diminution in the amount of urine, and the longer this diminution continues, the more severe and intractable will be the whole course of the disorder.

2. After a period of uncertain length, the urine returns to its normal amount. Urea and the chlorides increase. The urine becomes bloody, and sometimes very dark in color. Albumin is usually present in large proportions. I have seen the urine become absolutely solid under the heat and nitric acid test. The specific gravity of the urine is usually not as high as in the earlier stage of the attack, owing to the presence of so much more water. The microscope shows epithelial, hyaline, and granular casts, pus-corpuscles, more or less blood-corpuscles, and tubular epithelium. If the pelvis be affected, which is generally the case, epithelium from the pelvis of the kidney will often

* Henry B. Millard's Treatise on Bright's Disease of the Kidney, p. 84.

be found, showing the existence of pelvilitis (Millard). Nausea and persistent headache are frequently concomitant with this stage. Epistaxis and convulsions are rare, but do sometimes occur. Serious heart complications are not uncommon. I have had cases where the right heart was much enlarged. Anæmia is usual, and the child is commonly very pale. Rigor is a most unfavorable symptom—far worse than convulsions.

3. When the urine changes from a smoky and dark appearance to a clear and normal hue, the case enters upon the third stage. This change generally takes place gradually, the albumin lessening meanwhile. The urine is usually abnormally profuse and of low specific gravity. This state of things may continue for some time after all trace of albumin has been lost.

The attack may in several particulars vary from the typical form described above. The urine may not be markedly increased or decreased in amount; it may at no time be dull or smoky in appearance; it may suddenly become very bloody, remain so for a day or two, and then return to its previous appearance; or the second stage may continue indefinitely, and the case pass into a chronic Bright's disease.

In still other cases, and these are more common than has been supposed, the urine ceases to be albuminous, an examination shows no casts or debris, and the only variation from a perfectly normal urine is a slight decline in the specific gravity. Still, the child does not seem to recover completely. Without being ill, it fails to convalesce satisfactorily. If now it be subjected to any debilitating influence, the symptoms detailed above return, and the case assumes a very intractable and unsatisfactory appearance.

The cases which come on gradually after a lapse of several weeks are the hardest to cure.

The Dropsy.—This is usually concurrent with the albuminuria, but it may precede it, may linger after this has ceased, or, according to some authorities, may replace it altogether. Gee says that albuminuria is almost constantly absent in some epidemics, but I have not found it so. Sometimes the kidney trouble will be slight or long delayed, but it is always to be detected by careful and continuous scrutiny. Dropsy, on the other hand, is an uncertain symptom, and many children escape it altogether. It rarely appears before the fifteenth day, generally not until the eighteenth to twentieth. Sometimes this only amounts to a slight puffiness of the skin; but in other cases its progress is more insidious and persistent. The face becomes pale or puffy-looking; the eyelids stiff and swollen; the back of the hands, and about the instep and ankles, œdematous; and gradually complete anasarca occurs. So long as this dropsical effusion is confined to the subcutaneous cellular tissue, there may be much discomfort, but there

is very little danger. The most serious of these local œdemæ is a swelling in the lumbar region. This is considered as implying a severe form of kidney disease.

Much more portentous are effusions into the serous cavities. These may occur in any of the serous sacs; but the order of their frequency is into the abdominal cavity (*ascites*), into the pericardium (*hydropericardium*), into the pleura (*hydrothorax*), and into the ventricles of the brain (*hydrocephalus*). At the same time effusion may take place into the lung (*œdema pulmonum*) or into the glottis (*œdema glottidis*). When these thoracic effusions are rapid, great lividity and extreme dyspnœa ensue, and death from asphyxia takes place with startling suddenness, sometimes within six hours from the first appearance of effusion. In rare cases the most violent dyspnœa may result from interstitial œdema of the lungs, without any other serious dropsical symptoms. I have had one such case, where the only previous sign of dropsy was moderate swelling of the hands and feet. Suddenly the patient was found gasping for breath, the countenance haggard, eyes staring and injected, face mottled, lips blue, nails purple, and the pulse feeble and fluttering; Aconitum saved this patient, who, however, was not able to lie down for six days afterward without a sense of impending suffocation, which compelled him immediately to sit up.

It will sometimes happen that dropsy sets in at a later period, after the nephritis has been subdued. This *dropsy without albuminuria* is an insidious condition, resulting from loss of the solid constituents of the blood, so that the serum leaks insensibly through the capillaries. In some cases it seems due to the weakened state of the heart. This form of dropsy creeps slowly from part to part, often disappearing from one as it appears in another. It is not especially dangerous in itself, but is very intractable and slow of cure.

The treatment of scarlatinal nephritis and dropsy differs in no essential particular from that arising from other causes, except so far as it may be necessary to modify our prescription to cover concomitants which would not exist in a case of acute Bright's disease not associate with an exanthem. It is desirable that the patient should maintain, if possible, a recumbent position. Whatever causes increased activity of the heart, will accelerate renal circulation, and so produce albuminous exudation. The efficacy of rest in diminishing the exudation of albumin has been fully demonstrated (Bartels). Whatever tends to increase the action of the skin and to assist in the elimination of nitrogenized elements, will relieve the overburdened kidneys, and so lessen renal plethora. The hot-air bath would doubtless be serviceable, but this is practically unattainable. I have investigated most of the portable baths which have been placed on the market during the past twenty years, but while they serve the purpose in some cases, of an

effective depurator, by causing a rapid cutaneous hyperæmia, the result in post-scarlatinal dropsies is not favorable. The heart is too weak and sensitive to stand so heroic a measure, and oppression of the chest, throbbing headache, and faintness result. I have been able to send two patients, one an adult and the other a youth of fifteen years, to a Turkish bath establishment, where they could remain as in-patients. In both cases the cautious use of hot-air was strikingly beneficial. The most effective means at hand for the purpose is the wet-pack, described under the head of Auxiliary Measures. Diluents should be given as freely as possible, especially during the first stage, while the amount of urine is scanty. Nothing is better for this purpose than lemonade; though when they are in season I use limes in preference to lemons. The lemonade should be strongly acid, using as little sugar as possible, and should be drunk hot while in the wet-pack, and cool at other times. In the matter of diet, all highly nitrogenized food should be avoided; but at the same time due regard must be given to supporting the patient's strength. Clear soups, broth of clam or oyster, milk, chicken, and fish, with fruits and fresh vegetables, will form a sufficiently varied and nutritious dietary.

The remedy homœopathic to the case will need to be selected with great care, and in accordance with all the symptoms. Do not hesitate to give any remedy which may be clearly indicated by the symptoms, especially if the mental and moral concomitants agree. Any attempt to make a prescription on a pathological basis will lead to dire disaster. A few of the more frequently indicated remedies are mentioned; but these by no means exhaust the list.

In the first stage: Hepar sulphuris, Apis mellifica, Bryonia, Colchicum, Senega, Terebinthina, Digitalis, Helleborus.

Hepar sulphuris is, according to Kafka, the best remedy for commencing nephritis in scarlatinous patients. Its value in croupous inflammations needs no herald at this late day, and pathologists now unite in denominating this disorder croupous. Hepar, when given early, has nearly the same abortive power in croupous as in suppurative inflammation; indeed, when the inflammation is intense the croupous may run rapidly into suppurative, and blood and pus be found in the (almost suppressed) urine. When Hepar is denoted, the urine flows in a sluggish stream; and although the desire is strong, he must wait long before it starts (intermitting flow, *Clematis, Conium*). It burns on passing, and excoriates the meatus; the last drops may be bloody. It drops down vertically, without force, and ceases, leaving a sense of incompleteness, as if the bladder had not been thoroughly emptied. It may be clear when voided, and become turbid and thick on cooling; or it may be dark-red, turbid, or milky from the first. The lumbar region seems as if bruised; the abdomen is distended; sweat follows even the slightest exertion (*Phosphorus*); and there are offensive exhalations from the skin. Swelling of the glands (cervical, inguinal, etc.) will emphasize the demand for this remedy, especially when suppuration seems impending.

Apis mellifica has this same burning soreness when urinating (*Cannabis sat.*), and the urine voided is scanty and high-colored. The desire is frequent, but little or even none may pass. Apis is to be preferred to Hepar when œdema, local or general, or serous effusions occur. And it is usually to be preferred to every other remedy when these are accompanied by the characteristic absence of thirst, by drowsiness, by lassitude with trembling, and by stinging pains here and there. Apis is frequently the best remedy in hydrocephalus and hydrothorax. In more moderate cases, where the urine

is scanty and albuminous, and the cellulitis localized, I rarely give any other remedy. But it will cure quickly even severe cases. In one notable instance, a little boy about four years of age, sent to me by a professor in one of the New York colleges, in which the scanty, dark-red urine contained an enormous amount of albumin, a cure was wrought promptly by Apis. This case had had crude medication for two weeks or more, and was considered critical. The face, hands, and feet were puffed; and during the past twenty-four hours the cheeks and back of the left hand had become burning and erysipelatous. Apis relieved greatly all the symptoms in twenty-four hours, nearly doubled the amount of urine voided, and completed the cure in eight or nine days.

Bryonia is much less frequently indicated, though it has a well-defined relation to croupous inflammation. It will be needed in those cases in which a scanty, almost brown, albuminous urine is associated with great thirst (contra *Arsenic*). The cellular tissue is not much affected, though there may be œdema of the lower eyelid (*Digitalis*). Irritation of, and effusion into, serous sacs is quite diagnostic, and in ascites, hydrothorax, and similar dropsies, Bryonia should be carefully compared with Asclepias, Spigelia, Ranunculus, Scilla, Kali carbonicum, and Spongia.

Colchicum I have only used once. In that case the urine was scanty, dark, and turbid. It burned the urethra like fire. There was a scanty diarrhœa of bloody mucus, with severe tenesmus. Thirst was very great, salivation, and the ascitic distension considerable. Colchicum cured the diarrhœa, reduced the ascites, brought the urine up to normal quantity, and the case finally recovered under Kalmia. Colchicum should be compared with Bryonia, Spigelia, Kalmia, and Rhododendron.

Senega has a scanty, dark-colored, and frothy, albuminous urine, which separates into strata as it cools. It has a special affinity for the pleura, and for effusions therein.

Terebinthina is useful when, after scarlatina, the patient passes small quantities of dark, sweet-smelling, turbid urine, which upon cooling deposits a sediment resembling coffee-grounds. The urine, though rich in albumin and blood-disks, contains but few, if any, tubular casts or epithelium. The patient is stupid and drowsy as if intoxicated; with thirst, burning pains in the region of the kidneys, excessive, tympanitic distension of the abdomen, and a cold and clammy condition of the skin.

Digitalis may be used when the pulse is extremely slow and intermitting, in dropsical affections. There is constant urging to urinate, but the discharge is scant, dark, and turbid. Respiration is irregular, or consists of deep sighs. The skin is cold, and perhaps clammy. The patient feels faint and as if dying.

Helleborus may be useful in any of the post-scarlatinal dropsies when the urine is scanty and albuminous, but its main field is in hydrocephalus. Helleborus is one of our most important remedies when the exudation is completed. The exact time for its administration is when the reaction has become almost nothing, and the phenomena of paralysis have become more or less complete (Bähr). Helleborus is often indicated in weakly scrofulous children, especially when the dropsical swelling (anasarca, ascites, etc.) comes on with great suddenness.

In the second stage: Mercurius, Sulphur, Kalmia, Arsenicum, Lachesis, Scilla.

Mercurius corrosivus is our sheet-anchor in the cure of the second stage of scarlatinal nephritis without dropsy. It may sometimes be indicated when anasarca is present, but it will rarely here replace Arsenicum. The toxic effect of corrosive sublimate in the kidney is a perfect picture of parenchymatous nephritis, as can be seen by reference to Allen's *Encyclopædia*.* It produces every degree of variation in the quantity voided, from a copious bloody discharge (six pints in as many hours) to complete anuria. In one case of poisoning no urine was passed for eighty-one hours, and the catheter showed that none was secreted. As a rule, the urine is scanty and bloody, though it may be profuse and pale. The specific gravity is high; albumin copious; and under the microscope the sediment shows large amounts of epithelial débris, in a state of granular fatty degeneration. Clinical experience has verified the homœopathicity of Mercurius in this condition of the kidney. There is generally spasm of the neck of the bladder, the urine passing drop by drop, even when the entire amount voided is nearly up to normal. The anginose symptoms will often determine

* Encyclopædia of Pure Materia Medica, vol. vi., page 254.

the choice upon Mercury when otherwise judgment might be in doubt. The tendency to softening and gangrenous disorganization will pointedly indicate this remedy as the only one likely to stay the onward march of the phagedenic inflammation.

Sulphur is not, as I am aware, mentioned by any of the authorities in this connection. Nor does it seem to have ever caused albuminous urine. It has a marked influence upon the kidney, and produces many symptoms; Allen gives one hundred and twenty five; and many of these resemble those found in parenchymatous nephritis. It seems fair to believe that Sulphur acts here as in other parenchymatous or croupous infiltrations, awaking the activity of vegetative life, promoting the process of absorption and removal of the abnormal product, and thus returning the kidney to its pristine state. Certainly, in several cases in which Sulphur seemed to be called for by the general tenor of the symptoms of the case, it accomplished all that was desired without other medicament.

Kalmia latifolia deserves a wider recognition in this disorder than it has yet achieved. Its value in Bright's disease was first made known by Dr. B. C. Macy, of Dobb's Ferry, New York, in a paper in the *American Homœopathic Review*, vol. iii., page 366, February, 1863. The diagnosis in this case was corroborated by Dr. Carroll Dunham. My own attention was called to the drug by Professor Burdick, many years ago, in a case of albuminuria following scarlet fever, which refused to yield to either Hepar, Apis, or Arsenicum. Kalmia proved to be the right remedy. I have used it in a number of cases and it has benefited most of them. I now give it the preference over all other remedies, in the second stage of scarlatinous nephritis, when albumin in the urine is associated with pains in the extremities or in the back (rheumatic), or with irregular, paroxysmal pains in various parts (neuralgic), or with heart complications. Hering's proving contains only the symptom: Frequent micturition of large quantities of yellow urine. But clinical experience shows it to be an admirable remedy in albuminuria from various causes. I usually begin with the sixth potency; but I have seen good results from the tincture, second and third decimal, and the thirtieth and two hundredth potencies, in different cases. Kalmia should be compared with Colchicum and other anti-rheumatic drugs, especially such as Spigelia, which have a notable influence upon the heart.

Arsenicum is probably the favorite remedy among homœopathic practitioners in the treatment of scarlatinal nephritis, and a very good remedy it is. For some reason, which I cannot well define, I have not used it with the same frequency as do most of my colleagues; and yet I cannot but admit that it is exquisitely homœopathic to this disorder in the elements of its pathology. Albumin is almost constantly present in the urine of persons suffering from arsenical poisoning, as well as the other detritus —tubular epithelium, fibrin-casts, and blood-corpuscles—found in the urine of parenchymatous nephritis following scarlatina. This is true both of acute and chronic poisonings. Three cases of chronic poisoning presented perfect pictures of Bright's disease, and two of these, in which death occurred, showed the characteristic kidney lesions (*Edin. Med. and Surg. Jour.*). The dropsy, also, which may be a mere local puffiness, as of the eyelid, or a general anasarca, is pathognomonic alike of arsenical poisoning and scarlatinal nephritis. Nevertheless, I should never give Arsenicum unless the general characteristics of the drug be present in the case—the nervous restlessness, the anguish and despair which drives him from place to place for relief, the dread of death or of being alone, the rapid emaciation, the profound prostration, and the peculiar thirst.

Lachesis will bring relief in those cases in which the urine becomes black and foaming, with frequent urging. Serous dropsies.

Scilla maritima causes inflammation of the kidney, with albuminous and bloody urine. Hahnemann pointed out (*Lesser Writings*, page 348) its value in rapid acute dropsical swellings resulting from this inflammatory process.*

The various dropsies may indicate special remedies:

Anasarca: Hepar sulphuris, Apis, Bryonia, Asclepias, Eupatorium, Arsenicum, Helleborus.

Ascites: Apocynum, Bryonia, Apis, Aurum, Arsenicum.

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* See also vol. ii., page 181.

Hydrothorax: Sulphur, Kali carbonicum, Bryonia, Senega, Helleborus, Apocynum.

Œdema pulmonum: Kali phosphoricum, Kali hydroiodatum, Tartarus emeticus.

Œdema glottidis: Apis, Stramonium, China.

Hydropericardium: Spongia, Apocynum.

Hydrocephalus: Sulphur, Zincum, Apis, Cuprum, Helleborus.

Synovitis.—Concurrent with the nephritic inflammation, or independent of it, there may develop toward the end of the second or the beginning of the third week an affection of the joints. The symptoms are tenderness and elastic puffiness about one or more of the joints, with or without redness; sweats, more or less profuse; heightened temperature; and a marked proneness to inflammation in other serous membranes. The attack may be severe or mild. It may only be transitory pain and tenderness, without swelling, in some one joint, or it may be a general attack on all the joints of the body. There is always a distinct increase of temperature, and other evidences of febrile excitement, but these may be blended with the pyrexia of nephritis and indistinguishable therefrom. When synovitis sets in later, as the result of debility, it may run an irregular pyrexial course, analogous to an attack of acute rheumatism.

In an ordinarily severe case, if the joint be examined during the first two or three days, there will be found evidences of a considerable increase in the amount of synovial fluid. If the case proves fatal from other causes, at this period the lining membrane of the joint will be found reddened from the flushing of the bloodvessels. The synovial effusion and the subjacent cellulitis is usually reabsorbed, leaving behind a thickened condition of the capsular membrane. In the hip, the round ligament, and in the shoulder the tendon of the biceps, in severe cases, will probably be destroyed; and the inter-articular cartilages are sometimes absorbed. When the process lingers, the whole osseous surface of the joint may become denuded, or the ends of the bones become enlarged and misshapen by the deposition of osseous matter. Sometimes suppuration in the joint occurs during the pyrexia; this is fatal.

The treatment of this complication will probably involve taking into account conditions elsewhere. When the synovitis dominates the case, the remedy may be either the Carbonate or Iodide of Potash, Iodum, Silicea, Calcarea, or one of the numerous anti-rheumatics. In addition to these, rest, ample dietary, and, if a large joint be at fault, the use of the weight and pulley.

Post-scarlatinal, rheumatic, or neuralgic pains may call for Apis, Arsenicum, Belladonna, Bryonia, Cannabis, Colchicum, Digitalis, Gelsemium, Lachesis, Mercurius, Rhus toxicodendron, Senega, or others.

Serous Inflammations.—These sometimes occur independently of the dropsy or synovitis with which they are usually associated. The pleura is the most likely to be thus affected. Next to that the pericardium. The endocardium may suffer. Systolic cardiac murmurs are occasionally heard in the second interspace or the fifth. These sometimes persist for months. In one case I saw dilatation of the heart follow an attack of scarlatina.

Anginal Inflammations.—Simple or ulcerative sore throat may supervene during or even after desquamation. The sore-throat of the invasion may subside apparently, to be rekindled in the second week, or the present inflammation may be due to a new form of lesion. These secondary sore-throats are apt to occur in cases which have run an atypical course, but in which the primary throat-symptoms have been comparatively slight. The condition resembles the angina of severe or malignant scarlatina during the rash period, but there is not the same natural tendency to resolution. Large, deep sloughs are apt to form, suppuration dissects out the glands, hæmorrhage from the bloodvessels ensues, and death is probable.

Otorrhœa.—This complication may be due to an inflammation of the external meatus, and is then easily controlled under homœopathic treatment. In other cases it is the result of the extension of the coryza through the Eustachian tube to the middle ear. It is then a very serious condition. The tympanum becomes distended with purulent exudation, and, unless measures are taken to prevent that catastrophe, the pus bursts through the tympanic membrane and escapes by the external canal. "Paracentesis of the membrana tympani is advisable if the pains are not readily relieved by remedies, and if there is an accumulation in the middle ear, causing the drumhead to bulge; for a spontaneous rupture may leave a permanent perforation, while a simple puncture leaves no bad results, besides at once giving the patient relief from the agonizing pain" (Norton). Consult: Argentum nitr., Borax, Capsicum, Ferrum phos., Kali hydr., Plantago maj., Sulphur, Tellurium, Terebinthina.

Abscesses.—Convalescence is often delayed by the formation of abscesses. These, when large, may be the immediate cause of death. The retro-pharyngeal abscess is one of the gravest, and has caused death by suffocation. Abscesses of merely local effect may prove permanently disfigurative, as the sloughing of the cornea, causing destruction of the eye, or an abscess on the back of the hand, gluing the tendons together and rendering the hand useless.

Other sequelæ are pneumonia, gangrene, purpura, and paralysis. Epidemics of scarlet fever are occasionally followed by epidemic diphtheria, but this is not a sequela.

MEASLES.

BY GEORGE WILLIAM WINTERBURN, M.D.

Synonyms.—Morbilli; Masern; Rougeole.

Definition.—Measles is an acute infectious disease, occurring mostly in children, appearing in wide-spread epidemics, characterized by a roughened rash upon the skin, which begins in red spots like flea-bites and quickly coalesces into crescentic patches, accompanied by coryzal symptoms, a moderate fever, and general constitutional disturbance. The period of incubation is variable, generally lasting from ten to fourteen days; but in those cases in which the disease is produced by inoculation, the period is seven days. One attack usually protects for life, though recurrences are not unfrequent. Relapses are rare, but sequelæ and complications are the rule, except in very mild epidemics.

History.—Measles is known to have existed in Asia as early as the fifth century. It was described in the writings of Rhazes and others of the Arabian physicians in the early part of the tenth century. Rhazes and Avicenna supposed that measles, small-pox, and scarlet fever were varieties of the same disease. Measles was first distinguished from small-pox by the Arabian physicians of the twelfth century. After the non-identity of these two diseases had been determined, scarlet fever and measles still remained indistinguishable, and even as late as 1670–4 the account given by Sydenham of measles, then epidemic, shows that that skilful diagnostician had failed to clearly mark the difference between them. A much better description is that by Ingrassias, of Palermo, nearly a century earlier; but it was not until the present century that the differential diagnosis between these disorders was defined with distinctness and universally accepted by the profession.

Ætiology.—The causes of measles are predisposing and exciting.

1. An important predisposing cause of measles is a condition of the atmosphere favorable to the development of catarrhal disorders. When the season is mild and equable, the disease becomes unfrequent, but if it becomes stormy and variable, the epidemic takes on a severer aspect. Measles is rarely absent in large towns, and in New York is a constant cause of deaths; but the epidemics are apt to be local, other parts of the city being entirely free from the disorder at that time. I have several times seen epidemics start at some one point, and gradually march block by block in one direction, as an army might, leaving its trail of victims behind.

A community isolated from ordinary routes of travel and commerce may long enjoy immunity from measles, but when it is reintroduced it will probably spread with great rapidity and virulence. This was

eminently illustrated by the epidemic in the Faroë Islands in 1846, where within six months more than three-fourths of the entire population had the disease, the mortality percentage ranging very high. A similar outbreak occurred about ten years ago in the Fiji Islands, when nearly one-fourth part of the population were carried off by this disease.

Although measles is usually most severe in the winter season, this is not always so. The annexed table shows the comparative number of deaths from five children's diseases, in the city of New York, by months, during last year (1884).

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Totals.
Measles	36	29	35	41	93	117	124	57	36	26	70	98	762
Scarlatina	53	60	64	68	68	54	48	21	25	19	50	78	608
Diphtheria	79	82	73	77	83	92	70	62	55	127	139	151	1.090
Membranous Croup	49	65	58	70	62	44	30	47	42	82	98	101	748
Whooping Cough	22	26	23	32	44	28	64	55	72	51	42	31	490
Mean Tempera're (Fahrenheit)	24.69	34.01	37.67	48.13	59.82	71.25	71.93	73.71	72.03	57.70	44.30	33.64	52.42
Mean Reading of Barometer	29.965	29.935	29.880	29.715	29.835	29.991	29.761	29.966	30.009	30.023	29.943	30.020	29.920
Mean Humidity (Saturation 100)	88	72	68	59	59	59	61	72	73	74	69	83	70
Number of Miles travelled by the Wind	6,712	5,268	5,714	6,183	5,661	4,214	4,734	3,386	4,287	5,698	5,494	6,286	63.637
Total Rain-fall (inches)	5.22	4.92	4.62	2.82	3.74	4.98	4.74	7.90	.21	3.75	3.18	6.17	52.25

It will be noticed that the highest death-rate from measles was in July, and the lowest in October.

The inhabitants of low and damp situations suffer most severely from this disorder, and in all localities it is likely to be more prevalent and virulent when the season is unusually wet.

The susceptibility to this contagion is almost universal. Sex exerts very little influence, and the fact that there are more males than females attacked is mainly because there are more males than females born. The disorder is most frequent between the ages of two and five years. It is not uncommon among infants, but susceptibility dies out as youth merges into adolescence. One attack usually protects for life, but multiple attacks are more frequent in this than in any other of the zymoses, save typhoid. I knew one little girl who had this disorder in three successive years, each time in the month of February; the parents made all preparations for an attack in the fourth year, as they had come to consider it almost a matter of course; but the child escaped, though measles was again epidemic in the neighborhood.

Measles, unlike scarlet-fever, increases in severity and fatality in proportion to the age of the patient; and while the cases in individuals past fifteen years of age are comparatively very rare, this loss of susceptibility seems to consist rather in the protective power

of a previous attack than in any special inaptitude *per se* to the disease.

2. The exciting cause of measles is a specific poison the exact nature of which is still undetermined. This contagious principle is volatile, is given forth at all stages of the disease, lasts for some time after the rash has faded, may attach itself to articles of clothing, and thus be carried from place to place. It is found in the breath, in the mucous secretions, and in the blood; inoculation with either of the two latter conveys the disease. Braidwood and Vacher made some interesting experiments to determine the nature of the contagion. By causing persons sick with measles to breathe through glass tubes coated interiorly with glycerine, and subsequently examining this microscopically, they discovered what they believed to be the means of contagion. This consists of numerous sparkling, colorless bodies, some ovoid and some spherical. They appear during the incubatory period, but are most abundant during the first and second days of the eruption. In order to show whether these were peculiar to measles, they next examined the breath of children suffering from other contagious diseases, such as scarlet fever and typhus, as well as that of healthy persons, but with only negative results.

As a rule, the liability to contract measles is greater in a person unprotected by a previous attack than from any other contagious disorder, but the virus is easily dissipated, and when well diluted by a constant supply of fresh air is almost innocuous. According to Meyr, the mere airing of clothing is a sufficient disinfectant.

Pathology.—The characteristic lesions of measles are found upon the skin and mucous membrane. The rash is papular. It begins with a slight hyperæmia of the orifice of a hair-follicle, followed by effusion of plasm, causing a minute point of œdema. Around this hyperæmic point there forms a papule on a roseolous patch. These patches are clearly and sharply defined, crescentic in shape, and though usually of a bright-rosy color, sometimes shade off into a bluish tint. Each patch has but a brief existence; as soon as it reaches its maximum development, it begins to fade, leaving a pale-brown stain, which may remain visible for two weeks or more, and which is due to granular changes in blood-corpuscles which have been caught in the meshes of the rete mucosum. Not unfrequently several papules may form on a single patch, the central one developing over the hair-follicle. Braidwood and Vacher examined microscopically sections of the skin made on the sixth day of the eruption. The corium was much swollen and the papillary eminences blunted and thickened from excessive proliferation of cells. The hair and sweat ducts and glands were involved and immeshed in all these tissues, and especially between the corium and mucosum were found the same sparkling, colorless, spheroidal, and elongated bodies already described

in the experiments by the same investigators upon the breath. These bodies were intermixed with other spindle-shaped, staff-shaped, and canoe-shaped forms, albuminoid in character (Eustace Smith).

The mucous membrane of the upper air-passages and of the eyelids and pharynx is more or less intensely congested. The anatomical changes are those of acute catarrh, and the hyperæmia is most severe immediately preceding the appearance of the rash, gradually decreasing as the eruption becomes pronounced. This catarrhal condition is pathognomonic, and will frequently enable the practitioner to diagnose the disorder previous to the development of the rash. Bacteria are found in the sputa and nasal mucus, but there is no evidence that these are different from those of ordinary coryza.

In cases where the child has died early from the sudden malignancy of the attack, the post-mortem appearances are unimportant and indefinite, save that the blood is unusually thin, dark-colored, deficient in red-corpuscles, and coagulates imperfectly. Keating found micrococci in the substance of the white-corpuscles and in the liquor sanguinis, and Klebs verified the discovery in the blood taken from the hearts of infants dead with measles. The principal post-mortem appearance is that of the complication to which the fatal termination of the attack is due. This may be the hypostasis in the lungs, with evidence of extravasation; or hyperæmia and inflammation in any of the mucous surfaces, especially (after those already mentioned) of the colon. The spleen and lymphatic glands are often swollen, and tumefaction of the solitary glands sometimes occurs. The peculiar refractile spheroidal bodies already described have been found in the lungs and liver, after death in malignant cases.

Symptoms.—An attack of measles consists of four stages or periods, the incubatory, prodromal, eruptive, and desquamative.

I. Incubation.—The incubation period of measles is about ten or twelve days, and consists of the span from the reception of the contagion into the system to the appearance of catarrhal symptoms. This period is usually entirely free from symptoms, though there may sometimes be noted an unusual irritability and peevishness, and Rehn, and others, speak of having detected ephemeral febrile movements develop in some cases.

II. Prodroma.—The beginning of the prodromal period is generally abrupt, and resembles in a general way the results from an exposure to damp cold. The little patient is languid and cross, complains of pains in the head, in the back, and in the limbs, and of chilliness, which may amount to rigor. He sneezes, coughs, his eyes look watery and red, and he is thought to have taken cold. The coryzal symptoms increase, appetite is impaired or altogether lost, vomiting is not unfrequent, and may be persistent and profuse, while the bowels may be either constipated or show a tendency to diarrhœa. In some cases

there is nose-bleed, and in most there is slight soreness of the throat, accompanied by hoarseness. The mucous membrane of the mouth and throat is reddened and mottled, but generally these tissues are not at all swollen. The cough is short, dry and teasing, and soreness in the chest may be complained of. If there be much dyspnœa, the respirations are hurried and shallow, and the pulse is rapid and easily compressible. The rise of temperature is sharp. The thermometer in the axilla on the first day generally rises to a temperature of 102°–102.5° Fahr., but it may be as high as 104° Fahr. without portending serious subsequent severity in the attack. The fever moderates slightly on the second and third days, but rises again on the appearance of the rash. A steady rise of temperature through the three days of invasion is not a favorable sign. Sometimes the amount of fever will be but slight compared with the severity of the coryza and cough. I have seen a number of cases in which the temperature during the preëruptive stage did not go above 100° Fahr., and Eustace Smith relates two instances in which he took the morning and evening temperature for four days previous to the appearance of the rash without finding it at any time over 99° Fahr., and when the eruption began the temperature only rose to 101° Fahr. In each of these cases, as well as in my own, the rash was typical in character, abundant, and preceded and accompanied by the usual catarrhal symptoms in wonted severity. On the other hand, in one case, in a little boy of three years of age, I saw the bodily temperature steadily rise from the beginning of the attack, until on the third day it reached 107° Fahr. There was considerable congestion to the head, a dazed condition of the sensorium, a heavy and rapid heart-beat, constipation, croupy cough, and great dyspnœa, harsh, dry skin with pungent heat, cold extremities, restlessness, and sleeplessness. On the morning of the fourth day he had, in quick succession, several copious offensive stools, after which the temperature declined, the sensorium became clear, the rash appeared on the skin and mucous membrane in unwonted profuseness, and the case progressed in severity, but safely, to a somewhat prolonged convalescence. This child, though rugged and ruddy in appearance, was subject to sudden bronchial and pneumonic attacks, and was what is called a "croupy child."

At the beginning of the prodromal stage the skin is dry and harsh, but it is no unusual thing for it to become moist on the second or third day, especially when there is a considerable fall in the fever temperature; yet, there are cases in which the skin is moist from the first, and others in which it remains dry throughout. Either extreme of moisture or dryness indicates a probably severe attack. It will sometimes happen that the preëruptive stage, instead of showing the usual catarrhal conditions, will commence as a diarrhœa. In one case, during the past month, a boy was attacked with diarrhœa and the usual symptoms of inflamma-

tion of the small intestines. The evening temperature on the first day was 102° Fahr. There was an entire absence of cough and coryza, and measles was not suspected. The temperature rose through the night, though the bowels did not move. In the morning it was 103.2°, but after a copious stool it fell immediately to 101.7°. He had seven stools during the day, and at bedtime the temperature was only 101.3° Fahr. The next day the bowels were better, but the eyes were watery, and there was a slight hoarseness with cough. On the evening of the third day, when the rash appeared, the temperature was 104.3° Fahr., pulse 130, respirations 46, and the case subsequently followed a normal course. The condition of the bowels on the first two days caused considerable apprehension and excited a fear of peritonitis, but the pain and tenderness entirely disappeared on the appearance of the rash.

In the prodromal stage the urine is scanty, even though thirst be severe, and on cooling deposits a reddish sediment rich in lithates. The lips are parched, and in severe cases sordes gather on them and on the teeth. The tongue is moist, flabby, takes the impression of the teeth, and is covered with a thick, disagreeable fur, through which scattered red papillæ may be seen to project. On the second, or certainly by the third day, a patchy redness may be observed on the roof of the mouth and in the pharynx, or there may be rose-colored punctate and stellate spots on the otherwise pale mucous membrane. These appearances are rarely absent, and are diagnostic twenty-four hours prior to the appearance of the rash.

The preëruptive stage lasts three full days, though it may be prolonged by complications which delay the appearance of the rash, especially in feeble children, to four or six days. The following cases, selected from the records of the Manhattan Hospital, show the usual variations in this particular. They are all from the records of one day; seventeen cases were entered that day; the remaining eleven had a typical prodroma, as in the first here mentioned:

Female, Aged Three Years.

	Temp.	Pulse.	
Feb. 7, . .	101.7°	110	Conjunctivitis.
" 8, . .	101.2°	106	Cough.
" 9, . .	100.8°	100	Amelioration.
" 10, . .	103.2°	120	Eruption.

Female, Aged Five Years.

	Temp.	Pulse.	
Feb. 7, . .	102°	116	Conjunctivitis.
" 8, . .	102.6°	122	Angina.
" 9, . .	102.3°	120	Cough.
" 10, . .	102.8°	128	Diarrhœa.
" 11, . .	104.2°	136	Eruption.

Male, Aged Two Years.

	Temp.	Pulse.	
Feb. 7, . .	102.4°		Cough.
" 8, . .	102.6°		Conjunctivitis.
" 9, . .	102.8°		Catarrh.
" 10, . .	103.6°		Pneumonia.
" 11, . .	104.5°		Exacerbation.
" 12, . .	105.6°		Eruption.

Female, Aged One Year.

	Temp.	Pulse.	
Feb. 7, . .	102.1°	130	Cough.
" 8, . .	101.8°	128	Catarrh.
" 9, . .	103°	140	Capillary bronchitis.
" 10, . .	103.2°	140	" "
" 11, . .	104.5°	154	Eruption.

Male, Aged Seven Years.

	Temp.	Pulse.	
Feb. 7, . .	102°	112	Catarrh.
" 8, . .	101.8°	110	Coryza.
" 9, . .	101.5°	100	Amelioration.
" 10, . .	103 2°	128	Pneumonia.
" 11, . .	104.3°	150	. . . . .
" 12, . .	105°	164	Eruption.

Male, Aged Eighteen Months.

	Temp.	Pulse.	
Feb. 7, . .	103°	136	Conjunctivitis.
" 8, . .	102.3°	124	Coryza.
" 9, . .	102.6°	140	Epistaxis.
" 10, . .	103.1°	154	Bronchitis.
" 11, . .	104.2°	160	Eruption.

III. Eruption.—Until the fourth day of the fever, as a rule, the skin presents no abnormal appearance. Exceptionally an evanescent erythema may be seen upon the face, or minute pink papules upon the body, but these are never sufficiently distinctive to be diagnostic. The eruption is ushered in by a decided increase in the bodily temperature and in the other concomitants of fever. There is usually great restlessness and irritability, and a short, suffocative, almost constant cough; in some cases this is markedly paroxysmal. With this increase of the fever comes also exacerbation of the conjunctivitis, blepharitis, and photophobia, increase in the amount and acridity of the coryza, anginal sensitiveness, and more rarely vomiting and diarrhœa. Unless care has been exercised in the matter of diet, many children on the day of the eruption will suffer from nausea and vomiting, and even with the greatest care this may become profuse and persistent. If the bowels have been constipated during the prodromal period, they are likely now to show a tendency to looseness; but a moderate diarrhœa has no serious significance. The temperature, as a rule, is lower and the nervous erethism less harassing if the bowels move gently twice or thrice a day than when they are obstinately constipated; but if the dejections become profuse or bloody, the case will need careful attention. When the fever is very violent, the little patient passes from the state of mental vacuity and listlessness, so characteristic of ordinary measles, into one of delirium. This, however, is rarely noisy or loquacious, and when merely nocturnal will quickly pass so soon as the temperature is lowered.

The rash first appears upon the upper border of the face near the scalp and in front of the ears; and from there it spreads rapidly downward over the face, neck, chest, and limbs, so that the entire surface is covered within the twenty-four hours succeeding. This exanthem consists of flat, rosy-red papules, varying in size from that of a pin's head to the sixth of an inch in diameter. These small papules are situated upon a hair-follicle, and at the beginning are not unlike flea-bites. They soon become surrounded with an erythemic zone, and as the eruption becomes profuse, these show a remarkable tendency to group together into crescentic masses, about the size of an ordinary bean, and whose papular origin is more perceptible to the touch than to sight. These crescentic patches may be separated from

each other, over the entire body, by healthy integument; but if the rash comes out well, and the case in all respects follows a normal course, they are liable to be confluent on the face, back, and nates; and this may produce a tolerably uniform erythematous blush over a considerable extent of surface. As the rash becomes more completely developed, it assumes a more dusky shade, a tinge between a yellow and a red; and this change gradually goes on until the eruption fades. When these semilunar-shaped patches are pressed upon, especially soon after they have formed, their color disappears; but it soon returns from the centre to the periphery, when the pressure is removed. Night-sweats are common, and, should the skin be very moist, miliaria may form, and these may cause much irritation from pruritus.

A child with the eruption profusely developed, and with the symptoms of coryza well marked, presents a characteristic appearance which, once seen, will ever be remembered as diagnostic. The features are swollen and appear thick and coarse, and if the exanthem is generally abundant the swelling will extend over the whole surface of the body. It is always most noticeable upon the face, and causes sometimes such an alteration in its contour as to render the patient scarcely recognizable. The dull flush upon the face is speckled over with crescentic patches of a still duskier hue. The eyes are injected and suffused, and the lids swollen, perhaps even to closure. The upper lip is excoriated with the acrid mucus which trickles down from the nasal passages, and often dried blood-crusts are seen at the entrance to the nostrils, from the epistaxis within. Deafness is more or less pronounced from the swelling of the mucous membrane of the Eustachian tube, and all the special senses are obtunded or benumbed. The hands and feet feel tense and stiff from interstitial distension. An examination of the lungs reveals, in the earliest stage, a rude respiratory murmur, and sonorous or sibilant, and later, mucous râles on the dorsal surface, these latter being most abundant at the base of the lungs. In some cases physical examination reveals nothing more than a moderate catarrh of the trachea, not extending beyond the bifurcation.

The disease remains nearly stationary after the day of eruption for two more days when, if no complications arise, the rash begins to fade. Occasionally it is so poorly developed that the stage of desquamation is delayed or its commencement ill-defined. This is especially observable in feeble or sickly children, though sparseness in the eruption may occur in vigorous children from the mildness of the attack. In enfeebled children the rash may first appear upon the chest, back, or limbs, and spread irregularly and slowly; and such cases demand constant and careful scrutiny to ward off complications involving the viscera. Sometimes the rash comes out suddenly, so rapidly indeed as to give the appearance of great intensity to the attack, but if the child has been previously healthy, and during the incubation has

shown no marked signs of general weakness, no alarm need be felt at this variation from normality of development.

IV. Desquamation.—On the fourth day from the beginning of the exanthem the desquamative period, as a rule, begins. The temperature, which has remained high during the entire eruptive stage, now rapidly sinks to normal; the pulse, which all through the attack has sympathized with the temperature, now also subsides to its proper rate; the catarrhal symptoms dwindle until nothing remains but a slight and loose cough; appetite, hitherto altogether wanting, now returns; and the patient starts on what bids fair to be a rapid convalescence. The eruption, as a rule, begins to disappear from any part about thirty-six hours after it appeared on that part. It, therefore, begins to clear from the face first, and steadily disappears from above downward, in the same order in which it made its appearance. This process lasts about three days, so that it has become a domestic saying, "Three days coming, three days staying, and three going," referring to the several stages of incubation, eruption, and desquamation. The desquamation is always slight, and is most apparent on the face, or wherever the rash may have been confluent. In discrete cases of measles it is hardly observed at all. The old cuticle never peels off in large flakes as it may do in scarlet fever, and usually the scales are so diminutive as to be scarcely visible unless deflected on a dark background. It continues about eight or ten days.

As the rash fades, it leaves a yellowish-brown stain upon the surface wherever a spot of exanthem has been, and these are gradually removed by absorption. This staining seems partly due to the deposit of pigment-cells in the rete mucosum, and partly to blood-disks which have escaped from the capillaries during the hyperæmia. In some few cases bluish-red patches remain, which do not disappear on pressure. These hæmorrhages into the skin, unless extensive,—and they are rarely so except in the hæmorrhagic diathesis—cause no trouble, do not interfere with the normal progress of convalescence, and have no particular significance.

Varieties.—This simple normal course of measles, as detailed above, will not hold true in all cases. Epidemics vary greatly in severity, intensity, and malignancy, though individual peculiarity makes wide variations in the seriousness of the attack. Malignant measles is distinguished by great prostration and asthenia. The pulse is small, feeble, and variable; the respirations are hurried, shallow, and labored; the temperature is high, although the extremities are cold and numb; the tongue is dry, brown, and thickly furred, and the teeth are loaded with sordes; there is twitching of the muscles, muttering delirium, and partial coma. When the exanthem appears, it is dark-red or violet in hue, and petechial spots form on various parts of the surface. The pulse soon becomes so rapid as to be prac-

Typical Measles.

Nature	Epidemic. Contagious. Infectious. Self-limiting.		
Attacks	Children mainly; one to fifteen years; severity usually proportional to age; one attack usually protective, but multiple attacks not uncommon, and may be severe.		
Incubation	Ten to twelve days.		
Stages	Prodroma.	Eruption.	Desquamation.
Term	Three days.	Three days.	Three days.
Temperature	99°–102° Fahr. Highest first day; then declines.	103°-105° Fahr.	Slightly subnormal.
Pulse	90–120	100–140.	Normal.
Skin	Hot; usually dry.	Crescentic patches begin on forehead and descend over body and extremities.	Slight desquamation, leaving dingy spots.
Head	Drowsiness. Frontal headache.	Dazed sensorium. Headache.	Gradual subsidence of all the symptoms.
Eyes	Watery.	Conjunctivitis.	
Nose	Coryza. Sneezing.	Catarrh.	
Tongue	Moist fur.	Dry.	
Throat	Punctated injection.	Pharyngitis.	
Chest	Bronchial catarrh.	Hoarseness, cough.	
Appetite	Anorexia.	Variable.	
Bowels	Constipated.	Diarrhœal tend'cy.	
Duration	Nine to twelve days.		
Sequelæ	Bronchitis. Pneumonia. Phthisis.		

tically uncountable, hæmorrhages occur from the various outlets of the body (epistaxis, hæmaturia, etc.), from mucous membranes, and from the skin; and after death ecchymoses and effusions of blood are found in various internal organs and cavities. Death usually occurs on the fourth or fifth day of the fever, the patient dying comatose or in convulsions. If life is prolonged, convalescence is tedious and likely to be interrupted by attacks of bronchitis, pneumonia, diarrhæa, or other complications, from which the little patient is unable to rally. Children of a scrofulous diathesis are generally great sufferers from measles, and it is rare, nowadays at least, for previously healthy children to present such a severe series of general symptoms as are here described. During our recent civil war (1861–65) very many cases of measles occurred among the soldiery, at times of a very malignant type. The rash was dark in color, petechial in character, and the accompanying fever partook of the nature of a typhoid. These cases corresponded to what was formerly called black measles (Hartshorne).

Petechial measles are not necessarily dangerous. If these minor hæmorrhagiæ show themselves at the beginning of the attack, they merely evidence the intensity of the local hyperæmia, and may have no reference to, or influence over, the general character of the attack. When, however, these appear subsequently on the second and third days of the eruptive period, and the exanthem darkens instead of fades, while patches or streaks of purpura, more or less extensive, appear, especially in persons who have indulged in excesses or have suffered recently from other illnesses, the prognosis will be very grave, the significance of the symptom being proportional to its extent.

Another variety of measles is what is termed *morbilli sine exanthemata.* In these cases there is no eruption at all, but otherwise all the distinguishing marks of the disorder are present. These irregular cases are generally mild, though not universally so, and would not be recognized as measles except as occurring in the midst of an epidemic, and as being subsequently protective. Another anomalous form is described as *morbilli sine catarrho*, in which the characteristic rash is present, but without catarrhal symptoms; this is evidently a mistake, as this disease, whatever it is, does not protect from subsequent attack. It is probably epidemic roseola, a very harmless complaint which is described in a subsequent article.

The rash may be normal in general appearance, but, instead of becoming visible on the fourth day of the fever, may be noticed as early as the first, or it may delay until the seventh or eighth; or it may begin properly on the fourth day, and extend so slowly as to have faded on the face before it has reached the feet. In some cases the attack is so mild that the rash fades upon the day that it appears, without being followed by any of the untoward symptoms which

result from a repercussion. Sometimes the eruption will feel "shotty," but this is never as noticeable as in the exanthem of small-pox. Other variations in the rash may occur from personal idiosyncrasies, unsanitary surroundings, and unknown causes, but these have only a clinical value, and need not be discussed here. These various appearances of the rash have led to the adoption of different designations to represent them. Thus

Morbilli læves is a variety in which healthy skin intervenes between the maculæ, which are only slightly elevated.

Morbilli papulosi designates a condition in which the papules are of a dark-red color, are very fully developed, and closely resemble the papules of small-pox.

Morbilli vesiculosi, when the mouths of hair-follicles are filled with fluid, and small vesicles are thus produced.

Morbilli confluentes, cases in which the maculæ are so abundant and so crowded together that they coalesce, and no healthy skin is to be seen. But even in this variety there is always a spotted appearance, though the entire skin be reddened.

Morbilli asthenici, *septici*, or *nervosi* are the different names for those cases in which there is profound blood-poisoning or severe prostration.

Morbilli synochales denotes an unusual intensity in the febrile symptoms, and the development of inflammatory processes.

Morbilli petechialis, or *hæmorrhagici*, is when extravasations take place into the maculæ, which, of course, do not then fade on pressure.

Complications.—The complications which may prolong an attack of measles or endanger the life of the patient, are in general merely exaggerations of the ordinary symptoms of the disorder or the reaction of these on the constitutional peculiarities of the patient.

Epidemics of measles vary greatly in severity and characteristics. In some the death-rate is trifling, while in others it kills a third, or more, of its victims, and maims the majority of the remainder with tedious and troublesome sequelæ. Nevertheless, in a thoroughly healthy child, who has during the illness proper treatment and efficient nursing, an ordinary attack of measles is a mild disorder of brief duration, with little severity of the general symptoms, and with very little danger to the general health. The constitutional tendencies of the patient, when known, will enable us to cast the horoscope of the disorder, and foretell with certainty the extent of its ravages. When the inherited physical proclivities, or the consequences of recent physical disorders, determine a natural or acquired predisposition to derangements of the mucous membranes, we may anticipate that the attack in such a patient will assume a sharpness of aspect beyond the average of the current epidemic. There is little danger to the patient in this specific fever from the hyperæmia of the skin, unless there be coexisting ulcerations and abrasions on the cutaneous surface. When these

are extensive, serious local inflammation, erysipelas, and gangrene may be anticipated, and will occur unless carefully guarded against. The more obvious danger is from the extension of the coryzal condition into the frontal sinuses or into the middle ear, causing meningeal irritation; or downward along the respiratory tract, setting up capillary bronchitis or catarrhal pneumonia; or by extension from the pharynx to the stomach and intestines, inducing a severe, and perhaps dangerous, emeto-catharsis. These pathological consequences are to be expected if the disorder takes a bad turn, and are to be anticipated when it develops in an enfeebled or diseased child. Little patients already weighted with a scrofulous, rachitic, or syphilitic diathesis suffer severely when attacked by measles even of the ordinary type. It is in these patients that catarrhal symptoms, and the effects of the catarrhal symptoms, produce such serious consequences.

The severity of the complication is also, to a considerable extent, dependent upon the season of the year. Pulmonary affections are more common in winter than in summer; also in inclement weather, or during sudden changes in temperature from seasonable mildness to severity. The most important of the complications affecting the respiratory apparatus are catarrhal laryngitis, capillary bronchitis, broncho-pneumonia, pneumonia, and acute tuberculosis.

Catarrhal laryngitis is a prominent symptom in some epidemics. It may be croupous, when simply catarrhal, or, if diphtheria is current, it may take on some of the characteristics of that disorder, without being truly diphtheritic; still, diphtheria may run a parallel course in a case of measles. There exists in most cases of measles a tendency to hoarseness in the earliest stage of the disease, from the extension of the coryzal condition to the mucous membrane within the larynx. The voice and cough are hoarse, and there is a variable amount of deafness. If this inflammatory process goes on, the voice becomes husky and indistinct, the cough croupy, the breathing stridulous, and strangulation seems impending, though the actual danger is really quite slight. This condition, as a rule, is greatly ameliorated on the evolution of the eruption, or, if it still persists, it disappears, often quite suddenly, on the decline of the fever, about the seventh day. It is only when it continues to grow worse after the appearance of the rash that it assumes special clinical significance. A form of spasmodic laryngitis sometimes precedes all other symptoms of the attack, or is severe out of all proportion to the catarrhal conditions of the case. A mistaken diagnosis is very easy under these circumstances; and if measles is epidemic in the neighborhood, the practitioner will need to use considerable circumspection in giving an opinion, or else the appearance of the rash two or three days thereafter will disclose the true nature of the disorder, to his mortification and discomfiture. Laryngeal troubles are very common, even in

mild epidemics of measles, in children who are subject to croup; and as the disease in such patients often begins with such a seizure, both parents and the physician may easily be mistaken as to the nature of the impending disorder. In some epidemics a large number of the cases will develop catarrhal laryngitis about the ninth day, just as the rash has almost entirely disappeared. These cases are generally obstinate. Dr. Stofella examined laryngoscopically a number of measles-patients in Hebra's clinic, and found the laryngeal mucous membrane intensely congested.*

Capillary bronchitis may occur either during the pyrexia, or subsequently as a relapse; in either case it is a very grave accident. It is almost always fatal in children under two years of age, for at this early period collapse of the lung is easily induced and difficult to rectify; when once fully established, the patient is doomed, and the final catastrophe will not be long delayed. Capillary bronchitis often comes on insidiously but rapidly, with oppression of respiration, lividity of the face, anxious or distressed expression, and great prostration. It is often masked by the coexisting catarrh until well developed, and it is important to remember that the subjective symptoms are frequently non-characteristic, and that it is necessary to make careful physical examination of the chest at frequent intervals. With the stethoscope may be heard abundant crepitant and fine subcrepitant râles, over the lower portion of both sides of the chest, on its dorsal aspect particularly, without dulness at first, and with increased resonance later. While usually the catarrhal symptoms precede by several days the inflammation of the finer air-tubules, yet in certain very rare cases the capillary bronchitis initiates the attack, and prevents by its severity an early recognition of the true nature of the disorder; but except for the satisfaction of having made a brilliant diagnosis, this is of slight practical value.

Broncho-pneumonia is a not uncommon complication, and occurs much more frequently in young children than pneumonia proper. It is apt to come on just as the eruption is fading, or after it has entirely disappeared. It does not differ in its ordinary symptomatology from the same disorder as occasioned by exposure to cold or dampness, except that in children much enfeebled by the measles pyrexia, or previously, it will run a more asthenic course. The disease begins as an ordinary bronchitis, and gradually increases in severity. The little patient suffers from a constant, hacking cough, which can be immediately induced by pressure on the sternum over the site of the bifurcation of the trachea. There will be more or less stertor accompanying both inspiration and expiration, except just after coughing, when it may entirely disappear, but soon returns. The croupiness of

* Wien, *Medizin. Wochenschrift*, Nos. 18, 19, 20; 1862.

the sound will depend upon the amount of mucus in the bronchi; if there is little, the sound is dry; if much, it is rattling. It is a bad sign when the cough suddenly becomes more severe, the respiration shorter, the expirations moaning, and the skin dry and pungent. The presence of bronchitis or broncho-pneumonia can be determined by the effects of crying. Children who can cry without coughing, are not suffering from this complication. Physical examination shows early in the attack an abundance of moist subcrepitant râles, most prominent at the base of the lobes, but becoming pitched, dry, and superficial as consolidation advances higher. This change in the character of the râles is the only sign by which we may know that the bronchitis has passed into broncho-pneumonia. Increased and increasing resonance is the rule, and the respiratory murmur is generally completely overborne by the râles. Dulness and tubular breathing may develop, from consolidation, but this will be found rarely, and then, I think, only in cases about to become moribund. Under all these conditions the more gentle the percussion, the more reliable and definite the diagnosis. In some few cases the râles are very unfrequent, simply a rough respiratory murmur being heard over the entire chest, either lasting several days, until moist râles make their appearance, as indicating resolution, or else until death occurs. In these cases respiration is often irregular and very rapid, reaching one hundred, or more, per minute. The irregularity consists in a number, say ten or twelve, of respirations following each other with great rapidity, and then succeeded by a pause, after the manner of the Cheyne-Stokes phenomenon. When death is about to ensue the cough grows weaker and less frequent, while auscultation reveals widely diffused mucous râles; somnolence sets in; the eyes are half-closed and rolled upward; the temperature perhaps becomes subnormal; and, if the patient be an infant, convulsions, general or partial, close the scene. This complication is the most frequent cause of death in measles. The younger the patient, the more grave the prognosis. And coming, as it usually does, just at the end of the week of fever, and attacking in almost every case those who have a special susceptibility to thoracic inflammations, it is a complication which ever requires our most studious attention.

Pneumonia is much more unfrequent than broncho-pneumonia. The older the patient, the greater the probability of this complication. This is not, as in the former condition, an extension of the inflammation from the trachea and bronchi, but an independent attack, though it may be, and usually is, preceded, in order of time, by catarrh. The laryngeal and coryzal symptoms are here to be regarded merely as prodromata of the pneumonia, induced by the same cause, and preceding it by a variable period. The pneumonic invasion is generally sudden, and this again separates it from the bronchial complications

which usually creep on insidiously. It runs a typical course, as in the ordinary pneumonia, and, unless death results, terminates by crisis within the usual period, and does not tend to continue on into a chronic form, as do the bronchial disorders.

It is often a most difficult matter to differentiate between these several complications, and the diagnosis is, therefore, frequently obscure. In children the fine crepitant râles of pneumonia are by no means easy to distinguish from the subcrepitant râles of bronchitis. In this latter affection the râles are at first limited to, and at all stages of the attack are more marked at, the lower portion of the lobes; in pneumonia, on the other hand, they are more evenly distributed over the entire surface of the lung. In pneumonia the fever is higher, the respiration more disturbed, and the natural progress of the measles, as a self-limiting disease, prevented. In bronchitis and broncho-pneumonia there is greater lividity, more jugular engorgement, and greater tendency to convulsions; but, as all these are comparative, and in the multiplicity of conditions variable, the positive diagnosis of the complication is sometimes simply impossible.

Acute tuberculosis is rather a sequel than a complication of measles. Still, it will happen occasionally that there is no defervescence between the pyrexia of measles and the beginning of the inflammatory phthisis, and that one merges so completely into the other that they run apparently a continuous course, death ensuing in from four to six weeks.

Diarrhœa is, as a rule, a symptom of little consequence, except when resulting from a sudden retrocession of the rash. Indeed, moderate frequency of stools, as long as these remain fæcal and natural in color and odor, seems to exert a favorable influence on the pyrexia. But should this mild intestinal catarrh become inflammatory, with bloody or glairy mucous stools, colic, and tenesmus, the case assumes a more serious aspect. Except in decidedly scrofulous children, death rarely, if ever, occurs from this complication alone.

Convulsions have already been mentioned as sometimes accentuating the commencement of an attack of measles. When these are limited to the first day or two, they are rarely significant of danger; but if they continue on into the eruptive stage, they indicate some severe visceral inflammation, and though probably never themselves the actual cause of death, they portend a fatal termination by means of that lesion (usually of the lungs) of which they are the consequence.

Epistaxis is a common enough symptom in all stages of the disease, especially during the first four days. It is rarely severe enough to excite any alarm, but in exceptional cases it may be so profuse as to endanger life. Epidemics of measles are sometimes of the typhoidal type, and in these, cases occur where bleeding from all the outlets of

the body, though not profuse enough to be really serious, does appreciably prolong the period of desquamation and delay convalescence.

Among other contagious disorders there are but two which are associated with measles with any special frequency; these are diphtheria and whooping-cough. Diphtheria is a very fatal complication, being rarely limited to the pharynx, but extending rapidly down the air-passages. Tracheotomy is an almost useless operation when diphtheria follows upon the heels of measles, as the growing membrane runs quickly past the wound, and involves the tissues below. Diphtheria, when it occurs as a complication, usually develops about the ninth day, but Henoch mentions one case in which the diphtheritic membrane and the measles rash developed simultaneously. If measles develop during the run of whooping-cough, the child will hardly escape the broncho-pneumonia which is sure to follow. Henoch observes: "Under such circumstances I have seen the eruption very scanty or cyanotic in color, while the dyspnœa was enormously increased; the pneumonic signs become more widespread, and the pulse more rapid and smaller. Death almost always occurred in from thirty-six to forty hours in intense cyanosis. This rapidly fatal course is to be apprehended in all children who are attacked by measles after having suffered for a long time from any of the exhausting diseases."* An almost equally fatal, though perhaps less rapid, result follows an attack of whooping-cough supervening on measles.

Diagnosis.—The careful observer need make no mistake in the diagnosis of measles, although before the appearance of the rash a guarded opinion must be given. Measles occurs in epidemics, and when it is in the neighborhood may be expected to seize on every child who is not already protected by a previous attack. Isolated cases, or cases not accounted for, are not so likely to occur as in scarlet fever, as the morbillous virus is neither so viable nor so portable as the scarlatinous. If symptoms of a severe catarrhal cold occur suddenly in a child previously in good health, who has not yet had measles, at a time when that disorder is epidemic in the vicinity, the attack is almost surely due to the specific contagion. Catarrhal colds in children do not come on suddenly and severely, but gradually; and this difference in the rate of progression will generally suffice to determine whether the symptoms are due to exposure to cold or exposure to contagion. If the swollen eyelids and the suffused eye, the coryza and the sneezing, the hoarse cough and the frontal headache, the languor, the fever, and the thirst, do not sufficiently emphasize the condition, so as to make the diagnosis positive, there is still one symptom which will prove the specificity of the attack fifteen or twenty hours before the development of the exanthem. This is the discovery

* Lectures on Diseases of Children, p. 280.

of a rose-colored papule on the free border of the uvula. Usually, also, a punctated redness can be observed on the hard and soft palate at the same period. If spasmodic laryngitis appear in a child not heretofore subject to that disorder, and the rise in bodily temperature showed that the attack was not a mere nervous symptom, we would naturally conclude that this was symptomatic of some latent febrile disorder. It has been already pointed out that measles is sometimes ushered in by an attack of laryngitis, with or without catarrhal symptoms; and the presence of an epidemic of that disorder in the neighborhood would suggest the probability that we have to deal with the effects of that disorder, hampered or complicated by some idiosyncrasy of the patient's constitution.

The measles exanthem in its several stages simulates that of scarlet fever, small-pox, typhus, rötheln, roseola, and syphilitic roseola; but these need never be confounded with it.

Scarlet fever differs from measles at the onset by the absence of catarrhal symptoms, by the injection, but not suffusion, of the eyes, by the greater intensity of the angina and fever, and by the appearance of the rash on the second day. The scarlet-fever rash begins on the upper part of the chest, and is very generally diffused; the edges of the patches are not well defined, and they do not form elevations; the rash consists of very small points, set closely together. On the other hand, the measles rash begins on the upper part of the face; it is papilliform, not punctiform; the patches are elevated, and their edges sharply defined. The color of the eruption varies very much in each exanthem, but taking into account the gravity of the general conditions, the measles rash is much duskier than the scarlatinal. It is stated that the two fevers may coexist, but this is not probable.

Small-pox has many symptoms corresponding to those of measles, but the rash comes out one day earlier, and the temperature falls as soon as the eruption appears; on the second day of the eruptive stage the small-pox papules become changed into vesicles, and all resemblance between the two disorders ceases. Nevertheless, just as the eruption is about to appear, a hasty examination might easily lead to an erroneous diagnosis. In both, there are catarrhal symptoms; in both, suffusion of the eyes; in both, small, red papules appear first on the face and thence spread downward over the rest of the body. If the measles eruption is very discrete, in passing the finger over the papule it may simulate the hard, shotty feeling so diagnostic of small-pox, and thus mislead the judgment. In small-pox there is a peculiar odor to the skin, a severe pain in the back, and the vomiting is much more alarming than in the early stage of measles; finally, small-pox is apt to attack the patient with greater abruptness.

Typhus, when it attacks children, presents some points of resemblance to measles, the most noticeable of which is the appearance of a some-

what similar rash on the fourth day of the fever. But the prœruptive stage of measles lacks the fierce pyrexia of typhus, and the eruption is usually of a brighter hue. The typhus exanthem, moreover, appears first on the wrists. In measles, the cough and coryza appear early, and are constant and prominent factors of the attack; while in typhus the bronchial irritation advances slowly and insidiously, and cough may be so slight as to be hardly noticeable. Measles is almost wholly a disease of childhood, and attacks the children of a family first; whereas typhus seizes the adults first, and passes from them to the children. When the patient is not seen until the rash has faded, and is then examined for the purpose of fixing the diagnosis, the mottling left upon the skin may look wonderfully like the petechial spots of typhus, but a careful study of the origin and history of the case will leave little room for doubt, even though measles and typhus be both epidemic in the community at the time,—a most rare contingency.

Rötheln has catarrhal symptoms, furred tongue with elevated papillæ, and the throat is slightly sore; in all these it resembles measles. But the rash appears on the same day as the fever in rötheln, and not until the fourth day in measles; it lasts but a day or two, is of a bright rosy-red color, and is seldom accompanied with a higher axilla temperature than 101° Fahr., while the exanthem of measles lasts three full days, is dusky in hue, and is usually associated with a high grade of fever heat (104°–105°).

Roseola and measles present a somewhat rough resemblance. The rash is of similar character, but is more discrete; it is accompanied by very little fever, and appears on the same day as the fever. Roseola is attended with no catarrhal symptoms, with very little disturbance of the general health, and the whole attack is ephemeral and unimportant.

The accompanying schedule shows the characteristic differences between these six diseases on the day of the appearance of the rash.

Measles.	Scarlet Fever.	Small-pox.
Rash appears on the *fourth* day.	Rash appears on the *second* day.	Rash appears on the *third* day.
Fever increases.	Fever remains about the same.	Fever declines very markedly.
Tongue thickly furred; a few papillæ enlarged.	Tongue furred; with many papillæ enlarged.	Tongue furred; papillæ not enlarged.
Slight sore throat.	Throat intensely sore and swollen, with glandular enlargements.	Slight sore throat.
Severe catarrhal symptoms.	No catarrh.	Eyes suffused, without catarrh.
		Severe lumbar pain.

Typhus.	Rötheln.	Roseola.
Rash appears on the *fourth* day.	Rash appears on the *first* day.	Rash appears on the *first* day.
Very intense fever.	Moderate fever.	Fever slight, or absent.
Tongue dry and tremulous.	Tongue furred; papillæ slightly enlarged, particularly at the edges.	Tongue very slightly furred; only a few papillæ enlarged.
Slight bronchial catarrh.	Slight sore throat.	Slight sore throat.
Eyes suffused, injected, and pupils contracted.	Very moderate catarrhal symptoms.	No catarrh.
Mouse-like odor of the skin.		

Syphilitic Roseola.—The mottling remaining after the exanthem of measles has faded is a close counterfeit of the staining of the skin from erythematous syphilides; but the history and course of the disease, the absence of chronic induration of the glands, and the fact that the mottling is most noticeable on the shoulders and over the scapulæ, while that of syphilitic origin is generally unobservable about the shoulders, but very pronounced on the abdomen and along the back, will clearly establish the diagnosis.

Eustace Smith mentions having seen cases of acute general eczema which presented the closest possible resemblance to the exanthem of measles; but the absence of catarrhal symptoms in the eyes, the nasal passages, and the throat, and the low temperature, would prevent the veriest tyro from making a mistake. Various other rashes occur which present a general resemblance to the morbillous exanthem. Of these are certain drug-rashes, such as from morphia, copaiba, etc., and also

from some varieties of fish. Such rashes, however, follow an irregular course, last a much longer time, and do not possess the ordinary concomitants of the exanthem of measles.

Prognosis.—The mortality varies greatly in different epidemics; but as a rule, the death-rate is low. Still, it is not the innocuous disease which many mothers consider it, and to avoid serious risk, the morbillous patient should receive all possible care. Some epidemics are mild at the beginning, but from telluric, or other, influences increase in malignancy as they progress. I took part some years ago in an epidemic of that sort. It began in that filthy region of which Little Twelfth street is the centre; it crept gradually northward, street by street, keeping all the way up to the westward of Eighth Avenue, until it reached Forty-sixth or Forty-seventh street, and then turned and came down over its old track. On its northward march, its victims were many, but the deaths were few; but as it came southward, it developed a terrible malignancy. Many children who had previously escaped now took the disease, and many others who had been ill with it had relapses (actual second attacks) and died with it. It was no uncommon thing to see two or three funerals every afternoon from a single block; and this went on for weeks, the epidemic creeping slowly southward, and finally dying out, apparently from the lack of victims, in the slums about Spring and Broome streets, west. Altogether more than twenty-five hundred deaths occurred. The rest of the city was that year almost free from the disease; but the following year it broke out on the east side, while the west side was free. In estimating, therefore, the chances of the patient's recovery, we must take carefully into account the general character of the epidemic.

Next in importance to the nature of the epidemic is the season of the year and the character of the weather during the illness. Cold and damp weather favors the development of bronchial and pulmonary complications, and so increases the gravity of the prognosis. If the attack be in summer, a long heated spell will tend to develop gastro-intestinal disorders, and the little patient may die from diarrhœa or convulsions. On the other hand, although the type of the epidemic may be malignant, if the weather becomes mild and equable, the death-rate will noticeably decrease. Except in the first months of life, the older the patient, the more serious the aspect; dentition and pregnancy are especially disastrous concomitants.

The previous health of the patient exercises a distinct influence on the course of the disease. If the child is healthy and strong, and has not been subjected to other deleterious influences recently, and if ordinary care be exercised, even though the epidemic be a malignant one, the child ought not to die. Even if the health has been impaired by previous illnesses, or if the child's sanitary surroundings are markedly unfavorable, the chances of recovery still predominate greatly.

Of more importance than actual recent illnesses are the constitutional tendencies of the child; yet, if these be bad, careful attention and nursing may still carry the little patient through the primary disorder; but it is less easy to avert permanent injury from the serious sequelæ which will probably develop in such a case. In spite of all we can do, a child of tuberculous diathesis will have that tendency receive a distinct impulse, and death will follow, at a longer or shorter interval, from some form of tuberculous development. The same is true of the scrofulous and rachitic diathesis; although the destruction of life may not be so immediate nor so sure.

In very young children capillary bronchitis, and in those somewhat older broncho-pneumonia, is a very common complication. This, although serious, does not warrant an unfavorable prognosis, unless the child is of an unhealthy parentage. If the older children of the family present signs of rachitis or scrofulosis, or if the father was syphilized previous to the conception of the child, the final result will remain in doubt, not only until the subsidence of the secondary fever, but until convalescence is fully completed. In such cases, after the patient is supposed to be out of danger, fever may return, glandular enlargements take place, and serious results follow. If, therefore, the child be weakly, either constitutionally or accidentally, we should speak very guardedly as to his ultimate recovery.

In brief, the conditions for a favorable prognosis are: the disease follows the ordinary sequence in the development of symptoms; the complications are moderate, and do not prolong the fever beyond the seventh day; all the symptoms gradually decrease with the fading of the rash.

An unfavorable prognosis must be made when the disease develops irregularly or follows an irregular course; when during the premonitory stage the axilla temperature goes above 104° Fahr., or remains high beyond the seventh day; when the exanthem, instead of fading, turns livid, and hæmorrhages occur from any of the outlets of the body; or when diarrhœa, pneumonia, meningitis, or other serious disorder supervenes.

Treatment.—In considering the physician's duty in relation to this disorder, we must define the power of prophylaxis; the benefit to be anticipated from due regard to the dietary of the patient, the use of disinfectants, and the competency of the nurse; the selection of the remedy homœopathic to the case; and whatever advantages may be had from the employment of baths and other auxiliaries. In a disorder so apt to be associated with complications more destructive to life than itself, and to be followed by sequelæ so serious, long-lasting and penetrating in their results, it behooves us to take advantage of every element of a rational therapeutics, to guard our patient at every avenue of attack, and to fortify him with every means which experi-

ence has shown to be successful. To do this in the most successful manner in any given case means the possession of a thorough mastery of the entire art of healing.

Prevention.—Isolation is rarely effective as a preventive measure, because the child has already been infected before the desirability of sequestration is suggested. The period of incubation is so long, and the possibility of infection by means of the breath of any one who may be incubating the disorder is so great, that the methods which answer in scarlet fever are of little value in measles. Absolute immunity against this infection, as is sometimes seen in relation to scarlet fever, probably never occurs. Unless the child has had the disorder, it is almost sure to take it upon due exposure. All do not, however, take it at the first contact. In the same family some of the children may sicken with the disease three or four weeks later than the first patient, and this when no effort has been made to guard against the spread of the disorder. This would seem to indicate that those who had it later could have been saved from the contagion by proper isolation. Except when all the conditions are favorable, such as the prevalence of a mild epidemic at a seasonable period, and the child is known to be free from all predisposition to diathetic diseases, I should enforce isolation.

The value of Pulsatilla as a prophylactic is doubtful, though its usefulness, when given for the early catarrhal condition, is not to be gainsaid. I am inclined to believe that Pulsatilla, when given before the appearance of any symptoms, may hold the disease in check for a while, but it will afterwards break out with increased violence. Sulphur, while not at all prophylactic, may be given occasionally to a child who is supposed to be incubating measles. It will tend to ward off subsequent complications or to render them less serious. But on the whole, we cannot claim ability to do anything to prevent the spread of the disease, except such results as are due to our sanitary regulation of the patient during the course of the fever. This will now be described.

Hygienic and Dietetic Treatment.—The room in which the patient is confined should be kept at as equable a temperature as possible. It is best that it should be a little warmer than that required by a scarlatinous patient, but it should be equally well ventilated. Drafts must be avoided, and yet a free circulation of fresh air maintained. It is a mistake to keep the room too dark. The amount of light should be regulated to suit the comfort of the patient; but it is always well to arrange the bed in such a position that when sunlight is admitted it does not fall directly upon the patient's eyes. The patient should be put into bed and kept there. The child will go to bed readily enough at the beginning of the attack, for he feels languid and tired, and wants to lie down; but when the rash has come well

out, the mind is clearer, and in only moderately severe cases he may desire to sit up or move about the room. This should not be permitted, but he should be kept quietly in bed until convalescence is fully established. Quietude and absolute cleanliness, both of the room and of the patient's person, should be enforced. No one should be permitted in the sick-room except the necessary attendants, and every form of excitement and everything likely to interfere with sleep should be sedulously avoided. All excreta and soiled linen should be immediately carried out of the room. The child's skin should be cleansed at least once a day, and a morning and evening sponge-bath is generally preferable. It is a popular notion that it is dangerous to undress the morbillous patient—that it will drive the rash in, and cause serious consequences. Consequently, such children are often allowed to lie unwashed and unkempt for several days, even in families who ordinarily appreciate the amenities of life. It is not necessary in cases of measles to keep the child dirty, though, of course, in bathing it, and changing its body-linen, every precaution must be taken to prevent exposure and a chill. It is my custom to require that the child be deftly bathed with alkalized water night and morning. This is prepared by adding to water nearly boiling, sufficient bicarbonate of soda to produce a soft and agreeable impression upon the hand. The patient is sponged quickly with this, one part of the body at a time, each part being uncovered, washed, and dried separately, so that no considerable surface is exposed at one time. As the bath proceeds, a little boiling water is occasionally added, so that the last of the bath shall be taken at as high a temperature as the beginning. This not only does not in any way injure the patient, but is almost always followed by a quiet sleep and a temporary reduction in the temperature.

Sleep is very essential to the morbillous patient; it lessens fever and increases appetite. So important do I consider sleep, naturally obtained, that I willingly sacrifice to it every other condition in the regimen and treatment. It is especially important, if serious complications occur, that appetite shall be maintained, and nothing so preserves the natural relish for food as a sufficiency of sleep. Thirst is often considerable and, unless satisfied, induces wakefulness. The patient needs a much larger quantity of fluids than in health; and this increased need will be proportional to the amount of fever. Warm drinks are preferable, and if there is much gastric disturbance, freshly boiled water, taken as hot as it can be sipped, relieves thirst and quiets the stomach better than anything else. Iced preparations must not be permitted, as tending to impair digestion; but the patient may be allowed to suck slivers of ice if he craves something cold. Acid drinks are generally relished; these may be made from the juice of limes, oranges or lemons, tamarinds, raspberry or gooseberry vinegar, or

dilute nitric or other mineral acids, as may be convenient or as may suit the caprice of the patient.

The amount of food to be allowed is a matter for serious consideration, and will need to be carefully adjusted to the digestive capacity of the individual. In nearly all cases there is some stomachic disturbance, and this may be made serious by injudicious feeding. It is a good rule, in the early part of the attack, not to offer food unless demanded by the patient, and then to give rather less than the appetite craves. What is given should be in such form as to throw as little work as possible on the digestive apparatus, and a reasonable variety is to be insured, the food being given in small amounts, repeated at short intervals. Milk, oatmeal gruel, chicken-broth, beef-tea, and calf's-foot jelly will form a sufficient variety for the first week of illness. Three or four ounces of milk, or a proportionate amount of the other viands, at one time, is quite enough for a child under six years of age. If desired, the milk can be reinforced by half a teaspoonful of Beef peptonoids, which not only gives it an agreeable flavor and adds to its nutritiousness, but also increases its digestibility. If vomiting is persistent, the uncooked albumen of egg, diluted with barley-water, should be given in small quantities at frequent intervals. Should the child be very weak, it may be desirable to dilute the milk with a third part of barley water, so as to insure a proper division of the curd; and to this can be added ten drops of limewater to the ounce if the food shows a tendency to turn acid upon the stomach. In the second week of the illness, if all goes well, a more generous dietary will be demanded and may be allowed. Soft-boiled eggs, a bit of broiled chicken, meat jellies, and light puddings may be given in moderation, but care must be exercised not to overload the stomach, or to permit too great a variety of food at one time.

Alcoholic stimulants are not required in ordinary cases of measles. Even if the child be very much enfeebled, the most natural stimulant, and the most efficient, is easily digested food, in small quantities, at brief intervals. If from excessive prostration, feebleness of the pulse, or failure of digestion, it seems desirable to resort to alcohol, it is best given in very small quantities with the food. Probably the best form in which to give it is as eggnog or simply in milk. A teaspoonful of good brandy or rye whiskey in two ounces of milk, a teaspoonful of which mixture may be given every five minutes, will increase the force of the heart's action, stimulate digestion, and promote sleep. In all exhausting diseases, children bear alcoholic stimulation very well, but, save in great crises, they are not benefited by it in proportion to the amount ingested.

During convalescence every precaution should be taken to secure a sufficiency of good, sound sleep. There is always considerable vital depression at this period, and the patient should be encouraged to

take, in addition to the ordinary sleep at night, one or two naps during the day. The appetite, digestion, and assimilation are all greatly influenced by the amount and quality of the sleep, and, other things being equal, the more hours spent in sleep, the more rapid the convalescence. Simple, healthy food, moderate exercise in the open air, in the direct sunlight, and the avoidance of fatigue and exhausting emotions, is all that is required in ordinary cases.

Therapeutics.—The simple variety of measles requires little medication. Each epidemic presents certain characteristics of its own which point to some one remedy. This, except in cases decidedly modified by diathetic conditions in the individual patient, will usually cure every case of that epidemic. Thus, in one epidemic of measles some years since, I cured every one of my cases—one hundred and fifteen —with *Gelsemium*, giving no other remedy until after the fever had completely subsided, and even then in only a few cases, where the exanthemata had given an impulse to some constitutional weakness, or the patient was neglected and took cold, or some other complication arose, not directly traceable to the febrile disorder. In this particular epidemic the fever and concomitant symptoms presented such a complete picture of the Gelsemium pathogenesis that no homœopathic physician would have been justified in prescribing any other remedy; but in other epidemics of measles Gelsemium is not called for at all. I believe I have not prescribed it once, in this disorder, during the past two years. Most of our physicians still follow the elder homœopathists in always giving *Aconitum* in the prodromal stage, if called to the case at that period. It is, as a rule, a well-directed prescription, especially when thirst and restlessness are dominating concomitants of the pyrexia. In moderate cases the exanthem runs its course, under the continued use of this remedy, without any serious complications arising.

It has been my rule for some years not to give *Pulsatilla* until after the eruption has developed, in all those cases in which there is presumptive expectation that this disorder is incubating. Should Pulsatilla be given just as the prodromata are about to appear, it may delay the development of the disease, and by thus prolonging the preëruptive period intensify the subsequent series of symptoms. Nevertheless, should the system call unmistakably for Pulsatilla at this, or any other, period, theoretical reasons would have to give way in the presence of clinical facts. When the exanthem fails to appear at the proper time, the most probable remedy will be *Bryonia*, though, if vomiting sets in and becomes persistent, *Antimonium crudum* may give a more favorable appearance to the case. When the pulse becomes very feeble and intermittent, the extremities grow cold, and the patient exhibits an alarming and increasing prostration, *Veratrum*, *Arsenicum*, *Carbo vegetabilis*, *Phosphorus*, or *Camphor* will bring relief. Just which

of these remedies will be the best in any given case can only be known by a careful comparison of their several symptoms. Whichever drug may be selected as homœopathic, I desire to counsel, from my own experience, against giving the very lowest potencies of any of these drugs in so critical a condition. Taking, for instance, the last mentioned one, without doubt in many of these algide cases one or two-drop doses of the tincture will stimulate the heart and improve the pulse, warm the extremities and arouse the sensorium from its dazed condition, and thus apparently ward off the fatal collapse. But this improvement lasts, perhaps, but a few hours. Soon the dangerous symptoms return, reaction against them cannot be induced, and the little patient dies. A more attenuated dose, if the remedy be truly homœopathic, will bring about an improvement which will be permanent and satisfactory. If it be asked *how* can one *know* that the remedy is homœopathic, the only proper reply is that of Hahnemann: "When we have to do with an art whose end is the saving of human life, any neglect to make ourselves thorough masters of it becomes a crime."

When the exanthem is fairly out, if the case seems likely to depart in any particular from a normal course, a few doses of Sulphur, intercurrently, may prevent the waking-up of latent diathetic conditions, and carry the case safely through to a favorable termination. This is all the treatment which a majority of the cases will require. It is desirable to select, in the beginning, the remedy which corresponds closest to the general character of the epidemic, and to give it steadily in such dose and potency as may seem, in the judgment of the practitioner, most serviceable, avoiding chasing after isolated, though troublesome, symptoms, as, if the first remedy has been correctly chosen, and its influence is reinforced by Sulphur in the cases indicated, these will all disappear with the natural evolution of the disease. In this way, while *Ipecacuanha* may seem indicated for the dyspnœa, *Phosphorus* for the hacking cough and scraping in the trachea, *Kali bichromicum* for the hoarseness, *Tartarus emeticus* for the rattling breathing, *Pulsatilla* for the dry coryza, *Euphrasia* for the conjunctival injection, *Belladonna* for the tendency to delirium, and *Arsenicum* for the diarrhœa, yet more harm than good will be done by changing from one to another of these remedies as various symptoms assume a temporary prominence. While, however, the case should be treated throughout with one remedy, a remedy selected in reference to the idiosyncrasies of the prevailing epidemic, no blind persistence should prevent the practitioner from changing the remedy when conditions arise indicating the development of concomitants and complications not provided for in the previous prescription.

If the eruption suddenly recedes, or alters in appearances, *Bryonia*, *Ammonium carbonicum*, *Opium*, *Gelsemium*, *Cuprum*, or *Ipecacuanha* will probably be needed. For cerebral affections: *Belladonna*, *Arsenicum*,

Cuprum, or *Veratrum viride*. For ophthalmic disorders: *Pulsatilla*, *Euphrasia*, *Mercurius*, *Belladonna*, *Sulphur*, or *Arsenicum*. For sleeplessness: *Coffea*, *Belladonna*, or *Sulphur*. For convulsions: *Gelsemium*, *Belladonna*, *Veratrum viride*, or *Coffea*. For swelling of the parotid and other cervical glands: *Mercurius iodatus*, *Baryta muriatica*, *Dulcamara*, *Arnica*, or *Arsenicum*. For aphthous and other sores in the buccal cavity and pharynx: *Sulphur*, *Mercurius*, or *Phytolacca*. For diphtheria: *Lachesis*, *Apis*, *Lycopodium*, *Phytolacca*, *Mercurius cyanatus*, *Bromium*, *Arsenicum*, or *Baptisia*. For croupy cough: *Hepar sulphuris*, *Spongia*, or *Kali bichromicum*. For whooping-cough: *Drosera*, *Zincum*, *Scilla*, *Coccus*, or *Lobelia*. For dry cough: *Hyoscyamus* or *Chamomilla*. For bronchitis: *Kali bichromicum*, *Asclepias*, *Bryonia*, *Euphrasia*, *Sepia*, *Ferrum phosphoricum*, or *Pulsatilla*. For pneumonia: *Phosphorus*, *Sanguinaria*, *Tartar emeticus*, *Cannabis sativa*, *Nux vomica*, *Spongia*, *Kali carbonicum*, or *Sulphur*. For typhoid conditions: *Baptisia*, *Terebinthina*, *Rhus toxicodendron*, or *Carbo vegetabilis*.

During convalescence: For gastric derangements, *Antimonium crudum*, *Sanguinaria*, *Kali bichromicum*, or *Sulphur;* for extreme weakness, *Cinchona* or *Phosphoricum acidum*.

The choice of remedy will probably fall on one of the following:

Aconitum presents an almost photographic resemblance to the measles pyrexia in a majority of the cases, without having probably any influence over the septic germs upon which the disorder depends. It is not an antidote to the measles malaria, in the sense that Baptisia is of typhoid, Arsenicum of intermittents, or Belladonna of the smooth variety of scarlatina; nor will it cut short an attack of this disorder as it can a rheumatic fever or a tonsillitis. Its utmost power seems to be to ward off the effect of the poison upon the tissues, to prevent local inflammations, to preserve the integrity of the vaso-motor system, to calm the arterial storm, as oil cast upon the waters, until the disease has past its culmination and subsides by natural limitation. The resemblance of the first stage of measles to a febrile coryza from exposure to inclement weather; the irritation of the mucous membrane of the eyes, nose, and throat; the headache and the roaring in the ears; the stupefied sensorium; the intolerance of noise and the desire for quiet; the thirst, the loathing of food, the nausea, and the anxious feeling in the præcordia; the quickened pulse, the husky voice, and the nervous restlessness, present the Aconite picture in vivid outline. And if we will remember that it *is but an outline*, that the measles-miasm and the Aconite poison are not in their essentials similar, we will prevent ourselves from falling into the error of expecting too much from the remedy. But given, as it were, as a stimulant to all the vital processes, and thus putting them on their guard against the ravages of the virus, it will accomplish—in those cases which thus present a rough similarity—all that our present knowledge of the resources of the Materia Medica permits. It is true that, toxicologically, Aconite has produced red spots and dots upon the skin, spots like fleabites, and various itching eruptions; but I see nothing in this to modify the statement above, based upon clinical experience. Aconite has never caused measles, seems utterly incapable of causing measles, and cannot, therefore, cure measles in the technicalsense; but as patience will alleviate calamities which it cannot cure, so Aconite will conduct a case to a harmless conclusion. Aconite will be indicated in inverse proportion to the amount of blood-poisoning, and will find its chief service in those sthenic cases for which allopathic authorities still recommend the lancet.

Gelsemium is, in some epidemics, the all-sufficient remedy. In cases which call for this remedy, rather than Aconite, there is much more muscular prostration. The patient, instead of being restless, keeps quiet from a sense of inability to make the necessary effort to get about. He lies with the eyes closed, because it seems to require too much effort to keep them open. He is drowsy, though conscious, with a sense of mental helplessness, as in one under the effects of drink. This semi-somnolence

is associated with giddiness, so that when the little patient is carried about, he seizes hold of the nurse as if he thought he was about to fall. If the patient is older, he complains very much of his eyes. They feel sore, sensitive to the light, are watery; the eyelids feel heavy; and vision is dim and confused. The expression of the face is dull and besotted. Speech is indistinct, as if from difficulty in properly controlling the tongue. Thirst and appetite are both subnormal, and may be altogether absent. This peculiar languor of body and mind is very characteristic of Gelsemium, so that even the fever is of the asthenic variety. The pulse is not very rapid, and inclines to be full and soft. The tongue is covered with a moist white fur All the symptoms are manifestly worse toward nightfall and during the night, there being a distinct remission in the morning, including in many cases a decided fall in the bodily temperature. Gelsemium will also supersede Aconite when, on the day of the eruption, convulsions occur or seem imminent; when respiration becomes slow, with sudden and forcible expiration and rattling in the glottis; when the catarrhal symptoms are more dominant than the exanthem or the fever; or when the rash suddenly recedes, leaving livid spots, with abdominal and thoracic congestion.

Belladonna is much more rarely needed in the treatment of this disorder, The Belladonna fever is ordinarily much fiercer than the measles pyrexia; but in cases in which the arterial storm is severe, the congestion to the head very noticeable, the inability to sleep, though constantly drowsy, is marked, the throat is very sore, and the cough hollow and barking, it may be of great service.

Euphrasia has a special influence upon the eyes, and when the conjunctival inflammation is out of proportion to the other catarrhal symptoms, during the prodromal period, or later, it is the remedy which is more likely than any other to prevent serious mischief to the visual organs. It is particularly indicated when the secretion from the eyes is acrid, while that from the nasal passages is bland. This is the reverse of Arsenicum, between which two remedies the choice will often fall in this connection. It is the custom of many physicians to alternate this remedy with Aconite, under the impression that some remedy must be given for the fever. But Euphrasia is itself capable of reducing temperature in those cases in which it is homœopathically indicated. The Euphrasia pyrexia is, as can be seen from the provings, similar to the ordinary feverishness of a catarrhal cold. It is more like the Gelsemium fever than that of either Aconite or Belladonna, but it differs from it in the absence of muscular prostration, and of the typhoid-like symptoms. It further resembles Gelsemium in the confused sensorium, and in the dimmed vision, but this similarity is only superficial, and the two remedies are easily distinguishable. When the febrile movement is pronounced, Euphrasia is rarely the remedy; although if all the other concomitants agreed, I should not hesitate to depend upon it because the temperature was 102°–103° Fahr. If the temperature goes higher than that, other symptoms will almost surely supervene which are not contained in the Euphrasia pathogenesy.

Pulsatilla is an old-time favorite in this disorder, and it is given by many of those who practice homœopathy as a routine remedy; but cases differ so greatly one from another, that it is no wonder that some die under routine treatment. It is my belief that save in epidemics of hæmorrhagic (black) measles the mortality from primary measles should be *nil*. Unhealthy children will die from the impetus given by the primary disorder to some latent condition. That cannot be avoided, and it is well that it cannot. Death in such cases is generally a merciful interposition of Providence, as it saves the victim of unhealthy or mismated parentage from the sufferings which await it after puberty. But in an ordinarily healthy child the careful student of the Materia Medica has a problem which he can work out successfully, if he has the good fortune to be seconded by an efficient nurse. Pulsatilla will rarely be indicated in the prodromal stage, more frequently at the height of the exanthem, when, if the symptoms actually demand it, it causes a rapid and, at times, almost miraculous defervescence; and most of all during desquamation, when the gastric or thoracic symptoms persist or assume importance. For the early coryza Pulsatilla is not often needed, but at this later stage, when the discharge has become cream-like, yellow, or yellow-green, or when the nose is stopped up, with hardness of hearing, roaring in the ears, styes or other inflammations about the eyes, deranged digestion, gurgling and pressure in the abdomen, frequent or involuntary micturition, shortness of breath, with difficult expectoration and wandering pains in various parts, this is generally the remedy.

Sulphur often helps to clear up a case at any stage. It has no relation to the

exanthemata, has no power to abort an attack or cut short the disease, but it will modify or prevent the various complications which are apt to show themselves in this connection.

Auxiliary Treatment.—The simple form of measles needs no auxiliary treatment. The appropriate remedy, careful nursing, seclusion, and cleanliness are all-sufficient in a majority of cases. When certain local symptoms assume undue prominence, local measures may be adopted which do not interfere with the general treatment. Thus, when bleeding at the nose is severe or prolonged, a simple injection of cold water will sometimes put an end to it. Still, it must be remembered that a moderate bleeding often relieves congestion in the neighboring organs, and is nature's remedy for that purpose. More harm might, therefore, be done by forcibly stopping it than in permitting its continuance. Should the bleeding become an active hæmorrhage, plugging the nostrils may be necessary. The vomiting which usually occurs during the prodroma, or on the day of the eruption, is rarely severe enough to cause alarm. If it does not cease spontaneously, and it is the rule for it to do so, the patient may be permitted to swallow small pellets of ice, or may be given freshly boiled water, sipped as hot as it can be coaxed down. For the convulsions little can be done, and little needs to be done. They are rarely long-lasting or severe. When they are so, they are symptomatic of the general condition, and furnish an important help in the selection of the remedy homœopathic to the case. When the bodily temperature is high, convulsions may occur from the incautious ingestion of food. In such cases the temperature may be very rapidly lowered by enemata of cold water, a gill at a time, repeated in ten minutes, or at such intervals as the circumstances of the case and the effects produced may seem to warrant. I should advise the use of this measure only in desperate cases, but I have certainly seen it produce good results. This it does primarily by its tonic effect upon the nervous system, and secondarily by reducing temperature and permitting the stomach to perform its proper office.

When the laryngitis is severe, a sponge wrung out of boiling water may be applied beneath the chin. If this does not quickly afford relief, the cold pack to the throat is usually efficient and comforting. The prodroma is sometimes unduly prolonged by the appearance of bronchitic or pneumonic inflammation. In such a case a hot mustard bath will relieve the internal congestion, and send the rash out. The child can be kept in the bath until the nurse's hand and arm begin to tingle; assuming, of course, that the hand is continued in the bath continuously from the time the child is put into it. If capillary bronchitis, catarrhal pneumonia, or other thoracic congestion occur during the desquamative stage of the disorder, life may often be saved by the timely use of the dry-cup along the spine and on the dorsal aspect of

the chest. I have obtained very satisfactory results from the use of a modified cold pack. A napkin is wrung out of water at a temperature of 80°–90° Fahr., and is then placed upon the chest, leaving the arms free, but covering the entire front and sides of the body as far down as the diaphragm. Over this is quickly put a sheet of cotton wool, and this is covered with a roll of flannel or a square of oiled silk. If the temperature is above 104° Fahr., this may be renewed every half hour, the old napkin each time being replaced with a fresh one. If the fever is only moderate, but dyspnœa is severe, this pack may still be used, and will probably need renewing only every two or three hours. This application is immediately followed by deepened inspiration, driving the air downward into the alveoli, and thus preventing atelectasis. Usually a gentle perspiration will quickly ensue, and this, if care be taken to prevent its becoming too profuse, will greatly aid the action of the proper remedy. When there is much hoarseness or dyspnœa, it is well that the air of the apartment be kept moist with steam.

Sequelæ.—The sequelæ of measles are as a rule nothing more than the already described complications which have been allowed to run on and become chronic. Chronic broncho-pneumonia is undoubtedly the most frequent of these untoward after-effects. In this chronic form ulceration may begin on the mucous surface of the tubes or in the hepatized tissue, forming little pockets or cavities, filled with a cheesy mass which looks not unlike tubercle. These millet-sized bodies may be subsequently absorbed, or they may form the basis of a more extensive degeneration. Such cases may go on for a number of months, and then terminate fatally. Complete recovery is rare, as the condition depends upon a previous vitiated state of the system, to which the attack of measles has simply given opportunity for development.

In cases in which there has been no impairment of the lung, we may still have a very obstinate chronic laryngitis and bronchitis. Enlarged bronchial glands often remain for months as sequelæ of the disorder; nor is this always dependent upon an obvious cachexia. In all cases of hoarseness remaining after an attack of measles a careful laryngological examination should, if possible, be made, to determine whether the trouble is a local paresis, an anæmia of the vocal cords, or a chronic inflammation. In some of these cases the supposed laryngitis turns out to be due to a weakness of the adductor muscles, which prevents them from putting proper tension on the cords. The tissues will be relaxed and anæmic, and this may be a premonitory indication of tuberculosis.

Gangrenous inflammation of the buccal cavity is another possible sequela of measles. It begins insidiously, as a slight excoriation. After remaining quiescent for an indefinite period, it suddenly

becomes malignant; the tissues slough, the gums swell, the teeth drop out, the eye is closed, the ulcer eats through the cheek, and the child probably dies of septicæmia. A similar inflammation is occasionally seen further back in the pharynx, with abscesses on the anterior surface of the neck, or it may still more rarely occur at the vulva.

Otitis with chronic impairment of hearing is all too common; still, it does not occur as frequently as after scarlet fever. Chronic blepharitis, conjunctivitis, keratitis, and other degenerations of the eye may occur in the scrofulous or the neglected. Measles often leaves the eyes sensitive and of not much use for months afterward; but actual blindness is probably always the result of carelessness during convalescence.

Degenerative changes of the kidney and liver are much less probable than after scarlet fever. Nephritis is very rare; even Henoch says he has seen but few cases. Diseases of the skin follow measles quite commonly; these are chiefly eczema, impetigo, and ecthyma. Purpura may develop subsequent to measles, even in cases which do not themselves show any hæmorrhagic tendency.

The treatment of these sequelæ must be mainly systemic. Whatever promotes the general health of the patient will moderate the effects of the local lesion. In addition to the indicated remedy, warm clothing, a varied though simple dietary, cold sponge bathing in the morning, and cod-liver oil are recommended.

RÖTHELN.

BY GEORGE WILLIAM WINTERBURN, M.D.

Synonyms.—German measles, Mock measles, Epidemic roseola, Scarlatina morbillosa, Rubeola notha, Hybrid scarlatina.

Definition.—Rötheln is a term used to designate an epidemic exanthem presenting characteristics composite of measles and scarlatina, but proving its specific nature by not protecting the subject from subsequent attacks of either of these disorders. It is attended with but little constitutional disturbance, and its entire duration rarely exceeds one week. The eruption somewhat resembles in general appearance that of scarlatina, but it is paler. The catarrhal symptoms are similar to those of measles, but more benign.

History.—This disorder appears to be indigenous to Germany, where it was recognized as an affection differing from ordinary measles about a century or more ago. It seems to have been imported into this country in the winter of 1873–74, when an epidemic, new to New York practitioners, swept across the city. It spread the next year to Philadelphia, and thence further south. In 1880–81, it became quite

generally prevalent, the epidemic appearing in Boston, Philadelphia, St. Louis, Chicago, and nearly all the larger cities. It again prevailed extensively in the autumn of 1883 in this city. Cases are reported to have occurred in Boston as early as 1845, but unless the disease was subsequently mistaken for the ordinary measles, it then died out, and fresh cases did not appear until it was brought into New York by immigrants some ten years since. It is more than probable that the disease has prevailed in many localities where it was not recognized as a disorder distinct from the morbillous exanthem. Murchison seems to have been the first to point out that this affection is not protective against measles, and the lack of definiteness in the diagnosis has probably led to error in some of the reports of second attacks of this latter disease.

Efforts have been made to show that rötheln was known to the Arabians many centuries ago; but this seems more than improbable. They were unable to differentiate between the other exanthemata, and even though rötheln had existed at that time, they would not have distinguished it from measles and scarlatina. De Bergen, in 1752, and Orlon, in 1758, were the first to separate it diagnostically from other disorders of its class, but their ideas were disputed, and never gained general credence in the profession. In 1815, Maton, of England, called attention to an epidemic eruptive disorder which presented characteristics differing from measles, scarlatina, and variola, and which he asserted deserved a new designation; this was evidently what we now know as rötheln. It was about this time that Hildebrand advanced the idea that this was a mere hybrid variation of measles, a point which will be discussed under the pathology of the disease.

Ætiology.—The nature of this contagium has not been defined. Like other of the exanthemata, it is essentially a disease of childhood, and according to statistics is somewhat more prevalent among girls than among boys; but this apparent difference may be due to inaccurate observation.

Susceptibility to the disease remains nearly constant up to puberty, when it greatly lessens; still, cases have been observed in persons of forty years of age. The period of incubation seems to vary, in different epidemics, from six to twenty-one days, the average being fourteen. It has exceptionally been observed to be contagious before the exanthem appears, in this respect resembling measles. Its contagion is not nearly as great as that of measles, the majority of children escaping altogether; and epidemics in this country seem to have a tendency to die out, the same as all exotic disorders. In Germany it is more constant and prevails more extensively.

Pathology.—As there are no fatal cases of rötheln, the only anatomical lesion which has been observed is the one upon the skin; and this varies so much in different epidemics that it hardly comes within

the meaning of the term "characteristic." This variation in the expression of the disease and its limits being somewhat wide, it has been made the basis of a theory that rötheln after all is only a hybrid measles or scarlatina. Hartshorne has pointed out that in malarial regions, during epidemics of yellow fever, cases are to be met with presenting the combined characteristics of these two fevers (yellow and intermittent); in the same way, typhoid fever and malignant remittent occasionally seem to unite as a typho-malarial fever. And from this it has been argued that rötheln is simply the union of some malarious miasm with the morbillous or scarlatinous virus. It would seem, however, as if this could hardly be the case, for several reasons.

Rötheln is not a fatal disorder, and we cannot well assume that the union of a malarious influence with measles would render the attack less fatal. Nor is it within fair presumption to suppose that rötheln is a mere variation from measles, when it is in no degree protective against a subsequent attack of that disorder; nor does either scarlatina or measles prevent the occurrence of this disease; nor has any one ever seen rötheln generate anything but rötheln. The rash of rötheln consists of lenticular blotches of pale rose-color. These are due to capillary hyperæmia of the papillary layer. In some cases miliaria form on these patches, especially on those located on the back. As these hyperæmic spots fade, they leave faint stains upon the skin; but these soon vanish, being neither as long-lasting nor as deep in tinge as those of measles.

Symptoms.—Rötheln is divisible, like other eruptive fevers, into a prodromal period, the eruptive stage, and the stage of desquamation; but these divisions are not in all cases clearly defined.

I. *Prodromata.*—In mild cases there may be no premonitory symptoms, the first manifestation of the disease being the eruption. Severe cases will be ushered in by shivering, slight fever, headache, nausea, pains in the back and limbs, and abnormal sensitiveness to external influences. Stiffness of the neck is the most usual symptom, and often the only one, during the prodrome. Lewis Smith records one case of convulsions.

II. *Eruption.*—After an average incubation of fourteen days, the rash appears. The period of incubation varies very much in length, in this resembling scarlatina; in measles the period of latency is more uniform. The part of the body upon which the rash first presents itself is not always the same, but it most frequently begins upon the face, sometimes upon the neck, chest, or back, more rarely upon the arms or thighs. According to Emminghaus the eruption generally forms roseolæ varying in size from that of a pin's-head to that of a small bean. These are pale-red or rosy in color, mostly round in shape, though sometimes oval, and bordered by well-defined or blurred edges, as the case may be. The intervening skin is generally un-

changed, but this is not always so. A close inspection will reveal upon the skin, between the punctated spots, small dilated bloodvessels, while from the spots themselves processes extend, with more or less regularity, to other spots, in such a way as to give the skin a marbled appearance. The larger the spots, the more discrete they are apt to be, and they are seldom arranged in crescentic outline. When considerably scattered and far apart, they are apt to be surrounded by a pale but perceptible halo; but when minute in size and crowded together, they present a close resemblance to the scarlatinous exanthem. The rash is, however, less vivid than in scarlet fever, and less purplish than in measles. They are oftener confluent upon the face than upon the body or extremities, and when thus thickly studded are apt to occasion intense itching. A marked characteristic of the rötheln rash, as characteristic as this lack of uniformity of expression, is that it is never fully developed all over the body at one time. No matter on what part of the surface it begins its invasion, it proceeds so sedately in its march from part to part, that the earlier macules have lived their life and departed, leaving nothing but a staining of the skin to show where they have been, before the later ones appear. As each macule remains visible only from three to twelve hours, if the first spots are upon the face, these will be quite gone thirty or forty hours before the development of the rash upon the thighs; this should be ample to differentiate it from measles. The entire duration of the rash is about four days. Sometimes a vesicular eruption appears in conjunction or alternation with the already described punctated; with this there is considerable itching.

The constitutional symptoms associated with the rötheln-exanthem are usually ephemeral. The extent and intensity of the involvement of the mucous membrane vary considerably, but, as a rule, it is merely spotted over with macules similar to those upon the cutaneous surface; sometimes a uniform hyperæmia may be detected on all the visible mucous surfaces. In the average case the eyes are but slightly suffused, lachrymation is moderate, and photophobia only noticed under intense light. Sneezing is common enough, but there is generally little, if any, coryzal discharge. Sore throat is a more constant feature, and is apt to persist after the fading of the rash. The tongue is usually covered with a white fur, through which a few enlarged and reddened papillæ can be seen, especially at the tip. The tonsils are moderately swollen, but never ulcerated. A very important and characteristic condition in rötheln is the swelling of the lymphatic glands of the neck, especially those back of the sterno-mastoid; this induration often precedes the appearance of the rash, and in severe cases there is usually a marked tendency to the engorgement of glandular structures elsewhere. The bodily temperature seldom reaches 102° Fahr., though when complications are present it sometimes goes to

104° Fahr. The fever usually reaches its highest point on the second day of the rash, and then slowly declines. In other cases it maintains a high level for three or four days, and then ends by sudden defervescence. The pulse is moderate, and follows the temperature. Transient albuminuria has been noticed in some cases, but it may well be doubted if this can rightly be considered a characteristic of rötheln.

III. *Desquamation.*—The fading exanthem leaves a brownish stain upon the skin, which gradually fades. The desquamation is furfuraceous and unimportant. During this period, and for a week or more after the fading of the rash, the bodily temperature may be easily disturbed by fatigue, mental excitement, or any of the ordinary causes of debility. Complications and sequelæ are rare, but the following have been mentioned: diphtheria, pneumonia, bronchitis, otorrhœa, ciliary blepharitis. The total duration of an attack of rötheln is about seven days.

Diagnosis.—The detection of rötheln ought not to be difficult to one who has familiarized himself with its symptoms, though Hardaway mentions* that a physician asked him to examine his child, suffering, as he thought, with measles, which upon a careful investigation turned out to be a typical rötheln; a number of weeks later an older child got measles, from which it was communicated to this patient; in the following year both children had scarlatina. The only disorders with which rötheln is likely to be confounded are small-pox, measles, scarlatina, and roseola. In the early stage of the exanthem it is sometimes impossible to form the diagnosis from the appearance of the skin alone. The important differences between rötheln and small-pox are the slightness of the rise in bodily temperature, the evanescent nature of the backache and of the cerebral symptoms, the early appearance of the eruption, the lack of millet-seed character of the papules, which are usually larger, and invariably flatter, and the absence of the peculiar, sickly odor. Rötheln may be diagnosed from measles by the sudden appearance of the rash without the characteristic prodromes of measles, the uniformly mild course of the disease, the absence of cough and marked coryza, the roundish spots of the eruption which do not tend to run together into crescentic patches, the state of the bodily temperature before, during, and after the eruption, and the freedom from bronchial and laryngeal symptoms. Nevertheless, despite these pathognomonic points of difference, there may occur now and then single cases in which the resemblance to a mild attack of measles is so great that all other facts bearing upon the case, such as the presence or absence of an epidemic of either exanthem in the neighborhood, will have to be taken into consideration in

* Pepper's *System of Medicine*, vol. i., p. 584.

order to form a correct judgment. Happily, when remedies are properly selected, the absolute correctness of the differential diagnosis is not essential to the welfare of the patient; but, on the other hand, this should not be made the excuse for haste or carelessness. Rötheln is usually easily distinguished from scarlet fever by the absence of invasive symptoms, the comparative paleness of the eruption, the lack of uniformity in its distribution and continuance, the absence of pungency of the skin, the moderateness of the anginal, visual, and cerebral concomitants. Rötheln may be differentiated from roseola by the glandular enlargements so characteristic of the former disorder. For tables of differential diagnosis the reader is referred to the articles on scarlet fever and measles.

Rötheln is a disorder the course of which is uniformly mild. Patients never die of it, though serious complications might arise from exposure to inclement weather, draughts, or other contagious disorders. There remains, however, for a few weeks after desquamation, increased susceptibility to lung affections, and proper care should be exercised to prevent the development of lesions in these tissues.

Treatment.—It is probable that most cases require no treatment further than a restricted diet and being kept in bed until the completion of desquamation. As in the other exanthemata, care must be used in permitting the patient to be exposed to cold or inclement weather for some weeks after convalescence. Should, however, the symptoms be a little more severe, it may be desirable to give a few doses of *Aconitum*. Beyond this, various symptoms may call for *Belladonna*, *Bryonia*, *Pulsatilla*, *Mercurius*, *Kali bichromicum*, or *Sulphur*. In severe cases compare the therapeutics of measles and scarlet fever. Flaxseed lemonade makes an agreeable and useful beverage.

ROSEOLA.

BY GEORGE WILLIAM WINTERBURN, M.D.

Definition.—Roseola is an ephemeral disorder, characterized by small rose-colored papules upon the skin, attended with only moderate constitutional disturbance, which appears simultaneously with the rash. It differs from the eruptive fevers in lacking the incubatory and prodromal stages, and from all of them but rötheln in never being a cause of death. A roseolous rash may occur in association with any of the acute exanthems, and has been described under each of those disorders; but the peculiar cutaneous affection here considered is mainly gastric in origin, or else is dependent upon some depressed state of the nervous system. It rarely extends over more than two or three days, and presents little that is characteristic save the rose-red papules from which it acquires its designation. These papules vary

very much in shape and size. They are usually discrete, and are separated from each other by considerable spaces of healthy tissue. The spots may be smaller than a pin's head, are never elevated above the general surface, and disappear by a gradual loss of color. Though so minute in size, they sometimes come out so thickly as to form irregular-shaped patches of considerable dimension. Much difference of opinion exists among dermatologists concerning the phenomena classed under this heading, and in some quarters an effort has been made to give the disorder a pathological importance which it does not possess. This tendency is well criticised by Dr. Herman Biegel in his article *sub voce* in Reynolds's *System of Medicine:* "Willan is known to have described seven forms of roseola, which number has been raised to twelve by Bateman, Rayer, and Wilson. Whoever wishes to take the form and hue of an irritation of the skin or any other part of the organism as a basis for classification, can with great facility introduce hundreds of new species into medical science. But whether science would gain anything by our calling a pneumonia in which the inflamed part of the lung is round, pneumonia circularis, or if triangular, pneumonia triangularis, is another question. Quite the same may be said in reference to roseola annulata and punctata; and if the words æstiva and autumnalis express anything which may be taken as a basis for division, we might just as well find in the 365 days of the year material for a division into the same number of forms, not only of roseola, but of any other disease. Classifications of this kind, which neither define correctly nor are of any utility, ought to be banished from medical science. Those who know the former unpractical, incorrect, and circumstantial classification of ulcers, and compare it with that of the present time, simplified and based upon correct observations—admitting what influence nomenclature has on treatment—will acknowledge the necessity of a judicious division in other spheres of medical science, and particularly in dermatology."

Ætiology.—As has already been stated, digestive disorders are a prominent cause of this eruption. It frequently appears in children as the result of ingesting improper kinds of aliment, and may occur again and again in the same subject. Indeed, some children seem to have a peculiar susceptibility to these peculiar rashes, and in such cases they often arise from articles of food which would be innocuous to others. This sensitiveness to gastric impressions from particular articles of diet is not confined to children, however. Some persons have it whenever they eat crabs or other shellfish; others, after eating strawberries; and others again from merely drinking ice-water after getting heated. I have one patient, of the temperament sometimes called "strawberry blonde," who always has an acute attack of roseola whenever she eats even one strawberry. This attack lasts half a day or more, and affects more particularly the surfaces exposed to light.

I have another patient, who was also a patient of my father's for many years. This lady is now nearly eighty years of age, but she has never at any time in her life been able to take lemon-juice, even in the smallest quantities, without setting up an irritation in the stomach which is followed by a severe attack of what she calls erysipelas, but which is really roseola. Dentition, from its reflex influence upon the functions of the stomach, is a frequent cause of roseola. Sudden changes of atmospheric temperature will precipitate an attack in the susceptible. In some women every menstrual period is preceded or accompanied by an attack of this disorder.

Beside these cases arising from gastric or reflex influences, there are another series of cases of a more purely nervous origin. Anything which weakens the nervous system may cause roseola. This is probably the reason why it is noticed so frequently during the course of fevers, during convalescence from severe diseases, and as one of the symptoms in the progress of syphilis.

Symptoms.—The rash consists of minute rose-red papules, scattered over various portions of the body. It rarely extends equally over all portions, and is most frequently seen upon the upper portion of the chest. Sometimes it appears only upon the face and neck, and, again, these parts may be entirely free from it. It is very rarely seen upon the lower extremities. As a rule, the rash is smooth and not elevated at all above the general surface of the skin, but I have seen it when rough and dusky, and appearing more like ordinary measles. These spots disappear temporarily on pressure, darken after the first few hours, then slowly fade, disappearing at the end of the second or third day, leaving an almost imperceptible discoloration of the skin. Some cases will be followed by slight desquamation. In other cases the whole trouble may not last more than from three to eight hours, and then disappear without leaving a trace of its existence. The constitutional symptoms are always very moderate. The temperature is rarely more than just above normal, or if it rises beyond 100° Fahr., the unusual elevation is due rather to the consecutive gastritis than to the roseola. Often there may be a sense of feverishness when the actual temperature is normal. The tongue is usually slightly furred, and papillæ along the edge unduly prominent. The pharynx is somewhat reddened, but is not frequently in any way painful. The tonsils are not swollen. The attack is occasionally ushered in by vomiting and headache, but these are rarely persistent. Constipation, want of appetite, and insomnia are usually in some degree present, but in a majority of cases are not sufficiently marked to cause any anxiety.

The rash is characteristically inconstant. It may disappear entirely from one part of the cutaneous surface, only to immediately reappear upon another. As a rule, "come quick, go quick;" but a rash which develops slowly, disappears as slowly as it came. The rash may in-

volve the mucous membrane simultaneously with its appearance upon the skin, but, doubtless, usually the mucous disorder precedes the skin exanthem, except in cases purely neurotic in origin.

Diagnosis.—Roseola is easily mistaken for scarlet fever at the first glance; but the concomitant conditions are so different that an error in diagnosis is readily detected. In scarlet fever constitutional symptoms have preceded the appearance of the rash for some days; these are always severe and usually alarming, and especially the throat symptoms will attract attention and demand relief. Again, the papules of roseola are never so universally distributed as the rash of scarlatina, and are much mere evanescent. The thermometer will be found an almost infallible guide in making the differential diagnosis; only in those cases in which roseola is concomitant to an acute gastritis can there be a possibility of error.

Roseola might be mistaken for flea-bites or for the results of the stings of various insects; but in these there is always a central minute point, black in color, which is wanting in the roseolous papule. Erythema differs from roseola in occurring in patches raised above the general cutaneous surface.

Prognosis.—Roseola is so mild a disorder that, unless it occurs in connection with something more serious than itself, it never reaches a degree which occasions alarm. It always ends in recovery in a few days.

Treatment.—Nothing is required in the way of treatment, save rest for a few days. If there is fever, a few doses of Aconite, Gelsemium, or Belladonna, according to the peculiarities of the pulse, may seem desirable. It will, however, be judicious to seek out the cause of the rash and remove it or prevent it, or prevent its repetition. These preventable causes will generally be found to be the effects of dentition, constipation, worms, or an improper dietary. If the cause is neurotic, a more generous diet will be useful.

SMALL-POX—VARIOLA.

BY WM. OWENS, SEN., M.D.

Description.—This disease is considered the most formidable of the eruptive fevers. It is regarded as highly contagious and infectious. It is known and described under four different forms: Variola discreta, Variola confluenta, Variola hæmorrhagica, and Variola purpura. Though varying greatly in intensity and sequence, all may have a common origin in exposure to a mild case of varioloid.

All have a period of incubation, varying from five or six days to fourteen days, dating from the alleged exposure. This period terminates with what is known as the initial chill, or the commencement of

the stage of invasion, which, in turn, terminates in the stage of eruption or the appearance of maculæ, varying from two to four days. The appearance of maculæ marks the commencement of the stage of eruption, followed by the formation of papulæ, vesicles and pustules, lasting five or six days. The three first-named forms have a common history from the period of incubation until the close of the papulary stage. The stage of vesiculation and pustulation (filling) continues about four days. Desiccation lasts eight days, when the crusts are all thrown off, leaving deep stains, and in some cases irregular, deep cicatrices.

At the commencement of the attack no symptom is found which will enable the most skillful physician to make a differential diagnosis between the different forms of the disease; not even the violence of the symptoms, the source of the infection, or the general type of prevailing disease will serve any purpose in this particular.

History.—So far as known, the disease was introduced into Europe from Asia in the early part of the middle ages, probably before the year six hundred of the Christian era. It is known to have prevailed upon the Continent of Europe long before it was recognized and described in England, in 1242.

It is mentioned as existing in Mexico in 1527. It prevailed as an epidemic at various times previous to these dates in Europe, and was dreaded more than the black plague, which in its worse form (purpura) it much resembles.

Few persons are exempt from its attack. No period of life, sex, or occupation affords immunity from it. The fœtus in utero has undoubtedly been the subject of its contagion, but under what conditions the contagion reached it is wholly unknown. Nor do we know in any case with certainty the conditions of health, circumstances, or surroundings which would render persons more or less liable to infection.

It has been maintained that pregnant women and children are more liable to contract the disease than others. The correctness of this statement may well be questioned. If such persons are well protected, by vaccination or by having previously had the disease, there is no reason why they should be especially liable to attacks of the disease. But on the other hand, if they are not so protected, and if they do contract the disease, there are obvious reasons why they should suffer more, and in all probability a greater mortality attends this class of cases. The utmost that can be said, therefore, upon this point is that the disease is usually more severe and more liable to prove fatal in pregnant women and in children, and in the aged and in persons in feeble health, than it is in vigorous and healthy men and women.

It is also believed by many that certain constitutions are more liable to contract variola purpura than others (viz.: the hæmorrhagic diathe-

sis); persons of red or sandy complexion and of bright red skin, in whom the capillaries are well marked, belong to this class, and are usually regarded as unfavorable subjects. However this may appear in individual cases, it cannot apply as a law or even as a general rule, for many such persons have the disease no more severely than others of a darker and thicker skin. It is a well-known fact that small-pox has been unusually fatal among the Spanish races of South America and Mexico as well as among the Indians and negroes of our own country; furthermore, thorough vaccination affects the sandy complexion no more severely than it does others, and it gives the same measure of protection to all.

The question of the origin and propagation of small-pox has at times elicited much elaborate discussion. That it originated at different times in the sporadic form without contact with infected persons or substances has been maintained by writers of the highest repute. It may be said that this point is not yet settled, some contending that in such cases the disease originates "de novo"; others, on the contrary, maintaining that no case can occur without direct infection. Sporadic cases have been developed under circumstances which preclude the remotest probability of contact with infected objects.

Nature of Small-pox.—But little knowledge of its true nature is recorded. It is known, however, that the disease is contagious in a high degree, that it can be communicated by inoculation, that distance and contiguity have a modifying influence over its contagiousness, and that the confinement of the virus in a small space renders it more intense, while in its extensive diffusion in the atmosphere there is decreased liability to infection.

It is a difficult matter to determine the earliest stage in which the disease becomes contagious, or at what time its contagium is most intense, or when it ceases to be contagious. It is probable that these questions will never receive a positive reply.

It must be accepted as proved that clothing, walls of buildings, letters, papers, bank-bills, and perhaps coins, are means of conveying the contagium, and that for months, and perhaps years, these may contain the small-pox virus in sufficient activity to cause a new infection.

It is known that the bodies of the dead retain the virus in such activity, after having been interred for a period of several weeks, as to cause infection.

Woollen goods, furs, and feathers are liable to retain the virus longer and present more difficulties to disinfection than other kinds of goods.

Disinfection.—All sanitary authorities dwell much upon thorough disinfection.

This is, no doubt, wise and judicious, if they can produce an agent

which will accomplish this purpose. The means upon which heretofore reliance has been placed have not yielded satisfactory results. Fumigation with Chlorine, Iodine, Bromine, Sulphur, Alcohol, Carbolic acid, high and low temperatures, have all been diligently tried with varying results. It cannot be said that either of these or all combined have destroyed the contagium or have prevented its attacking others when exposed, even when the disinfectant was applied at once and thoroughly. Nor has it been known to render the attacks of those exposed less severe than if the disinfectant had not been employed.

Washing, scrubbing, and thorough ventilation are the only reliable and known means which will thoroughly eradicate its presence when it has been permitted to invade and diffuse itself in our homes. This, and thorough renovation by washing and scrubbing of all porous substances, carpets, etc., found in the apartments during the illness of the small-pox patient, can usually be regarded as sufficient.

Prophylaxis.—Here we have a clearer field and a more reliable course before us. We have measures which have innumerable times demonstrated their value and reliability; preventive measures which will enable us to confine the disease within limits, and which are of at least quite as much importance as medical treatment.

The first of these measures consists in isolation. Place the patient in a room which is well ventilated but secluded; remove all carpets, bedding, and clothing, except such as are necessary for the comfort of the patient and of his attendant.

The latter must not mingle with other members of the family. Every person not already protected by vaccination or who has not already had the disease, should be vaccinated without delay. The patients should not be allowed to mingle in society for several days after all the scabs have fallen off and after they have had at least two thorough sponge baths, taken twenty-four hours apart. These baths should be taken in equal parts of boiled milk and water, which are to be allowed to dry upon the surface, as a protection against atmospheric impressions upon the newly formed skin as well as for correcting emanations from the person.

The second means of prophylaxis consists in thorough vaccination and revaccination until the virus will no longer produce the characteristic crust;—we should assure ourselves that the vaccine is fresh and good. If it produces no local irritation, itching, or a slight pimple, the vaccine may be regarded as worthless; this means, if properly used, seems as if Divinely sent to protect a large portion of mankind from this terrible scourge.

Originally, inoculation with the pure small-pox virus was practiced with what was regarded as reasonably satisfactory results, but there was always great risk in undergoing this operation as well as the liability of

others to contract the disease, and the occasional fatal results which followed inoculation.

About the year 1776, an Englishman (Dr. Jenner) made the important discovery that the small-pox virus, when it had been passed through the cow by inoculation, was greatly modified in its virulence, and that human beings, after being vaccinated with this matter, now called "kine-pox," had a very mild form of illness, and were forever after protected against small-pox, even when inoculation with this virus had been performed. About the same time it was discovered that matter obtained from "grease-heel" in the horse had a similar effect, as it was believed. Jenner's discovery, however, obtained the preference and retains supremacy to the present time; his method does beyond question effectually protect persons to whom it has been thoroughly applied, against this formidable disease.

Special Forms.—Discrete Small-pox.—This affection is regarded as the result of an exposure to the small-pox contagion. The period of incubation dating from the alleged exposure to the initial chill or commencement of the stage of invasion is conceded to be from six to fourteen days.

Symptoms.—The stage of invasion is ushered in with a chill or succession of chills, lasting from four to six hours, or longer. This is followed by high fever, the pulse ranging from 100 to 120 beats per minute, and the temperature from 103° to 104° F.; the skin becomes hot and dry, sometimes followed by moisture when the eruption is about to appear. The thirst for cold water is intense; the head, back, and limbs ache, and a general feeling of soreness on motion or touch is often present.

Nausea and vomiting are almost always attending symptoms.

In children convulsions are not unusual.

Upon the third day small, red points, maculæ, appear about the forehead, face, and neck. They appear to lie beneath the epidermis in the papillary layer of the skin. In a few hours these points enlarge, elevate the epidermis, and feel like fine shot in the skin. The respiration becomes hurried, and more or less labored. The patient complains of tightness and of a sense of suffocation and distress in the chest.

In attempting to walk, he is weak and staggers. The tongue is coated white, yellow, or brownish; it is swollen, cracked, and bleeding. The breath becomes offensive from decomposition of blood, mucus, and epithelium. The appetite is wanting. A mild delirium sets in, which becomes increased, and in the severe forms may result in coma and death. In favorable cases it usually subsides when the eruption appears. At all times there is more or less vertigo on attempting to rise. When the eruption is developed, the aching and

suffering of the head, back, and extremities subsides, while the sufferings about the lungs and chest remain, or even increase.

In pregnant women the pains in the back and limbs have been mistaken for threatened labor or miscarriage.

There is often present in the earlier period of small-pox a slight cough, which may become a quite severe bronchial catarrh, and may continue through the entire history of the case. It may give rise to dyspnœa and palpitation of the heart, but cannot be regarded as a constant or serious complication.

The eruption invades the mouth, throat, and air-passages, causing swelling and infiltration of the soft tissues, giving rise to numerous ulcers and gangrenous patches upon the roof of the mouth, the palate, and tonsils, from strangulation of the circulation of the sub-epithelial areolar tissues.

It remains to be stated that in the discrete forms of small-pox, as well as in the malignant, a peculiar efflorescence often appears upon the surface before the variolous eruption. This has been mistaken for measles or "scarlatina." It disappears on the accession of the variolar eruption, and is regarded as of no diagnostic or prognostic value. On the fourth day after the chill, the small-pox eruption becomes distinctly papular; on the fifth, sixth, and seventh days the papules become vesicles, and umbilicated; on the ninth day the umbilication disappears, and pustulation becomes complete on the tenth day. From the eleventh to the fourteenth day desiccation commences, when the umbilicated depression reappears, and continues until the crusts are cast off. The stage of desiccation is completed about the eighteenth or twentieth day; pigmentation may remain for a few days or, in some severe cases, for weeks longer.

The eruption is never fully evolved at once, but continues to appear until the sixth or seventh day. Hence all the pustules are not matured at the same time, nor do they disappear at the same time, but do so successively; many papules fail to reach the vesicular stage, others fail to become pustular, while still others become confluent and extend over considerable surface.

Confluent Small-pox.—*Description.*—This, in point of severity, is the second form of small-pox, and derives its name from the fact that the pustules run together, merging at their borders, forming large irregularly shaped sacks or pustules which often invade the corium, and leave deep eschars. Not until the development of the vesicular stage, and frequently not until the pustular stage has been reached, do we discover any difference between the discrete and confluent forms of the disease. During the prodromata, invasion, and papulation, no symptoms arise which can be regarded as characteristic of one or the other form. In a large majority of cases but a relatively small pro-

portion of the pustules become confluent; the larger proportion remain isolated.

When there is a tendency to become confluent, the lymph, as early as the third day, commences to extend beneath the epidermis until the borders of the various vesicles meet, when they become confluent. This is particularly so upon the face, hands, and arms. On the eighth day after the chill the lymph becomes straw-colored, and on the ninth and tenth days the purulent stage has been attained. The vesicle which made its appearance on the third day now disappears in the pustule, and the umbilical depression in its centre disappears also, to reappear in the stage of desiccation.

Desiccation is usually completed on the eighteenth day, and by the twentieth day the crusts have fallen off.

In confluent small-pox the mucous membranes about the mouth, nose, and throat suffer greatly; hard, black crusts are formed, which undergo decomposition and form unsightly masses and yield an unbearable, offensive odor. These conditions often give rise to thickening and swelling of the soft palate, tonsils, and tongue, with ulceration. The salivary glands become infiltrated and ulcerate, and not unfrequently necrosis of the cartilages of the nose, glottis, and larynx takes place.

In confluent small-pox we always have secondary fever. During this fever the temperature often rises from 104° to 106° F. This usually sets in about the twelfth or thirteenth day of the disease, and continues until desiccation is completed.

The Hæmorrhagic Form.—This form of small-pox in point of severity is exceedingly dangerous, but few recoveries from it having been recorded.

Description.—There is during the stages of incubation, invasion, and papillary eruption no specially diagnostic symptom by which this could be distinguished from the two forms already described. At an early period in the vesicular stage, however, small ecchymotic spots appear in connection with the vesicles, or within them, which consist of bloody serum formed beneath the epidermis or pressing into the developing vesicle; not unfrequently a bright efflorescence spreads over the surface. Occasionally these changes are delayed until the vesicle has changed into the pustule. This delay should be regarded as a favorable circumstance. The eruption makes its appearance upon the mucous membrane also in the form of vesicles, which break and discharge a sero-sanguineous fluid, which passes from the bowels, bladder, uterus, mouth, stomach, lungs, and nose in the form of hæmorrhages, and soon exhausts the patient. The temperature falls below normal, often reaching 95° F., and it rarely attains 102° F. The mind is generally clear, and after the eruption makes its appearance

there is seldom much pain; sensibility seems to be paralyzed, and the patient sinks into a comatose state before death.

Variola Purpura.—This has been described as a distinct form of small-pox which has a more violent and even pernicious history than either of the other forms. It may, however, arise from the same exposure as the other forms, but presents no marked prodromous symptoms. It is said to be seldom seen in this country, and is usually manifest in the initial chill on the fifth or sixth day of the exposure. The chill is very severe and greatly prolonged, lasting twelve or eighteen hours. The reaction is feeble; an efflorescence, which is of a dark-purple color, spreads over the body. The body swells; the areolar tissue becomes infiltrated with serum, tinged with blood, the skin becomes deeply fissured, from which exudes a sero-sanguineous fluid; the patient becomes comatose, and usually dies on the third or fourth day after the initial chill. The body rapidly undergoes decomposition, and a most horrible stench arises from it.

During the summer of 1880 an epidemic of small-pox prevailed in the interior of South America along the Magdalena River; a large number of the natives were attacked, and about one out of every five died of variola purpura. A large mortality also prevailed among those who had the disease in the confluent and hæmorrhagic forms.

Complications of Small-pox.—These are mostly of a local character, affecting the heart, lungs, areolar tissue, or joints, causing pneumonia, pleurisy, œdema of the lungs, or pericarditis; or in the areolar tissue they give rise to deep phlegmonous abscesses, boils, erysipelas, and destruction of the sebaceous ducts by deep and adhering cicatrices, giving rise to numerous pustules and acne of a most intractable character. The organs of special sense are always liable to suffer more or less.

Conjunctivitis, œdema of the lids, ulceration, and perforation of the cornea, with loss of sight from hæmorrhage into the retina, are among its effects upon the eyes; suppurative otitis, with caries of the bones and more or less loss of hearing, are not unusual results. Not unfrequently ulceration of the mucous membrane of the nose extends to the cartilages and bones, and causes their destruction. Bronchitis is a usual attendant of small-pox, and often extends to the lungs, giving rise to croupous pneumonia, œdema of the lungs, or phthisis. While laryngitis, œdema of the glottis, and necrosis of the cartilages of the larynx may arise toward the close of the disease, pericarditis, pneumonia, pleurisy, and pyæmia are most formidable complications of the disease, and may prove fatal in many cases when the true nature of the trouble has not been suspected.

Pathology.—The anatomical changes which we observe are chiefly those which pertain to the mucous membrane and skin in the various stages of the disease. The papules are at first simply small red points or

maculæ which appear beneath the epidermis. Serous infiltration renders them tense and hard; they feel like fine shot under the skin. The infiltration soon extends into the papillary structure, the epidermis becomes raised, the cells become granular, hard, and flattened. The exudation of lymph detaches the superficial from the deep layers of the epidermis, and a vesicle is formed; continued exudation and infiltration give rise to swelling and increase the size of the vesicle, pressing the cells into groups, which are united by filamentous bands presenting the appearance of rods (bacteria), and have by some writers been supposed to be low forms of organisms which are the contagium of the disease. These bands divide the interior of the pustules into reticulated compartments, the interiors of which serve as the receptacle for pus.

Umbilication usually takes place about the third day after the commencement of the eruption, and the fifth or sixth day after the initial chill. It is often found that the centre of the depression is at the point of exit of the sebaceous glands or hair-follicles. This, however, is not uniformly the case, for the same depression takes place where neither sebaceous glands nor hair-follicles are present. On the ninth day, when the pustule is filled, the umbilication disappears, to return on the commencement of desiccation.

The anatomical peculiarities found to exist between various forms of small-pox consist in the discrete form of simple infiltration of lymph, pustule, and eschar. To these is added, in the second form, the merging of the vesicles or pustules, with excavation into the corium, and permanent cicatrices. In the third form, or hæmorrhagic small-pox, we have added to the second and first hæmorrhages into the vesicles or pustules; and in the fourth form we have extensive infiltration into the subcutaneous areolar tissue, great swelling of the parts or of the whole body, without distinct vesiculation or pustulation.

Anatomical changes have been found post-mortem in the breast, lungs, liver, spleen, kidneys, and various other portions of the body.

Diagnosis.—The diagnosis of the disease is not usually difficult, even at an early period. The eruption may, however, be confounded with secondary syphilis in its papulary stage, and with acne, measles, and scarlatina, or chicken-pox. In some cases we may be obliged to rely upon the patient's surroundings and history to establish a satisfactory diagnosis. Has an epidemic of small-pox been prevailing in the vicinity? or has the party been exposed to the contagion within a reasonable time? or do the symptoms correspond to those of small-pox? The character of the fever and eruption, if present, will be valuable aids in forming a conclusion upon this point.

Small-pox papules may be distinguished from syphilitic acne by the history of its development, by the degree of fever, and by the fact of a former syphilitic infection not having existed.

The disease may be distinguished from measles by the ephemeral character of the efflorescence, by the fact of its disappearance in about twenty-four hours, and by its immediate succession by the maculæ, or red points under the epidermis, which are peculiar to small-pox. The eruption of measles increases instead of diminishing or disappearing, and may be distinguished from scarlet fever by the color of the eruption, which in scarlet fever is of a bronze hue, and in small-pox is reddish, purple, or pinkish. In scarlet fever the sore throat precedes the eruption, and is constantly present; in small-pox the sore throat does not set in until the eruption is developed, at least in the mouth.

Small-pox may be distinguished from purpura by the great prostration and dark-purple appearance of the surface in the latter.

Chicken-pox is more likely to be mistaken for small-pox than any other form of disease, but its character may readily be determined by the following history: In chicken-pox there is but little fever; the eruption makes its appearance upon the body first, and extends upward and downward over the body, head, and extremities, while small-pox invariably shows itself first about the head, face, and upper extremities, and then passes downward over the body, reaching the feet last. It may also be observed in the roof of the mouth several hours before its manifestation elsewhere.

Prognosis.—The prognosis of small-pox in the discrete form may be regarded as decidedly favorable in all ordinary cases. Of the confluent form this can be only said of cases in which the surroundings are favorable, the constitution good, and the eruption not excessive. This may be further modified by the character of the epidemic and by the season of the year, the disease being more fatal in hot weather than in cold.

If convulsions occur at the commencement of the attack, as happens sometimes, especially in children, they are not usually to be regarded in as unfavorable a light as if they should take place at a later period; they would then indicate that the nerve-centres are probably becoming involved.

The duration of the disease is usually eighteen or twenty days, though in complicated cases and with serious sequelæ the recovery may be delayed several days or weeks longer. But in no case should the patient be allowed to mingle with people upon the streets in less than two or three weeks after recovery.

In the hæmorrhagic and purpuric forms of small-pox the prognosis is unfavorable; a large majority of the former, and quite all of the latter, succumb to the disease.

Treatment.—The treatment may be divided into four heads: prophylactic (preventive), hygienic, medicinal, and dietetic.

As a *preventive* or modifying influence after exposure to small-pox, vaccination should be performed as speedily and as effectively as pos-

sible. The author has observed in several instances complete immunity from the disease when this was done. A family of four children were vaccinated after an exposure of eighteen hours on the sixth day of the eruption; they were then isolated, not being allowed to re-enter the room of the person ill of small-pox or to come in contact with those who had been in. Two of these children escaped the disease; the other two had very light attacks. The vaccination formed characteristic crusts on all. The immunity was ascribed to vaccination. Another family received one of its members from a distance at night. On the following morning it was discovered that she had confluent small-pox in the suppurative stage. After complete and thorough exposure for ten hours, all of the children, five in number, were vaccinated for the first time successfully. Three of them escaped entirely, and two had slight attacks. The parents supposed that they themselves were protected by former vaccination, but both had mild varioloid.

The young lady who brought the disease into the house died. No precautions other than vaccination, thorough ventilation, and the free use of dilute vinegar were used about the premises; the children were not excluded from the sick-chamber during the whole time. We would, therefore, notwithstanding the expression of doubt on the part of many authors and essayists of the value of vaccination after exposure, recommend most earnestly that it shall be performed upon all who have been exposed and who are not certain that they are protected by vaccination or otherwise. The risk of harm from vaccination will be far less than the chances of taking the disease.

The rule should be to vaccinate and revaccinate until a pure and active virus will no longer cause a pustule but only itching and a small pimple at the point of the wound, dying away in five or six days.

The patient should be isolated in a moderately cool, secluded room, not too light, at a temperature of 60° or 65° Fahr. The bed covering should be light, yet sufficient for protection against atmospheric changes.

The nurse should not be allowed to pass through portions of the house reserved for other members of the family.

Hygiene.—The patient may be allowed to drink freely of cold water, not ice-water, and may use moderately of lemonade, buttermilk, or skimmed milk; he should be kept absolutely quiet. He must be sponged off every two or three hours with tepid water until the eruption appears. The head and face may be bathed with cold water. The cold water must not be allowed to remain long in contact with the surface. Avoid all irritating applications to the skin.

If the eruption promises to be abundant, a preparation of glycerine in proportion of one ounce of glycerine to four ounces of water, applied

to the surface every four or six hours, will keep the skin soft and allay the itching, the sense of tension, and the painfulness of the surface. The same application may be continued with great comfort and decided benefit through the stages of suppuration and desquamation.

The mouth and throat may be moistened with the same mixture, and it will give great comfort and relief to the patient.

The antiseptic properties of glycerine will greatly modify the offensive odor peculiar to this disease.

Sweet oil has been used for the same purpose with satisfactory results; it gives great comfort to the patient, and reduces the temperature of the body one or two degrees within an hour after its application.

Pricking the turgid pustule with a lancet or needle will afford a great measure of relief. The pus exuded should be removed and the part bathed with the glycerine mixture or sweet oil. At this stage of the eruption the temperature of the body often declines one or two degrees. When such is the case, a slight additional covering will be necessary as a precaution against pneumonia, pleurisy, or œdema of the lungs, any of which are liable to supervene as complications or sequelæ of the disease. Another, and most excellent, method of treating exanthematous fevers during the stage of desquamation is to bathe the patient frequently with boiled milk, or equal parts of milk and water boiled, allow it to remain upon the surface and dry, as a protection to the newly forming epidermis and against atmospheric vicissitudes.

This will allay the itching and irritation of the skin, which is often of a most annoying and distressing character.

Therapeutics.—These will consist largely in meeting the symptomatic indications as they arise in the progress of the disease.

Aconite will be the most useful in the stage of "invasion." It will modify the chill and reactionary fever, thirst, restlessness, and severe lumbar and sacral pains which prevail previous to the appearance of the eruption. I give it in the second or third attenuation every half hour or hour.

Arsenicum is required for burning heat over the body, burning thirst, great prostration; sore throat; offensive breath, and in pericarditis.

Belladonna.—Indicated during the stage of "invasion" by burning heat over the body, headache and backache, sleeplessness, delirium, and convulsions in children; pain, dryness, and soreness of the throat; photophobia.

Bryonia.—For headache, nausea, muscular soreness previous to appearance of eruption. Stitches in the chest, pleurisy and pneumonia.

China.—In malignant small-pox; pustules black; oppression of the chest; exhaustion.

Coffee.—Great restlessness, vomiting of bile.

Digitalis.—For painful dryness and soreness of the throat on attempting to swallow. Constriction in the throat, itching and prickling in the skin; lancinating pains in the head; redness and inflammation of the conjunctiva; violent throbbing in the head, extending into the eyeballs; burning heat over the body; great thirst, pericarditis.

Kali bichrom.—For eruptions all over the body like small-pox, the size of a pea; violent itching, followed by the eruption of pustules. It hastens the maturing of the pustule and desiccation, and exerts a decidedly modifying influence upon the secondary fever. Darting, stitching pain in the heart.

Mercurius solubilis.—To hasten the suppurative stage when slow in developing; copious flow of lochia; offensive breath; irritation of conjunctiva.

Nux vomica.—For gastric derangements, belching of gas from stomach; sore, bruised ache in the back.

Phosphorus.—For pulmonary complications; short, dry cough; condensation of lung tissue.

Rhus tox.—In malignant and confluent forms of small-pox. The eruption is vesicular, flat and livid; the tongue black, dry, cracked, bleeding, and covered with sordes; low muttering delirium; putrid, involuntary discharges from the bowels.

Silicea.—During the stage of desquamation and cicatrization; to lessen secondary fever, to limit phlegmonous suppuration and infiltration into the areolar tissue.

Stramonium.—At the beginning when there is a bright-red efflorescence upon the surface; the skin is covered with a red rash which itches, stings, and tingles—and resembles measles; vesicles appear in the mouth, which fill with bloody serum; violent delirium; silly expression; hoarse, rough, croaking voice; sore-throat.

Sulphate of zinc.—For dryness of the mouth and throat. Scraping, raw, sore feeling in the throat, which feels as if swollen; lancinating and drawing pains in the fauces, vesicles on palate which are painful and smart. This drug in the 1st attenuation in alternation with Digitalis[2x], every hour, has proved clinically of great value in all stages of the eruption of small-pox.

Tartar emetic.—When persistent nausea and vomiting are present. The skin is cool; loose and rattling mucus in the chest; great accumulation of mucus in the bronchia.

Thuja occident.—During the stages of desiccation, desquamation, and secondary fever, attended with heat of the surface; itching and stinging of the surface.

Diet.—During the stage of incubation great attention should be paid to diet, because the subsequent chill, fever, and eruption may be greatly modified thereby. The diet should be light and unstimulating during this period. But little meat, skimmed milk, meat broths, cooked fruits of the season, most of the vegetables of the season—cooked plain without butter, oil, or greasy dressings—cold water, lemonade, and new sweet cider, skimmed milk and buttermilk are allowable.

During the stage of "invasion" the patient seldom wants much but water or lemonade, which he may be allowed in moderation with meat broths, boiled milk, cooked fruit, bread, jelly, and the juice of oranges; also weak tea and coffee if he is in the habit of using them. During the stage of eruption meat broths *always well boiled*, jelly, cooked fruit, arrow-root made thin, and gruel are useful.

During the stage of suppuration the patient will require a more generous diet, and may be given warm milk, beef-tea,* milk toast, made quite soft, jelly, poached eggs, bread and butter, if he desires it.

In some cases the mouth becomes quite sore; if so, certain articles

* To make beef-tea:

Take of tender lean beef, strip it of membrane and fat, cut it into small pieces; place one pound of this in one pint of cold water; allow it to stand two hours, then place the vessel upon the back of the range or stove to *warm;* it must not be allowed to attain a greater degree of heat than 170° Fahr.; let it stand here two hours; pour off, and press out all of the juice and water; add a small quantity of salt. From four to six tablespoonfuls may be given at a meal every six or eight hours.

of food will give pain, and consequently should be avoided. During convalescence, when the tongue has cleaned off, the patient may be allowed to return to his usual diet, being careful to not indulge too freely for a few days.

CHICKEN-POX—VARICELLA.

BY WM. OWENS, SEN., M.D.

This disease is regarded as a slightly contagious eruptive fever.

History.—Many of the older writers on medicine believed and taught that this was a modified form of small-pox, and that both diseases had a common origin, but were modified by surrounding conditions. The health and habits of the patients, the conditions of the atmosphere, and the seasons of the year, were all thought to have a modifying influence in determining the character of the disease. By later writers, to meet and controvert these views, it was claimed that the symptoms and conditions attending chicken-pox are essentially different from those of small-pox, and that chicken-pox attacks those who have had small-pox and those who were thoroughly protected from small-pox by vaccination, and further, that chicken-pox cannot be communicated to another person by inoculation.

It is now conceded that the two diseases are essentially different and original diseases, and that neither form will give rise to the other under any circumstances.

The eruption in chicken-pox occurs in two, three, and sometimes four, successive crops, and lasts from seven to twelve days.

The symptoms are a slight fever and a general feeling of discomfort, which usually lasts from twenty-four to thirty-six hours, when sharply defined red spots make their appearance in the skin around the waist and chest. On the second day the eruption has extended upward to the neck, face, head, and upper extremities, and downward to the lower extremities which, however, are but sparsely marked; the eruption is attended with a very disagreeable tingling and itching sensation. Successive crops of the eruption continue to appear until the third or fourth day. While one crop of vesicles is filling and desiccating, another is forming. The vesicles are usually present in three different forms on the same person: the lenticular, the conical, and the globular. The first are oblong, flat, shining, and but slightly elevated, with a minute white vesicle filled with serum in the centre; on the fourth day the fluid becomes yellow, dries up, and there is formed a hard brown crust which crumbles away and falls off on the tenth or twelfth day, leaving a dark-red stain, but no cicatrix.

The conical vesicle arises from a round red point which is slightly inflamed; it is soon filled with yellow serum, which on the third day

becomes purulent. It shrinks on the fourth day, and forms a crust which in five days more has crumbled and fallen off. Slight pits often remain for two or three weeks.

The globular form of vesicle is larger, and arises from a round or irregularly inflamed base. They are usually filled on the third day, when they shrivel, desiccate, and fall off in six or eight days more.

Chicken-pox has no secondary fever, and is very seldom contracted a second time, though a few apparently well-authenticated cases of second attacks are recorded. This disease is generally found in children, though adults are not exempt from it.

Should the vesicle in chicken-pox be ruptured, a slightly turgid condition of the vessels at the bottom of it may be observed; irritation of this surface will induce a copious flow of lymph, forming a hard adhering crust, which may not be thrown off for several days thereafter and beyond the usual period, and may leave behind small cicatrices.

Diagnosis.—Chicken-pox may be mistaken for mild small-pox or varioloid, an error which might result in very serious consequences. But by a careful examination of the eruption and by close observation of the portions of the body where the eruption first makes its appearance, and the character and type of the fever, the physician should never be led into this mistake.

In chicken-pox the eruption becomes vesicular on the first day; in small-pox and varioloid it becomes papular on the first day, and feels like fine shot in the skin, and on the third or fourth day becomes vesicular and umbilicated.

The chicken-pox eruption begins about the waist and chest; in small-pox the eruption begins about the head and face. In chicken-pox the fever is very slight, if any exist; in small-pox the fever is very high, and the aching of the limbs, back, and head, very severe. In chicken-pox these symptoms are scarcely noticeable.

The **prognosis** in chicken-pox is always favorable; the disease is self-limiting, and terminates in ten or twelve days.

Therapeutics.—**Aconite** is indicated if there is fever, aching of the head, back, and extremities, great mental depression, fear, apprehension, and anxiety.

Antimonium crudum.—For gastric derangements, constant nausea, clean tongue, much itching over the body.

Belladonna.—For aching of the head, limbs, and back; erythema and itching over the body; sore throat.

Mercurius sol.—Sore throat, tenesmus vesicæ, strangury.

Pulsatilla.—For gastric derangements from eating fat, oily, greasy, or sweet substances.

Rhus tox.—For excessive eruption, great itching of the surface, not relieved by scratching or rubbing.

Thuja occid.—Excessive eruption, itching all over the body.

VACCINATION.

BY E. S. BAILEY, M.D.

Synonyms.—"The new inoculation;" (Fr.) Vaccination; (Ger.) Kuhpockenimpfung; (Sp.) Vacunacion; (It.) Vaccinazione.

Definition.—From the Latin *vaccus*, belonging to a cow, the act by which the virus of cow-pox is introduced into the human system for the prevention of small-pox contagion.

History.—In 1775, Dr. Edward Jenner, an English physican, while inoculating with small-pox virus in Gloucestershire, observed that on several persons the virus had no apparent effect, notwithstanding they had never had variola. Investigation revealed that all these persons had been previously affected with a pustular disease (cow-pox) which they believed had been contracted from milch-cows. He found the notion that an attack of this character gave immunity from small-pox a popular one, and upon further study became convinced of its truth. He conceived the idea that the inoculation of the cow-pox virus by subcutaneous insertion, in the same manner in which variola-inoculation had been previously practiced, would, if put into general use, prevent and exterminate small-pox. It was not a discovery that he made, nor was it an invention, or a fortunate accident; but as Mr. Marson says: it was greater, "a matchless piece of induction." His theories and claims were discredited and combated by the medical profession generally, and not until 1796 did he first perform the operation called vaccination. In this case all the phenomena of cow-pox in the animal were successively observed. The virus used was taken from the hand of a woman who had contracted cow-pox while milking.

On July 1st, small-pox virus was inoculated, without apparent effect, into the subject who had been vaccinated. Jenner's first essay, entitled "An Enquiry into the Causes and Effects of the Variola Vaccinæ, a Disease Discovered in Some of the Western Counties of England, Particularly Gloucestershire, and known by the Name of Cow-pox," was published in London, June 1, 1798. The belief held by him that small-pox and cow-pox are identical diseases, was prevalent among the people of Gloucestershire as early, at least, as 1735, for Mr. John Webb, a physician of Wick, recorded in that year the following facts concerning it. "A laborer on a farm in Gloucestershire having died of small-pox, the bedding and clothing of the deceased were thrown into a detached shed. A cow was observed to go frequently to this out-house and lie upon or near these cast-off articles, and she soon became sick with the pox. The remainder of the herd, nine in number, became affected with the disease one after the other. A milkmaid contracted it and experienced severe pains,

rigors, fever, right inguinal and axillary swelling, and three pustules near the thumb." After fifty-seven years this woman, still alive and well, and in the meantime having been repeatedly exposed to small-pox without having contracted the disease, and having observed that others who underwent a similar experience had the same good fortune in escaping small-pox, felt that she was quite secure against the malady. This shows that the prophylactic powers of cow-pox were locally known at least fourteen years before Jenner's birth. The following epitaph can be traced on a tomb-stone in the church-yard at Yatminster, England. "Sacred to the memory of Benjamin Jesty, who departed this life the 16th April, 1816, aged seventy-nine years. He was born at Yatminster, this county, and was an upright, honest man. Particularly noticed for having been the first person (known) who introduced cow-pox by inoculation; and who, from his great strength of mind, made an experiment from the cow on his wife and two sons in the year 1774."

In 1779 seventy prominent physicians of London published an article declaring their confidence in vaccination and advocating its general practice. The new procedure was introduced into America by Dr. Waterhouse, of Cambridge, in 1796, the year of Jenner's first vaccine inoculation. Jenner's, and indeed the usual, practice at the present day among English surgeons was and is to use "humanized lymph," or that taken from a typical vesicle on the arm of a person. This practice has, perhaps, given rise to the greatest opposition to vaccination of any one cause, for reasons which will be mentioned later. The symptoms of cow-pox in the human subject follow closely those observed in the animal, and, as usually manifested in a primary vaccination, are as follows: At the end of the second, or by the beginning of the third, day after the operation, a small papule is seen at the point of insertion of the virus. By the fifth or sixth day this has become vesicular, of a pearly color, with a raised edge, and a peculiar central umbilicated or cup-shaped depression. By the eighth day the vesicle has attained to perfect development, and at this time, or a little earlier, an inflammatory ring forms about it. This areola continues to widen for two days, when it is sometimes from two to three inches in diameter. The tissues which it involves are infiltrated and hardened. On the tenth or eleventh day the areola begins to fade, the vesicle dries in the centre, and the lymph becomes thick. By the fourteenth or fifteenth day a dark scab is formed, which hardens and contracts, and falls from the twentieth to the twenty-fifth day. The cicatrix is, usually, of a circular form, and depressed or pitted, and it is regarded as "typical" when there are at least three of these pits in its central portion, "indifferent" when the surface is smooth and not pitted. The mode of development differs somewhat according as the virus has been inserted by single puncture or scarification. In the

latter case the resulting vesicle is compound, or there may be a crop of coalescent vesicles. The course of the disease is retarded, as a general thing, if the lymph used is direct from the cow, it being a not uncommon thing for the various stages to be delayed four or five days in such cases. Seaton ascribes this delay to the use of the lymph in a dry state, it having to undergo solution in the tissues before it can be absorbed. Curious cases of retarded vaccination or, as they are termed by their recorders, "vaccinia revived," are mentioned by Mr. Shepherd, of London, and by Sir Thomas Watson. In Mr. Shepherd's case a nurse, whom he vaccinated unsuccessfully four years previously, presented herself for another trial. Not only did the last vaccination result in a typical vesicle, but the four places on the opposite arm, into which the virus had been inserted at the previous trial, threw out distinct areolæ, and showed tolerably characteristic marks of successful revaccination. The case of Sir Thomas Watson was a little girl who was vaccinated in infancy, and in whom the spots developed well-marked pustules fourteen years later during an attack of influenza. A case is mentioned by Mr. Briarly where the virus remained dormant for two months, but finally developed typical vaccinia. Poor lymph, or inefficiency in its insertion, usually accounts for the apparent insusceptibility of some individuals to vaccination, though there are undoubtedly cases which at times, at least, are not susceptible.

The constitutional symptoms following vaccination are occasionally very slight. Febrile reaction, which is generally considered a test of systemic infection, differs much in different persons. Contiguous lymphatics may or may not enlarge. Unless the course of vaccinia is fairly typical, it is certainly the best policy to subject the patient to a revaccination. The frightful prevalence and mortality of small-pox previous to the discovery and general practice of vaccination, and its decrease since are best illustrated by reliable statistics, which in themselves prove its great protective power, and are a strong argument in favor of universal adoption. Dr. Welch, physician in charge of the small-pox hospital in Philadelphia, is authority for the following: "In Sweden, during the prevaccinal period from 1774 to 1801 the annual average of deaths from small-pox per million of inhabitants was 1973; after vaccination was introduced, but was not obligatory (1802 to 1816), the annual average per million was 479; and after vaccination was made compulsory, during the period from 1817 to 1879, the average fell to 181. The annual small-pox death-rate in England and Wales was estimated by Drs. Lettsom and Sir Gilbert Blane at the close of the last century at 3000 per million of inhabitants. During the years 1841–53 this average had fallen to 304 per million, and from 1854–65, notwithstanding three very severe epidemics, to 202. The following table, compiled by Dr. Edward Seaton, shows not only the influence of vac-

cination on small-pox, but illustrates the value of legislative action in diffusing its practice.

Periods Compared.	Annual Deaths by Small-pox in England and Wales.	Annual Rate per million of population.
1. Average of thirty years previous to introduction of vaccination, estimated by Dr. Lettsom and Sir Gilbert Blane, ...		3000
2. Average of three years (1838–40) when vaccination had become to a great extent diffused, but before any public provision was made for its gratuitous performance, .	11,944	770
3. Average of nine of the years when vaccination was gratuitously performed, but was not compulsory, . . .	5,221	304
4. Average of twelve years (1854–65), during which vaccination has been to a certain extent obligatory, . .	3,967	202

As showing the modifying influence of vaccination over small-pox, when it is contracted subsequent to the development of vaccinia, the observations of Mr. Marson, made during thirty years' service in the London small-pox hospital, are of the greatest importance. Over 15,000 cases were during this time under his supervision. The unvaccinated died at the rate of 35 per cent., while the mortality among the vaccinated was 6½ per cent. When we consider the number of imperfect vaccinations which must necessarily occur in so large a number of promiscuous cases, we are almost led to believe with Jenner that the extermination of small-pox by vaccination is a possibility. His claim that vaccination protects to as great an extent as an attack of variola has, we believe, never been disproved. That variola does, in certain instances, attack a person twice is not to be disputed, therefore it does not detract from the value of vaccination that in a very few instances the individual who was supposably protected has contracted small-pox. In nearly all these cases the disease assumes a mild form. Such an attack may almost always be traced to peculiarly aggravating circumstances, as severe epidemic influences or close contact with an infected person, as living in the same rooms or sleeping in the same bed.

Revaccination.—Many eminent authorities claim that in a certain indefinite proportion of cases the primary vaccination does not thoroughly protect through a long number of years; therefore, the practice of revaccination has come into quite general use. This practice is conducted in a very thorough manner by the German government in its armies, and apparently with the happiest results. During the Franco-Prussian war small-pox prevailed to an alarming extent, and both armies were fully exposed to its contagion. The mortality in the French army from this disease alone was 23,468, while the German loss from the same cause was only 263, although the latter army was twice the size of the former. The explanation of this fearful mortality among the French on the one hand, and the astonishingly low death-rate in the Ger-

man ranks on the other, lies in the fact that in the former army neither vaccination nor revaccination was compulsory, while in the latter both were practiced. Almost every child in Germany is vaccinated within a year of its birth, and revaccination is generally performed about the twelfth year. All soldiers are vaccinated upon entering the army, and if the first trial prove unsatisfactory, the operation is repeated again and again until some result is obtained, or the surgeon is convinced of vaccinal insusceptibility. Mr. Marson states that very few persons have been admitted to the London small-pox hospital who acknowledged to a successful revaccination, and these few had variola in a very mild form. For over thirty years he revaccinated all nurses who came to live in the hospital, and in no case did the person contract small-pox. Dr. Welch has never observed a death from small-pox after a reliable revaccination.

Most authorities condemn the practice, so common among many practitioners, of repeating the operation of vaccination many times. Seaton says: "One thorough primary vaccination to start with, and one careful revaccination after puberty, so conducted as to give evidence that the lymph was absorbed, are all that is necessary for the complete protection of the population against small-pox. No doubt that nine out of ten are perfectly protected by the primary vaccination, but who can predict of any individual whether he is one of the nine or the exceptional one?"

The literature of vaccination cites several cases where vaccinia ran quite a typical course in a person who previously had had small-pox. In these cases, however, without exception, the disease had been experienced many years previous to the trial of vaccination.

Methods of Vaccination.—Various methods of performing the operation of vaccination have been, and are still, in use. The aim of all these is of course to bring the virus in contact with the absorbents of the cutis. A very common method is by puncture. If this is used, the arm of the patient should be grasped so as to tighten the skin, and the virus inserted on a perfectly clean lancet by a valvular puncture, made from above downwards. The lancet should be made to enter the cutis vera. To ensure success, a number of these punctures should be made, the distance between them being about one-half inch. Another method is that called tattooing; this consists in making a number of minute, superficial punctures with the point of a lancet. Over these openings is spread the vaccine virus. The tattooing should embrace a circular spot about a quarter of an inch in diameter, and to make sure of thorough infection, three spots at least should be made.

A very generally used method of abrading the surface is by scratching or scarifying with the ivory point upon which the virus has been spread, deep enough to make sure that the true skin has been reached, which will be shown by a slight oozing of blood. All such oozing

should be wiped away, and the lymph then plastered on. There should be at least three of these spots, and of sufficiently large size. A very good scarifier and lancet is the one invented by A. Weir.

When the lymph to be used cannot be obtained perfectly fresh, that put up in Husband's tubes may be substituted. This is ready for immediate use. If the dried lymph be preferred, that on glass or on ivory points answers the purpose exceedingly well. In case either of these is used, it will be necessary to moisten the virus with a very little water previous to inserting it. Care should, however, be taken not to use too much water, as in such a case the lymph would be too greatly diluted. Dr. Marson states that with good lymph an experienced operator should not fail of success once in one hundred and fifty times. His own per cent. of failures is much lower than this even.

Arguments for and Against Vaccination.—Ever since the practice of vaccination was inaugurated, there have been those, both among the profession and the laity, who have strenuously opposed it. In the great majority of cases the reason ascribed for this opposition has been that various cutaneous and scrofulous diseases have been transmitted by its practice from individual to individual. In England and on the Continent, where the practice of using humanized virus is very general, this claim may not seem unreasonable, though no eminent authority, so far as I am aware, believes in the possibility of such a disaster when only the lymph from a vaccine vesicle is used. Seaton says that although he has investigated a great number of alleged cases of transmission of disease by vaccination, he has never yet found that the child from whom the lymph was taken was suffering from the disease it was said to have imparted. Dr. Hardaway disposes of the statement that measles, scarlatina, and various other children's diseases have increased since the introduction of vaccination as follows: "This statement possesses some semblance of truth; but if we remember that small-pox was and is extremely fatal in childhood, it can be readily understood that vaccination, by diminishing small-pox mortality, leaves a much larger number to be attacked by other diseases. 'Vaccination,' says Seaton, 'does not profess to make mankind immortal: it saves from small-pox and its sequelæ, and from nothing else; and everybody whom it saves therefrom lives to die of some other cause at some future period. One might as well argue on such grounds against saving a man from drowning.' One disease especially, scrofulosis, which vaccination is declared to have increased, has been notably diminished since its introduction; for scrofulous and tuberculous affections were well recognized as the most dreaded and frequent sequelæ of small-pox. Dr. Farr, the eminent statistician, is authority for the statement that the mortality from fever has progressively decreased since 1771, and, moreover, that the

deaths from small-pox, scarlatina, and measles are only half as great as the mortality formerly occasioned by small-pox alone."

In this country, where the very general practice of using animal virus prevails, this objection cannot, of course, be raised. The old practice of using a human scab from a vaccine vesicle for virus cannot be too strongly deprecated. By its use there is no doubt that syphilis, eczema, and kindred affections have been propagated. The reason for this is obvious when we consider that the scab is composed of not only dried lymph, but blood-corpuscles and epithelium as well. Concerning vaccinal syphilis, it is due to the investigations of M. Viennois that we have a candid and scientific *résumé* of the facts connected with this disputed question: Can it be possible for two infectious diseases to affect an individual at one and the same time? The affirmative, held to be true by quite a number of reputable practitioners, was assailed by quite as many who opposed it as a principle. It was maintained that by inoculation either syphilis would be communicated alone or vaccine alone, also that the juices of a syphilitic person were not capable of giving rise to the disease by inoculation unless they happened to proceed from a syphilitic lesion. This writer, in an exhaustive monograph, deduced clear evidences that the horrible outbreak of syphilis, chiefly in Italy, could not reasonably be imputed to the ordinary occasions of syphilitic infection, but was certainly due to vaccination. It is at the present time accepted as a fact that syphilis may be communicated by improper vaccination, and it is equally as well recognized that there are two ways of avoiding such a calamity; one is to use only non-humanized lymph, as the lower animals are not susceptible to syphilis, and to apply the virus in such a manner as to prevent the possibility of communication by the use of instruments which have been brought in contact with simply the lymph, or lymph and blood, from the vesicle or scab of one previously vaccinated. Too great caution cannot be practiced in the operation of inoculation.

From a medico-legal point of view it is important to know that constitutional syphilis may follow vaccination, and yet not be a resultant of it. The demonstration lies in the fact that a child may be born syphilitic, but without outward manifestation of the taint; the infant is vaccinated, and the syphilitic dyscrasia will be manifest in the appearance at the spot of abrasion of the skin of a sore, which is in form like a chancre, and has its symptoms. If the vaccination only hastens the manifestation of constitutional syphilis, the act has merely evoked a prëexisting disease-tendency. Prudence in proceeding to vaccinate in the cases where syphilis is known to exist or suspected is advised. As regards its management, vaccinal syphilis does not differ from the ordinary form of the affection.

To what extent other constitutional taints may be conveyed by vaccination, our knowledge is largely inferential. Children with a

tendency to eczema have, or may have, a prolonged or obstinate form of this disease following vaccination.

The very rare occurrence of erysipelas after vaccination is probably in most instances the result simply of the inflammatory action attendant upon the working of the virus, and might be occasioned by any simple cause, as a burn, cut, etc., and its occasional occurrence really argues nothing against vaccination.

The claim that the subsidence of small-pox during the last century is due to other causes than the protection afforded by vaccination has been advanced by not a few medical men. By most of these the decrease has been attributed to better sanitation and hygiene.

Since we recognize small-pox as primarily a filth-disease, we cannot for an instant deprecate the immense value of sanitary measures in controlling its ravages, but the statement that to these measures is due the tremendous reduction of epidemics of, and the death-rate in, this disease, seems to us untenable. It is claimed that the contraction of cholera and various other zymotic diseases depends upon actual contact with the alvine discharges, perspiration, or other secretions from an infected person. If the contagion of small-pox were only transmitted in this way, then, indeed, might we look to sanitation as the sole cause of its decrease. But its infectious principle does not, apparently, depend upon anything tangible as a vehicle for its transmission. On the contrary, the very air we breathe may bring to us the seeds of the disease. We do not believe that municipal and national cleanliness, hygiene or any other measure, excepting vaccination, unless carried to an extent not likely to be at present attained, is capable of controlling the ravages of small-pox. Are the occasional apparently bad results of vaccination in an individual sufficient reason for its abandonment, leaving, as a consequence, the world unprotected from such devastation as its not remote past history chronicles?

Martin, in the *North American Review* for April, 1882, points out the fact that small-pox did not appear in Europe or America for many centuries, although insanitation and bad hygiene existed in a more marked degree than at present.

During the late war, it is said, small-pox was twice introduced into Andersonville prison where over 60,000 prisoners were confined under the most unfavorable sanitary conditions, but on account of the protection afforded by revaccination, performed at the time of enlistment, not more than a dozen soldiers died of the disease.

Briefly, we have as arguments in favor of vaccination the observations and statements of such men as Dr. Lettsom, Sir Gilbert Blane, Mr. Marson, Dr. Seaton, and Dr. Welch, not to mention many others of almost equal prominence, testifying unqualifiedly to its immense benefits. While they all admit that the procedure has occasionally resulted unpleasantly, for various reasons, they still unhesitatingly

advocate its general practice, even to making it compulsory, if necessary.

It is also urged that vaccination is not always a prophylaxis against small-pox, and that it is not permanent. This must be admitted. The reply in favor of vaccination is clear and positive. If we select a village of one thousand inhabitants, and permit nine hundred to be vaccinated and deny this protection to one hundred, reliable statistics will lead us to expect the following conditions in case a visitation of small-pox should occur. Of the nine hundred vaccinated more than seven hundred and twenty would escape the disease if exposed to it. Of the one hundred and eighty vaccinated, but not absolutely protected, the proportion would be eighteen cases of small-pox, against ten in the unvaccinated. The benefit of the vaccination does not end here; for out of the one hundred and eighty cases, six might die; while out of the one hundred not vaccinated twenty would die, and the entire number would have no chance of escape if once exposed, nor immunity from the severity of the attack, and hence, they all might die.

The summary in favor of vaccination as deduced from reliable statistics is as follows: It almost invariably protects from small-pox for the time being, generally for a term of many years, sometimes for life. Often the protection is positive and absolute; as a rule, it is very nearly so; in a few instances it is trifling. It is but little less protective than variola itself, as it is a fact that in a small percentage of people vaccination or variola itself does not protect against one or a repeated number of attacks of small-pox or against the malignant forms of the disease.

The Form of Virus to be Used, and When to Use it.—We advocate the use of non-humanized, fresh bovine virus, dried on quill or ivory points. Briefly, the arguments in support of the recommendation are : 1. It is the trustworthy prophylaxis; 2. It is more likely to "take"; 3. It is the immediate safe protection in case of exposure to small-pox or varioloid; 4. Its effects are less virulent, and the possible factor of other diseases being introduced therewith is ruled out; 5. It offers the most typical pock-mark, which is one of the best evidences of protection.

In the "arm to arm" vaccination and by those who justify the use of the humanized virus, the same points of excellence are claimed; hence, the experience of the profession is called upon to decide, and this experience speaks strongly in favor of the non-humanized virus. The form in which the lymph is to be used is essential, and the reasons for the preference are as follows. The dried lymph on the pointed bone or ivory or quill is the best. It is ready for immediate use; it can be wrapped and thoroughly protected from atmospheric changes, and it is convenient to send from the propagators, if need be, around the world, and still retain and maintain its virtues.

This form is superior to bovine crusts, for, contrary to the general opinion, crusts are often inert if not in reality absolutely worthless,

and their use, if good at all, is apt to be accompanied with an increase of inflammation resembling, if not absolutely of, a septic nature, probably from the putrescent or putrescible elements contained within the crusts. The cavity within the crust has been known to contain, when opened, a pulpy substance of most disagreeable odor. The lymph placed in tubes, even if carefully and properly sealed, cannot be divorced from a suspicion of being worthless when it is remembered that by placing fresh virus within a glass tube the tendency is to separation; a portion will be found clinging to the side of the glass, and a part will have become fluid; the latter is found to be inert; the use of this form of lymph will be in very many cases disappointing. No argument seems needed at this time to urge the use only of fresh and reliable vaccine virus; it is so easy by methods in vogue to overcome distance and time, that any physician, no matter where located, can by rapid correspondence and carriage receive by return mail a supply of reliable virus from the farm-propagators, at any time.

As to the proper time to vaccinate. Experiences of celebrated practitioners differ. It is admitted that prenatal inoculation by vaccinating the mother during gestation is experimental and void of positively good results. If there has been an exposure to small-pox, the infant immediately after birth may be vaccinated; if there is no known or suspected exposure, it is desirable to wait until the child is at least three months old, or even older, and to avoid as much as possible any complication or disorders that may arise if the child be teething, or suffering with any cutaneous eruption or scrofulosis. After the seventh year every child should be vaccinated; and revaccination should be urged with every threatened outbreak of an epidemic of small-pox. The changes that affect the system at puberty and after afford a good argument for revaccination, and the protection against the scourge is much greater than where the neglect to vaccinate is the rule. In large cities especially the rule should be to vaccinate the infant, to repeat the operation at the seventh year, and again at puberty. So far as protection is concerned, the same advice holds good for those living in the rural districts, but here the chances of contagion are materially lessened. After every exposure to small-pox, known or suspected, revaccination should be resorted to, and faithfully tried.

The part of the body to be selected for inoculation is a matter of choice, though Jenner used the arm in preference, the spot being at the insertion of the deltoid muscle of the left arm, as most free from irritating contact of clothing or friction from motion. In cases of women, in order to avoid the blemish of a scar, a concealed portion of the body is selected, usually the calf of the left leg.

Treatment.—The word vaccinosis has been coined to signify a diseased state engendered by vaccination, and if the ill effects produced beyond those commonly epitomized under the term vaccina are

as numerous and far reaching as is maintained by those who oppose vaccination, then the treatment of vaccinosis is of great importance. That specific and grave maladies have been engrafted upon some who otherwise would have escaped is a source of regret, and reason would suggest at once that such forms of treatment would be necessary to eradicate the imposed disease as if the poison or psora had been otherwise obtained; and unless it be as a complication in the immediate symptom of vaccination, the treatment is referred to that special form of disease which is indicated by the pathological changes or symptoms presenting.

During the stage of invasion, rest, ease, and quiet are to be enforced, and the whole system is to be rendered passive and peaceful. Local applications of a bland and soothing character over the parts inflamed and tender, such as cool compresses, olive oil, plain cosmoline or vaseline, Hamamelis tincture and water, equal parts, or Calendula tincture diluted with one part to six of water, will be found very grateful. Freedom from motion during the stage of inflammation is important. Sometimes, when the areola is large and the parts involved are hard and indurated, a soothing poultice, made of bread and milk, or part slippery elm and charcoal pulverized, will be serviceable. These are palliative. Avoidance of stimulants of all kinds is imperative, as is also exposure to sudden and severe changes of temperature or draughts. If no sudden change of temperature is possible, much relief from soreness and pain may be had by baring the inflamed arm and resting it upon a pillow without covering. The severe itching will be greatly relieved by the application of oleates.

The stage of suppuration demands attention. So far as possible, it is good practice to prevent the pus being reabsorbed, and also to provide against the pocketing of pus or its burrowing in the fascia. While the scab or covering of the suppurating parts is essentially for protection, its loss does not destroy the virtue of the vaccination, as is held in the popular mind. The scab should be maintained in its place until loosened by the process of resolution. The redness and purple discoloration following successful vaccination do not call for treatment, as in time the excess of color will have disappeared by absorption.

The immediately available remedies for the inflammatory stage are:

Aconite.—For the stage of chilly sensations, with arterial excitement; internal heat, with restless anxiety or fear. Parts hot, painful, accompanied by high fever. Skin having appearance of papular eruption, remaining unchanged by itching and scratching.

Apis mellifica.—Skin with bruised, sore spots, with pain and much swelling; erysipelas, or skin pale, waxy, transparent, or dark-blue, almost black. An antidote to animal poison, with ulceration and suppuration, where borders are œdematous, with stinging pains. Dropsical conditions.

Belladonna.—Acute swelling; erysipelatous skin, with high fever; inflamed parts burning and painfully sensitive to touch; skin dry and scaly; delirium with nervous excitation.

Rhus toxicodendron.—Intolerable itching of the skin; erysipelatous inflammation; induration and thickening of the skin; dropsy; complications of muscular and cuticular rheumatism.

Phosphorus.—Eruptions terminating in small pustules, containing blood and serum; with frequent small hæmorrhages.

Consult also : Sulphur, Calcarea carbonica, Thuja, and Silicea.

WHOOPING-COUGH.

BY JAMES C. WOOD, M.D.

Synonyms.—(Lat.) Tussis convulsiva; (Ger.) Keuchhusten; (Fr.) Coqueluche; (Eng.) Chin cough, Kink cough.

Definition.—Whooping-cough, or pertussis, is an infectious specific disease, chiefly affecting children, in which catarrh of the air-passages is combined with nervous symptoms of greater or less severity. This catarrh gives rise to a cough which, during the stage of inception, and in the declining period, does not differ from ordinary catarrh, but during the middle period of the malady is spasmodic. The characteristic cough comes on suddenly, with quick, short, forcible expirations and flushed face; then repeated paroxysms of coughing occur, characterized by the peculiar, long, shrill inspiration, or "whoop," which has suggested its most familiar name. The affection occurs in epidemics, lasting six or eight weeks, and may attack the youngest infants or the oldest adults.

History.—No writer before the middle of the seventeenth century has described whooping-cough, and it must have acquired one of its chief characteristics since that date, or otherwise the fathers of medicine would have undoubtedly set forth its peculiarities. Arabian, Italian, and French authorities, down to the sixteenth century, have described diseases having a contagious or epidemic character, resembling whooping-cough in its catarrhal symptoms, but lacking the distinctive character of the "whoop;" they more nearly resembled influenza than any other disease now known to us, and the literature of Hippocrates, and others before the Christian era, shows that while the early writers were familiar with certain spasmodic and catarrhal conditions of the respiratory organs, whooping-cough, as a disease *per se*, was unknown to them. The Arabian physician Avicenna gives an account of violent epidemic coughs, sometimes attended "with spitting of blood," and during the paroxysms of which the patients became black in the face. This is the first recorded description which corresponds with whooping-cough as we find it to-day, and it does not seem possible that a disease so strongly marked as this

could have escaped the attention of the ancient physicians had it then existed.

Dr. Charles Aberle believes it to be coeval with all those diseases resulting from the effects of the vicissitudes of climate upon the human frame. He assigns to it an antiquity as venerable as belongs to sore throats and cold in the head. "It is true," he says, "that the ancients make no distinct mention of this disease; but it must be remembered how many disorders were frequently included under one term." The ancient authors, too, whose works have descended to us, lived in a bland and genial atmosphere, and the disease, when it appears there at the present day, is much modified by the climate. Dr. Watt,* on the contrary, states that it appears pretty certain that this disease was wholly unknown to the Greeks, and he is fully of the opinion, with Astene and others, that whooping-cough, as it now exists, has not been described by any of the Greek, Roman, or Arabian authors.

We have no reliable data showing how long it has continued to afflict the human race. According to Mezeray, it first appeared in France in 1414, yet there is nothing very characteristic about his description. Hence, a history of the disease cannot be clearly traced back to a period earlier than that of Willis, who practiced first at Oxford, and afterwards in London, and died in 1675. From him we have received not only the first description of it, but one which in all respects is applicable to the disease as it exists at this time. He published his description of it in 1664, and speaks of it as a disease to which children were liable, that it was epidemic, and occurred most commonly in spring and autumn. He remarks that physicians had very little opportunity of becoming acquainted with the disease for old women and quacks were oftener consulted than regular physicians, and "rational modes of cure gave place to empirical prescriptions."

In 1670, it appears to have been well known in London, although Sydenham only incidentally mentions it, in giving an account of measles, under the name of "Chin cough."

We then have no reliable information concerning whooping-cough earlier than 1414, when it first appeared in France in the form of an epidemic which recurred a century later, 1510, and subsequently at shorter intervals, in 1557 and 1580.

Of writers who have followed Sydenham, may be mentioned Millor, Alberti, Brendel, Butter, Danz, Paldham, Perrada, Watt, Marcus, etc.; since the days of the latter, very full descriptions may be found in nearly all works on Practice from the pens of many of our most eminent writers, notably Gibbs, Bœnninghausen, Churchill, West, and Eustace Smith. From them it has obtained its long list of popular or learned names, according to some pathological theory adopted by the

* Treatise on Chin Cough, Glasgow, 1813.

writer, or from some circumstance supposed to be peculiar to the disease, or in some way expressive of its nature.

The epidemic appearing in France, in 1414, was of a very malignant nature, proving fatal to almost all adults who were attacked by it; this fatality, however, may have been due to the methods of treatment then in vogue, rather than to the malignant nature of the disease.

With the following epidemic, of 1510, symptoms characteristic of our modern epidemics made their appearance, viz.: very violent pains in head, stomach, and loins; high fever; delirium; vomiting, etc. The epidemic of 1557 extended from France into Germany, and, unlike those preceding it, attacked almost exclusively children, death resulting in many instances from suffocation. The later epidemic, of 1580, appeared first in Italy, where, in Rome alone, 9000 children died of it; this great mortality was probably due to the fact that it occurred simultaneously with, and was modified by, the plague. From Italy it again invaded its old birthplace, France and Germany, prevailing with great severity in these countries, and displaying peculiarities which serve to distinguish this from previous epidemics; it was not limited to children, and the fever was more violent than ever before.*

Like many other epidemic diseases (measles, scarlatina, small-pox), the great, widespread epidemics have pretty much disappeared, while, on the other hand, "their sporadic appearance in isolated regions and individuals is an almost constant phenomenon." With various degrees of severity, epidemics of whooping-cough extended over certain portions of Europe in the years 1709, 1712, 1732, 1747, 1755, 1768, 1772, 1775, 1777, 1780, etc. These general epidemics have been rare during the last century, while the disease in its sporadic form is never absent.

Ætiology.—Whooping-cough occurs generally in children and, as has been seen, may be met with in the first weeks of life. Watson mentions a case where the mother, during the last week of her pregnancy, lived in a house in which the disease prevailed, and the infant whooped on the very day it was born.†

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* "In this country, during the five years from 1844 to 1848 inclusive, there were 390 deaths from it in Philadelphia, under 15 years of age, out of a total mortality of 31,162. During the five years, from 1864 to 1868 inclusive, there were, out of a total mortality of 76,354, 543 deaths from whooping-cough; a proportion considerably smaller than that during the first period of five years above mentioned" (*Meigs and Pepper*).

These statistics give an average rate of mortality of the more modern epidemics when confined to the larger cities of this country.

† Another case is recorded by J. M. Keating where a woman, eight months pregnant, who had exclusive charge of two children suffering from whooping-cough, and who several times each day, at regular intervals, would suffer from a commotion of the fœtus which led her to maintain that her unborn child was also suffering from the dis-

The following statistics collected by Dr. Watt are important in showing the influence of age as a causative factor. The cases occurred during the various epidemics in Glasgow, and extended over a period of 30 years. Out of a total number of 1817 cases it occurred:

Under 6 months,							in 135	cases.
Above 6	"	and under 1	year			" 357	"	
" 1	year	"	"	2	years	" 596	"	
" 2	years	"	"	3	"	" 333	"	
" 3	"	"	"	4	"	" 186	"	
" 4	"	"	"	5	"	" 109	"	
" 5	"	"	"	6	"	" 37	"	
" 6	"	"	"	7	"	" 34	"	
" 7	"	"	"	8	"	" 12	"	
" 8	"	"	"	9	"	" 10	"	
" 9	"	"	"	10	"	" 5	"	
" 10	"					3	"	

It will be seen by the above table that the malady is more frequent in children between one and two years of age, and occurs less frequently as the age approaches the period of ten years. The number of cases occurring during the ages of 8, 9, and 10 years respectively is somewhat lower than is given by more modern statisticians. The writer has seen the grandchild of five and the grandmother of seventy-five years both afflicted at the same time, and most practitioners are able to record similar facts.

Sex has a marked influence both on the ætiology and the fatality of whooping-cough, the disease being much more frequent and fatal in girls. Of the 33 cases recorded by Bouchut, 21 were girls and 12 boys. Eberle, out of 356 cases, reports 133 boys and 223 girls. The disparity is not as great in the statistics furnished by Meigs and Pepper; of the 208 cases observed by them, 106 occurred in boys and 102 in girls.

It cannot be positively said at the present time that the cause of whooping-cough is specific; the fact that it has often occurred as an epidemic, and that it is most prevalent at certain seasons of the year, would seem to show that atmospheric influences are its chief exciting causes. Just in what manner the *materies morbi* is conveyed and generated is a pathological question as yet undecided. Certain it is that the disease can be carried from house to house by *fomites;* a portion of the atmosphere is easily removed and carried about in the folds of dress. No one susceptible to the poison, whatever it may be, can enter the atmosphere of the sick without suffering the usual penalty. This *materies morbi* will cling to the clothing of convales-

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ease. She was confined at the end of nine months, and the new-born babe was periodically attacked with asphyxia, but had no cough.

cents for a long time, and the disease may be thus conveyed after all apparent danger of infection has passed. The infectious particles probably enter the air-passages of the susceptible, setting up the same series of disturbances by which they are produced, and after fixing and multiplying, they reproduce abundantly more infectious material. Any bit of mucus thrown off by the cough may be the medium of infection. Whether other secretions may likewise convey the infection is at the present time a matter of doubt; the bodies of those dying from the disease have given rise to emanations infectious in character.

Letzerich, about the year 1870, supposed he had discovered the *contagia* of pertussis in the form of a fungus which, when received upon the surface of the air-passages in inspiration, increases rapidly and produces the spasmodic cough by its irritating effect or by the irritating property which it imparts to the mucus. In the first stages of whooping-cough he found only the spores of the fungus, and at a more advanced stage, in addition to the spores he discovered the irregularly ramifying branches of the thallus. The disease was reproduced in the rabbit by introducing the mucus upon the animal's fauces. Other micrologists have failed to verify the theory of Letzerich; "indeed, unless the cause were more subtle than the spores and branches of the fungus, it is very difficult to explain the phenomena of infection where the disease is transmitted from the mother to her unborn child, whose circulation is entirely distinct."

The exact nature of the *contagia* is yet not positively known, though the more recent microscopic investigations of Carl Bouger are quite conclusive in showing the infectious element to consist of micrococci. The research in this field during the last ten years has been very active, and unless the contagious principle of this disease is characterized by a much greater degree of subtilty than now seems probable, the microscope will before another decade undoubtedly define its exact nature.

The imperfection of our knowledge in reference to atmospheric influences, other than temperature, and the absence of registration of the presence of diseases which do not end fatally, prevent a more minute inquiry into this relation. The epidemics are chiefly prevalent in the spring and autumn, the disease extending over a large part of any town or district associated by various means of inter-communication, and spreading until it has no more material to attack. It is impossible to say whether, or not, the infection is carried across any wide distances; what the limit may be for such transportation is quite uncertain.

It has been estimated that the period of incubation is from two to seven days, constituting an interval from the inception of the infection to the evidence of its effects; it is often received with that of

measles, and the characteristic cough of one disease is not recognized till the rash of the other has passed away. Undue exposure of any kind during the incubation period will prematurely excite the disease, which would have inevitably appeared later had the patient not been subjected to such exposure. The system may be so debilitated by certain bodily affections, measles, scarlatina, and the condition of teething, as to predispose the mucous surfaces to receive the infectious germs of whooping-cough. As a very general rule it occurs but once in the same individual, although sometimes twice, and even thrice. Adults are rarely seized; no age, however, is exempt, and in the adult the disease runs through its full course with the same symptoms as in infancy, but with few of the dangerous complications.

Pathology and Anatomical Characters.—"Examination of the body in a fatal case of whooping-cough reveals nothing to account for the special nervous symptoms which impart its most characteristic feature to the disease." Indeed, fatal cases rarely result from the whooping-cough, but are due to its complications, and the morbid signs will be those of the supervening disease. The course and duration of all its symptoms are too constant and persistent to be accounted for by the presence of a local irritant alone acting upon the mucous surfaces of the respiratory tract, though we always find signs of catarrh of the air-passages, viz: congestion and hypersecretion. Broussais and Guersant locate this catarrhal process chiefly in the bronchi; Gendrin limits it to the laryngo-pharyngeal mucous crypts; Beau says that it is confined within the larynx; yet, these inflammatory conditions of the upper air-passage may be secondary to the cough, "and this may be excited by the mucus rising into the trachea from below as well as by that touching the glottis from above."

There must be a neurotic element in connection with the catarrh, for the spasmodic character of whooping-cough is absent in other inflammatory conditions of the respiratory mucous membrane, viz.: bronchitis and laryngitis. The bronchial lymphatic glands are often swollen when the cough assumes a spasmodic character, and this is thought by some writers to be a sufficient explanation of the spasm. The absence of this spasm from the first stage of the disease, or its delay, may be due to the fact that the bronchial glands are not very much enlarged in such cases, yet there are other conditions accompanied by the same enlargement of these glands without the peculiar cough of pertussis. This fact can only be reconciled upon the theory that in one case there is a specific or contagious element, while in the other it is absent. But the enlargement is much less marked in adults than in children, though the spasm is quite as prominent a feature in the former as in the latter, so that it is probable the enlargement of these glands is the consequence rather than the cause of whooping-cough.

The neurotic character is also shown by the violent agitation into which the child is thrown during a paroxysm. This agitation is usually attributed to terror, but is more probably the consequence of a general nervous commotion which, in its most exalted expression, may become a genuine convulsive seizure. There must be some reflex disturbance other than that caused by the enlarged glands, to explain these violent symptoms, for the local inflammatory condition is not severe enough to excite the paroxysms. Again, in simple bronchitis the spasm yields as soon as the secretion is established, while in whooping-cough the same contagious matter that began the irritation multiplies rapidly, and is thrown off by the surfaces where it proliferates with increased virulence and activity. A special influence must, therefore, from the first be attributed to the specific cause.

The impulsion of the morbid products to the bronchial surface is aided by the impaired function of the pneumogastric; the weak pulse, epigastric tenderness, loss of appetite, weak respiration, and pulmonary congestion are due to the same cause. Whether the element of contagion is due to the micrococci described by Letzerich and Bruger or the bacteria of Potain, there is no question about its being reproduced abundantly in the catarrhal secretions for a definite time, after which it does not appear. Roberts asserts that these micrococci not only abound in the secretions, but penetrate the cell structures, and are found in the leucocytes of the blood and tissues.

It will thus be seen that whooping-cough claims alliance with nervous affections, with zymotic diseases, and with ordinary catarrh. We cannot say that it is a pure neurosis, for it has the property of affecting others, and one attack usually grants immunity from a future. The indefinite duration, the absence of fever in uncomplicated cases, and the mode of origin make it quite impossible to class it with the exanthemata; yet it has many characteristics of these zymoses. If we insist that it is but an incident of child's bronchitis, a cough whose special character is due to the peculiarities in the innervation and mode of breathing of early life—how, then, should convulsive cough become contagious, or a single attack of such cough provide future immunity?

In this as in other respects, therefore, whooping-cough seems out of the rule of those diseases which it partially resembles. No single category can compass it; in its nervous relations it is consistent and uniform; but looking further, it becomes anomalous and surprising in that property of contagion which, to some extent, it seems to share with diseases of a totally different character. The contrast between it and the zymotic and simple catarrhal affections is quite as marked.

It is, therefore, "neither a pure neurosis nor a pure inflammation, but partakes of the character of both, and much more of the former than of the latter."

The post-mortem changes are as follows: slight, but not deep-seated,

congestion of the fauces, the catarrhal state above the glottis usually being absent or very slight; the trachea is pale, the bronchi always congested, and, as has been seen, the smaller lymphatic glands along their course, and beside the trachea, as well as the larger bronchial glands, are always swollen and, consequently, pathognomonic; degenerative changes may occur in these glands as the disease progresses. Inflammatory changes occur in the bronchial mucous membrane; it becomes thickened, red, and covered with sticky masses of secretions in which innumerable numbers of micrococci are found; the secretions are exceedingly viscid in the smaller bronchi, and are frequently drawn into the pulmonary alveoli, looking very much like tubercles as seen through the pleura; if punctured, the contents will squeeze out.

The pleuræ and pericardium become implicated, and ecchymoses are frequently seen upon their surfaces; the mucous membrane of the stomach is swollen and red, as a result of the excessive vomiting; this condition is frequently associated with follicular inflammation of the intestines, and extravasation of the blood into the bowels is not unfrequent; for obvious reasons the mesenteric and retro-peritoneal glands do not escape the same congestive changes. There is no definite kidney lesion, but the liver and spleen sometimes become hyperæmic; in patients of a tubercular or rachitic diathesis, fatty or caseous changes may follow this hyperæmia. Cerebral effusions are not by any means constant post-mortem conditions, and when they do occur are the accidents of cough and dyspnœa. Other secondary phenomena are obstructed air-cells and lobular collapse of lung with concomitant emphysema surrounding the collapsed portion. Repeated distension of the cavity of the heart during the fit of coughing may cause extravasation of venous blood into the bronchi or bleeding from the nose; catarrhal pneumonia is not unfrequently excited, and is always of serious import.

These various complications are usually the result of the futile coughing, and are much more liable to occur where some peculiar constitutional bias has lessened the powers of endurance; there seems to be a greater tendency to spasm in these depraved conditions of the system, and, when the patient is of a rickety diathesis, the constant coughing may produce bending-in of the ribs, thus permanently interfering with future development of the thorax, and making complete expansion of the chest an impossibility. In this manner whooping-cough predisposes to chronic bronchitis and phthisis pulmonalis.

In the above brief review of the pathology of whooping-cough the writer has endeavored to give only a digest of the many theories bearing upon its nature, and those which seem most probable in the light of modern scientific research; however, he fully realizes that the views of many eminent authorities are not in consonance with the above.

Endeavoring not to be too prolix, the teachings of some of the most prominent of the many writers upon the subject will be briefly quoted.

Willis considered it a quick, vehement irritation of the lungs, stimulating them to throw off the serum from other parts of the blood, thus producing a convulsive cough, exceedingly injurious to the function of respiration.

Sydenham taught that it was caused by a subtle vapor of the blood, which irritated the air-passages, thus provoking the paroxysms.

Cullen considered it an inflammatory condition of the bronchi of a contagious type.

Linnæus, in keeping with many of his pathological views, taught that the *materies morbi* entered the bronchi in the form of very minute insects—a causative factor now known by the more modern and extremely popular expression, micrococci.

Waldschmidt, Stoll and Friborg ascribed the disease to gastric disorders, affecting the air-passages by sympathy.

The doctrine of neurosis was instituted toward the close of the eighteenth century by Hoffman, Hufeland, Jahn, Brachet and others; hey considered the inflammation of the pneumogastric nerve a primary lesion which they found red and swollen; later, Dr. Sanders and Dr. Piddock modified this theory somewhat by asserting that the lesion of the pneumogastric was one of congestion rather than inflammation, and directed their treatment accordingly.

Boehme conceived the affection to proceed from a peculiar miasm, acting chiefly upon the nerves.

Miller looked upon it as due to the same peculiarities in children by which asthma is produced in adults.

Dr. Watt affirms that it is in all cases an inflammatory disease, affecting the larynx, trachea, bronchi, and air-cells; in other words, a bronchitis. Although he does not make the assertion, he raises the question whether or not this inflammatory condition may not be an eruptive disease of the mucous membrane.

Jahn located the lesion in the phrenic, instead of the pneumogastric, nerve; Lobenstein-Lobel adheres to the same doctrine.

Dr. Webster considered the affection of the respiratory organs secondary to some cerebral disease, and accordingly treated his patients by applying leeches to the forehead and behind the ears. Although evidently wrong in his pathological deductions, he was the first writer who fully appreciated the influence of the cerebral irritation in the respiratory organs of this disease, and called attention to this important nd early complication.

Wendt places it among the neuroses, and thinks that it is produced by a peculiar miasm; he states that the nerves involved are the branches of the intercostals, the eighth pair, and the recurrent nerve. The solar plexus he views as affected secondarily.

Desruelles looks upon it as a bronchitis complicated with irritation of the brain, upon the basis of which he coins the word *broncho-cephalitis;* Dr. C. Johnson inclined to a similar view, and directed his treatment accordingly.

Autenrieth believes the *origo mali* to be a determination of morbid matter towards the bronchi, and hopes to divert it by exciting morbid pustules upon the skin.

Dr. Volz uncompromisingly places it among the exanthemata, and adduces the reasons already cited under ætiology to explain why he does so. Dr. James Duncan coincides with Volz in his classification, but the essence of the disease he conceives to be "a turgescence of the bronchial glands, coinciding with, or arising from, a peculiar fever, and the result of a specific poison;" he explains the spasmodic phenomena by asserting that this poison acts upon the pneumogastric nerves, thus exciting reflex action. (Gibb.)

Of the more modern writers, the views of Guibert and Copland are probably entitled to quite as much attention as any not already quoted:

Guibert "considers that a common cough may pass into this affection by having the spasmodic state of the muscles of the larynx and of the diaphragm superadded to it; and therefore, that spasm—superadded to cough—constitutes the disease, the state of spasm resulting from the high nervous susceptibility and particular disposition to it existing in children and from individual idiosyncrasy." The increased secretion of mucus he refers to the excited state of the mucous membrane "which," he affirms, "exists independently of any inflammatory action," thus relegating the disease to the list of neuroses. Dr. Copland writes: "I believe that the disease is chiefly nervous in the simple cases; that it preserves this character more or less throughout, even when inflammatory complications ensue; and that in the uncomplicated state it never proceeds beyond irritation."

"The inflammatory appearances in the medulla oblongata and base of the brain may be owing to the functional relation of these parts to the respiratory order of nerves which receive the first impression of disease."

Contrary to the teachings of these two eminent practitioners, von Niemeyer considers that whooping-cough is a catarrh of the respiratory mucous membrane, complicated with intense hyperæsthesia of the air-passages, and asserts that the "whoop" owes its character to physiological processes precisely like those that occur in other varieties of "cough"; in other words, there is nothing specific in the whoop.

Symptoms. — Whooping-cough usually presents three stages, which, however, are not sharply distinguished, but gradually and im-

perceptibly run into each other. They are: 1st, catarrhal; 2d, spasmodic, nervous, or convulsive; 3d, the stage of remission.

The incubative period is difficult under ordinary circumstances to ascertain, owing to the uncertainty of determining the exact day of the advent of the disease; some writers place it at from two to seven days, while others aver that it may last a fortnight.

The Catarrhal Stage.—The early evidences are those of simple catarrh of the air-passages without any, or but scarcely any, febrile complications. The eyes are soon implicated in the catarrhal process, there is snuffling and increased secretion from the nose, and the child begins to cough. These symptoms present nothing peculiar or differing from ordinary catarrh, unless occasionally the cough be more frequent and teasing. Trousseau has known it to be repeated forty or fifty times per minute. The temperature is rarely above 100° F., but the pulse may be somewhat quickened; in a day or two there may be in addition some increased rapidity of breathing. The sneezing and defluxion from the nostrils, though marked, are less than in the commencement of measles. The cough is accompanied by little or no expectoration. The child is languid, restless, and irritable. If the catarrh affects the gastric mucous membrane, there will be loss of appetite, and sometimes nausea. The cough becomes more troublesome, and is worse at night than in the day; if the child is old enough, he will complain of an harassing tickling in the throat. After the second or third day the glandulæ conçatenatæ are perceptible to the touch. The symptoms are not relieved by the establishment of free secretions, as in ordinary catarrh. There may be high fever excited by undue exposure, or the fever subsides, and bronchial râles are heard on deep inspiration.

The duration of this stage varies in different cases. It is longer in mild, and shorter in severe cases, and in very young infants it may be absent entirely. In the case recorded by Dr. J. Lewis Smith, where the child began to whoop as soon as it was born, the disease began simply as a glottic spasm. The average duration, however, is from eight to fifteen days. In Dr. West's 55 recorded cases the average duration was twelve days and seven-tenths of a day. In rare instances this stage may be absent in older children. On the other hand, very mild cases may retain the character of unusual expirations, followed by a forced inspiration, throughout the whole course, and the whoop may never be heard.

These modifications, while not frequent, are misleading in diagnosticating the difficulty, and the practitioner should be on his guard, for the most severe types of the disease may be contracted by exposure to these anomalous varieties.

The Spasmodic Stage.—Ordinarily, the first stage gradually emerges into the second, but it may commence quite abruptly. It usually

begins as soon as the secretion is freely established, when the catarrhal symptoms gradually abate; the fever, and other disturbances in the general health, also diminish, but the cough continues. It is now and then observed to be more severe and spasmodic, especially at night and when the patient is in any way excited. In the course of a week the spasmodic element is well marked, and all doubt as to the nature of the disease is removed.

The severity of the cough during this stage varies considerably in different cases.

It occurs in paroxysms during which the body is bent forward, and a series of short, very rapid, and violent expirations occur; these are continued until the face is extremely suffused and the respiration seems to have almost ceased, when a deep, prolonged, loud and crowing inspiration takes place, producing the characteristic whoop. Such a paroxysm may commence quite abruptly, with little warning, but commonly there is a premonition of it, and the child endeavors to repress it. This premonition occurs in the form of a tickling sensation in the throat or median line of the chest, or in a feeling of constriction. The patient will show dread of its approach, and prepare for the attack by steadying himself or clinging to others for support; his face has a grave or even anxious appearance, while the pulse and respiration are somewhat accelerated. The alternation of the violent and rapid expirations and the crowing inspiration usually occurs two, three, or more, times during each paroxysm. The attack terminates with the emission of a somewhat large quantity of semi-transparent, glossy, and very tenacious mucus which hangs about the mouth and lips, and not unfrequently is accompanied with vomiting. The pertinacity of the expiratory effort is diminished, and inspiration occurs more frequently, whilst the secretion, although still abundant, is more opaque and less tenacious as this stage draws to a close.

In mild cases the disease may soon end, but in those more severe there remains much exhaustion and emaciation, with defective appetite and increased sensibility of the stomach, which leads to vomiting from trivial causes. Owing to the mechanical interference with respiration, the pulse quickens during the paroxysm, and may become almost imperceptible; the breathing is short and insufficient, the face becomes congested, the brows contract, and sweat breaks out on the forehead. During the paroxysm the straining may produce rupture in a child predisposed to hernia; and hæmorrhage, induced by the intense congestion, is a frequent symptom. Epistaxis is very common, but the hæmorrhage may take place from the eyes, the ears, the mouth, and sometimes from the lungs. From the fact that hæmorrhage from the nose is frequently swallowed when running back into the throat, instead of appearing externally, it is necessary to be guarded in both the diagnosis and the prognosis; it may be swallowed

and discharged as black matter by stool, or vomited at the next attack of coughing, and cause great alarm; or it may irritate the glottis, thus inducing a fresh paroxysm, in which case it is expelled with the cough, and is usually supposed to come from the lungs.

When the cough ceases, the normal respiration is restored, and the face regains its natural color; the frequent and violent paroxysms may cause a serous infiltration of the subcutaneous connective tissue, which continues for days or weeks, producing marked puffiness of the features. They last from a quarter to a half, or even a whole, minute, during which time, in cases of ordinary severity, there are from two to twenty series of expirations.

At the close of the attack the temperature, pulse, and respiration become normal, unless some complication has supervened. The severity of the cough seems to be somewhat influenced by the frequency of the paroxysms, being less severe when frequent, and *vice versa.*

In ordinary cases the cough increases in severity up to the thirtieth or thirty-fifth day of the disease, after which time it remains stationary for a certain period. It is aggravated by mental excitement or by physical exertion, but sometimes occurs while the child is perfectly quiet; anger or fright will likewise excite it. This stage usually extends over a period of from thirty to sixty days. It may, however, be considerably longer or shorter than this.

The "spasmodic cough," according to Roberts, "is not merely a reflex from the upper laryngeal nerve; shallow respiration and insufficient oxygenation excite respiratory efforts, but if no more air gets to the blood, expiration is accentuated, and goes on to convulsive repetition, due to the stimulation of the medulla by the venous blood." The paroxysm has been likened to an epileptic convulsion, which, by gradually increasing cyanosis, is self-limited, the carbolized blood finally bringing about an anæsthetic effect which produces relaxation.

A physical examination of the chest during the intervals of the paroxysms will reveal those symptoms characteristic of simple bronchial catarrh, or of the pulmonary affection complicating the primary lesion. The respiratory sounds are apt to be weak, and, over the larger bronchi, mucous rhonchi are almost always present, with finer rhonchi upon deep inspiration. The cilia from the epithelium of the smallest tubes may be cast off, owing to the fact that the spasm prevents air from entering them, and, mixing with the muco-purulent secretion, blocks a small lobule or fills an alveolus, thus replacing the sounds of the coarser and finer rhonchi by those of moist crepitation; or, owing to the forcible expiratory efforts, with the glottis closed, the fluid portion of the contents of the alveoli is squeezed out, when the débris becomes caseated, thus producing dry, instead of moist, crepi-

tation. Vesicular emphysema may be produced in this way when the air in some of the peripheral lobules becomes compressed, though this state of the lung can recover itself much sooner than when the pathological process is confined to the alveoli.

The Stage of Remission.—The second stage elapses into the third much less abruptly than does the first into the second. Indeed, it is impossible to fix a precise limit from which to date the beginning of the stage of remission. The transition, however, is said to commence when the spasmodic cough begins to abate, or when the disease is evidently on the decline. This spasmodic feature of the cough gradually disappears, losing by degrees its crowing inspiratory sound, and reassuming some of the catarrhal features which it had at first. As the paroxysms grow less frequent and less violent, the patient's general health improves until the sleep again becomes sound and tranquil, invigorating the strength and restoring the lost appetite. Although the duration of this stage is uncertain, it does not usually continue longer than two or three weeks, unless protracted by some of the numerous complications. It should be borne in mind, however, that the disease is not unfrequently reproduced if the child chances to take cold within a few weeks, or even longer, after its disappearance, and these relapses are common until at least six weeks have intervened from the subsidence of the second stage.

Both Dr. Mason Good and Laennec remark that in this stage the paroxysms may assume a periodic character, returning at a given hour every day, or every two, or even every three days, continuing obstinately for several months, and returning at the same season for two years. In other cases the patient will remain for several days without cough; but mental excitement, errors of diet, neglect of the state of the bowels, or change of weather, will suffice to bring back the whoop and to increase the symptoms which had almost disappeared.

The *total duration* of the disease in simple cases may be set down at from two to four months. The whole time occupied by an attack is often difficult to ascertain, owing to the frequent relapses which may prolong the attack for many weeks or months. A very slight form of whooping-cough may exist for a few days only, but this is the grand exception rather than the rule. The peculiar diathesis of the patient will influence both the length of time and the nature of the complications.

Complications.—As has already been stated, whooping-cough, in an uncomplicated form, is rarely a fatal malady; the importance of early recognizing and intelligently treating its many complications is, therefore, self-evident. It is apparent from the nature of the disease that the complications are neuropathic or inflammatory.

Bronchitis.—We have seen that inflammation of the bronchial tubes of a mild grade is a common accompaniment of pertussis, and it only

assumes the importance of a complication when it extends to the minuter tubes. This extension of the inflammation is marked by accelerated respiration and pulse and increased temperature; the discoloration and suffusion of the face are increased, and the exhaustion of the system is very great. The cough is more frequent, though not always spasmodic, and the dyspnœa more permanent, the degree of danger being in proportion to its severity. The only physical sign of bronchitis is an increase in the moist râles without the localized dulness on percussion which characterizes broncho-pneumonia.

Of the 208 cases observed by Meigs and Pepper, it existed to a greater or less extent in 42. "In 28 of these it was mild or only moderately severe, and of these all but one recovered. In 14 it was severe and very extensive, or else capillary, and of these 6 died. Of the fatal cases it was in several, no doubt, attended with collapse of the lung tissue."

Pneumonia.—Though not so frequent a complication as bronchitis, pneumonitis occurs oftener in whooping-cough than in any other malady of early life, excepting measles. The catarrhal form of pneumonia is the most frequent, and the pathological transition from bronchitis to pneumonia, especially in small children, is most natural. This complication is announced by the following symptoms: The whoop ceases; the temperature rises to 102° or 103°; the breathing is quickened and very difficult; the nares expanded and the face livid; the pulse-respiration ratio is perverted. A physical examination of the chest will reveal the signs given in the differentiation between bronchitis and broncho-pneumonia. Instead of the above symptoms a fit of convulsions may usher in the complication.

The prognosis depends upon the extent of the pneumonia and the stage of the disease during which it arises, being more favorable during the last stage. This complication, however, is an exceedingly dangerous one, and the prognosis should always be guarded, for the occurrence of a limited collapse may so reduce the already restricted amount of breathing space as to at once determine a fatal issue.

Emphysema.—Unlike bronchitis and pneumonia, emphysema is ordinarily a complication of but little gravity. In rare cases emphysema of the neck, and even of the entire body, may result as a consequence of the free escape of air into the connective tissue of the lung, and thence into the mediastinal spaces. Its production is probably mechanical, as in adults, some obstacle preventing the egress of the air, thus compressing it in the lung by the action of the diaphragm and other expiratory muscles; this obstacle may be in the upper portion of the respiratory track, or it may be due to the plugging up of a large bronchus, after the part of the lung to which it leads has been filled with air; bronchiectasis may also be induced by the same cause. The increased dyspnœa, the lessened respiratory sounds, and the exagger-

ated resonance on percussion are the only symptoms denoting the advent of a mild degree of emphysema.

Collapse of the Lung Tissue.—This is one of the commonest and most fatal complications. It occurs most frequently in young children, and may happen during any period of the disease, though the spasmodic stage is that in which it most frequently occurs; all the conditions which conduce to this disaster are present during every violent paroxysm of coughing. The inspiratory act is not only weakened by the state of exhaustion in which the patient is left after the lungs are almost completely emptied of air, but the ropy mucus offers an obstacle to its re-entrance.

If the area of the lung affected be large, the occurrence of the collapse may be followed by sudden death. Usually, however, it is indicated by less serious symptoms; the child's countenance is pale or slightly livid, and covered with a cold sweat; he lies back with his head low, and if there is much asphyxia the eyelids and lips will be of a dull red or purple color. A little dulness will be detected on percussing one or both bases behind; auscultation shows that the breathing is bronchial; and sometimes loose, crackling rhonchus may be heard at the lower part of each lung. The cough is modified by the occurrence of the collapse, the whoop generally ceasing, but each paroxysm leaving the patient weaker, death almost invariably ending the scene.

Convulsions.—Prominent among the neuropathic complications is convulsion. It may precede any of the other complications, or, if death is caused in any other way, it may usher in the end. Meigs and Pepper report its occurrence in 12 of 208 cases observed by them, 5 of which died. Of the 29 cases observed by MM. Rilliet and Barthez, it occurred in 5 cases, all of which died. It has already been seen that irritation of the brain and its membranes, and particularly of the medulla oblongata, is so common that many able physicians have considered it an integral part of the disease; eclamptic attacks, owing to this constant implication of the brain, are, therefore, very easily excited. They may be the consequence merely of deficient aeration of the blood; or may be excited by embolisms or congestion of the cerebral vessels or thrombosis of the cranial sinuses. Convulsions from any of these causes, excepting the former, are exceedingly dangerous, indeed, recovery from them is rare. Those occurring from an exaggeration of the nervous excitement which always accompanies even uncomplicated cases of the disease, especially in highly sensitive children, are not usually fatal, nor are those which usher in the onset of an inflammatory attack.

The occurrence of the convulsions cannot usually be predicted. Drawing-in of the thumbs during the spasm, the continuance of the discoloration of the face after it has subsided, and the intolerance of light, are symptoms significant in their nature, showing the complica-

tion is imminent. Should the child be suffering from teething or from gastro-intestinal disturbance in connection with the above symptoms, the physician cannot be too vigilant.

Hydrocephalus may be fanned into existence by whooping-cough in a constitution predisposed to it. The advent of this most important complication is indicated by the occurrence of drowsiness, headache, and starting during sleep, increased temperature, accelerated pulse and respiration, and immobility of the pupils with intolerance of light. Persistent vomiting on being moved is always a suspicious symptom.

The evidences of hydrocephalus are indisputable "when the convulsions are limited to one side of the body or when paralysis of one side occurs either with or without simultaneous convulsions on the other" (*vide Med. and Surg. Reporter*, vol. xlix., p. 449).

Apoplexy.—This is an exceedingly rare complication, but does sometimes occur even in children. It is due to the violent disturbance of the cerebral circulation during very severe or long-continued paroxysms of coughing. In all authenticated cases in which this accident happened, the result has been fatal. The hæmorrhage, according to Gibb, almost invariably takes place in the arachnoid cavity, thus diffusing the blood over the surface of the brain; the pressure, therefore, which the effusion exerts upon the organ, is nowhere very considerable, and the symptoms are consequently somewhat obscure.

Laryngismus Stridulus.—Although one of the natural and essential features of the disease, laryngismus becomes a complication only when developed to an excessive degree. Some epidemics of whooping-cough are especially characterized by this complication; or it may only occur in excessively nervous temperaments, or in the anæmical and debilitated. The disease may be running its ordinary course, when at the beginning of the paroxysm the laryngismus becomes so great as to instantly cause death; again, the spasm of the larynx may become more and more violent, convulsions setting in after a few days, and very soon ending fatally. In less severe cases the child will cease for the time to breathe, becoming entirely unconscious, reviving, however, after being fanned or carried to the open window.

Hæmorrhage.—Epistaxis is not by any means necessarily an untoward symptom. Indeed, it may be the safety-valve through which the engorged cerebral vessels relieve themselves, thus warding off an apoplectic seizure. It is only when the amount of blood becomes excessive, debilitating the patient, that hæmorrhage from the nose becomes a complication. In connection with obstinate vomiting and deficiency of nourishment, hæmorrhage from any source must necessarily excite alarm. Hæmoptysis is of rare occurrence, and is not usually fatal.

Extravasation of blood into the subcutaneous tissue of the eyelids

and that beneath the conjunctiva may occur. Occasionally, the blast of air which is forced through the Eustachian tube during the paroxysms, will perforate the tympanic membrane, and as a result there may be hæmorrhage from the ears; the blood comes from the torn surfaces of the membrane and is usually very slight.

Marasmus.—We have seen that vomiting at the end of a fit of coughing is a very frequent symptom. Usually the emesis is not alarming, but on account of its persistency it may seriously affect nutrition by ejecting the food before digestion has commenced. The catarrhal process attacking the respiratory mucous membrane may likewise implicate that of the stomach, thus interfering with healthy digestion and leading to general wasting of the body.

Diarrhœa is frequently excited by the mucous flux in the bowels which affords a favorable nidus for worms, thus further impairing digestion and increasing the marasmus.

Infantile Remittent Fever.—This complication rarely appears unless the disorder prevails during an epidemic of whooping-cough. It is more likely to occur in those unhealthy conditions where the tongue is coated, the breath foul, the evacuations unhealthy, and the abdomen tender on pressure and tumefied. Exacerbations and remissions distinctive of remittent fever are present, though introductory rigors may be absent.

Sublingual Ulceration.—During the paroxysm of coughing the tongue constantly scrapes upon the two lower incisors in such a way as to frequently cause ulceration. The sore may vary in size from a slight abrasion to an extensive ulceration. It is most common in children who have cut only the two central, lower incisors, because thus the friction is confined entirely to one portion of the tongue.

Diagnosis.—During the stage of invasion it is often impossible to diagnosticate whooping-cough. It is very difficult to distinguish during that stage between it and simple mild laryngitis or the mild catarrhal attacks which are so common to our climate. Its nature can only be conjectured from a known exposure or from the epidemic occurrence of the disease. Often, towards the end of the first stage, the frequency and peculiar violence of the fit of coughing may rouse our suspicions, but only a genuine paroxysm can remove all the elements of doubt, and it must not be forgotten that a more or less prolonged cough, with a faint whoop, may accompany a slight laryngeal spasm from any cause. The diagnosis is all the more confusing because modified pertussis may be as slight and transient as any of these acute catarrhal affections.

The constitutional symptoms will have to be relied upon in making the differentiation in some cases, for in the milder forms of whooping-cough the general health is rarely affected, while in a chest affection

severe enough to resemble whooping-cough the general health must necessarily be compromised.

The symptoms of the onset of whooping-cough and influenza are very similar. Both have dry, frequent cough, worse at night, and paroxysmal in character, with gastric and febrile symptoms. The epidemic character is equally marked in both diseases. Influenza, unlike whooping-cough, affects persons of all ages; there is more coryza; it usually reaches a crisis upon the fifth day, and runs its course in ten days; one attack does not grant immunity from another, a diagnostic point which is only valuable in attacks where the exact nature of previous seizures has been uncertain. The conjunctivæ are red, but never ecchymosed, as in pertussis; and if the cough is persistent, it is without whoop.

Bronchitis rarely occurs without some undue exposure. Its onset is more sudden, and the accelerated pulse and respiration, with the increased temperature and great dyspnœa, ought to make the diagnosis certain when the diseases do not coexist.

Enlargement of the bronchial glands from some other cause may excite paroxysms of violent cough, with some spasm of the larynx. Other signs incident to pressure upon the pneumogastric nerve are present in these cases; the voice is thick and hoarse between the attacks of cough, and the breathing more or less oppressed. If the glands are large enough to press upon the innominate vein, the venous radicals of the face, neck, and chest will become more distended than normal; the characteristic expectoration is not present, and the disease is not contagious.

Tuberculosis of these glands is the most frequent cause of their enlargement. Unlike whooping-cough, it is always sporadic and non-contagious; there are no distinct stages; it runs a chronic course; the kinks are generally very short and are not followed by vomiting; the physical signs are of a much more serious character than those of the mild form of pertussis, the only form for which it can be mistaken.

The continuous febrile movements with evening exacerbations, sweats, progressive emaciation, etc., in conjunction with the usual inherited tendencies to tuberculosis, will make the diagnosis certain.

It is exceedingly important to determine the mode of origin of the convulsions when they occur as a complication, in view of the prognosis. Convulsions arising simply from an exaggerated nervous condition or from partial asphyxia are not nearly as dangerous as those accompanying or announcing inflammatory complications, collapse of the lung, or thrombosis of the cerebral sinuses. The characteristic symptoms which mark these several lesions have already been described.

These points of distinction will ordinarily suffice to make the diag-

nosis plain. Time, however, constitutes the only reliable test. The chances for exposure, the absence of the history of any previous attack, the age of the patient, and the prevalence of an epidemic, should always be taken into consideration before the attendant gives a decided answer.

Prognosis.—The death-rate of many of the early epidemics of pertussis shows conclusively one of two things: either, that these epidemics were much more fatal than those of to-day, or that the therapeutics of the present time are much better than in former years. According to Hirsch (J. Lewis Smith, 5th Ed. p. 305) "72,000 persons perished from the disease in England and Wales between 1848 and 1855, or one in every forty who died."

"In New York city during the half-century ending with 1853, 4840 persons died of pertussis, or one died from this disease in every 76 of deaths from all causes."

With our present knowledge of hygiene and therapeutics we can safely say that whatever the age of the child, the prognosis is favorable so long as the disease remains uncomplicated; defective hygienic conditions, rickets, or any other constitutional defects will, of course, modify the prognosis even when no more formidable complications arise. The risk diminishes with each year of childhood, all other circumstances being equal. Convulsions, bronchitis with collapse, and catarrhal pneumonia, in the order given, are the most serious complications, the origin of the convulsions, as has already been shown, modifying the prognosis. Somnolence or a listless condition between the attacks, and persistent high temperature, are always bad signs. The severity and number of the spasms, the character of the secretion, and the condition of the nutrition are always to be taken into consideration in forming the prognosis. So long as the child seems well and lively, and without fever or dyspnœa in the intervals between the fits, there is no great danger; whereas somnolence, fever, fretfulness, loss of appetite, accelerated breathing, or diarrhœa is indicative of some complication, and the patient should be carefully watched.

Treatment.—Unfortunately we possess no remedy which acts as a prophylactic in whooping-cough. Our only safeguard lies in keeping susceptible persons away from those suffering from the disease; but when whooping-cough becomes epidemic or even endemic in character, it is sometimes impossible to isolate them in such a manner as to prevent their contracting it.

When a child manifests symptoms of pertussis, and especially if the disease is prevailing in the community, it should be placed in a large and airy room, free from draughts, observing all due precautions to avoid taking cold.* Where it is possible to do so, at least two

* A paroxysm of coughing is frequently excited during the sleeping hours by a current of air blowing upon the face of the patient. This can be overcome by throwing a fine muslin curtain over the cot, as recommended by Dr. Marshall Hall.

rooms ought to be appropriated for the patient, or patients, so that each may be thoroughly ventilated at least once or twice during the twenty-four hours; it is a good plan to spray the room with a weak solution of carbolic acid after the ventilation; the temperature should again reach 65° before the patient is again placed in it.

In mild cases, and especially during fair weather, it is not necessary to confine the patient constantly indoors. Indeed, it is desirable to have him get as much fresh air as possible, observing always the precaution of proper clothing. The parents should also be instructed to keep the child in as quiet and unexcited a mood as is possible.

The selection of a proper diet is of the greatest importance, for it is absolutely necessary to maintain nutrition. Overloading the stomach should be avoided, and it is better to administer nourishment in small but frequent quantities.

Acidity of the stomach and bowels is a frequent symptom, owing to the mucous flux coincident with the gastric complications; starchy foods of all kinds must, therefore, be given with great circumspection, where vomiting is excessive. In babies, Mellin's Food, in connection with milk and barley-water, is often serviceable as an article of diet. In older children, chicken-broth, the yolk of an egg occasionally given, and minced meat may be necessary in addition to the milk, in order to maintain the strength. Stewed fruit, if not too sour, is allowable in children still older. Nutritious drinks, viz.: oatmeal gruel, barley and rice water, and an infusion of slippery elm, are not only gratifying to the patient, but aid very decidedly in sustaining him.

Milk is, however, the best of all articles of diet, and even in quite small children two or three pints may be taken daily, but in such manner that the quantity given at a time shall be very small. The functions of the chylopoietic viscera can usually be regulated by observing a diet suitable to each individual case. With these functions in proper working order, in conjunction with the indicated remedy, the writer believes that the symptoms of pertussis can not only be decidedly modified, but that its course can be very materially shortened.

Therapeutics.—Aconite.—Since it is sometimes impossible to distinguish the first symptoms of whooping-cough from those of influenza, bronchitis, and similar affections, Aconite will naturally suggest itself at the beginning of the disease when the characteristic febrile symptoms of the drug are present. It is rare that the physician is consulted at this stage, but when there is fever, with a dry and hacking cough, associated with the peculiar Aconite anxiety and restlessness, the remedy will do much towards modifying the symptoms and preventing any early complications. Its sphere of usefulness does not extend far, and it is rarely indicated after the secretions are established, but is especially useful where the bronchial symptoms are prominent. There is thoracic congestion, with sighing respiration and hoarseness; the pulse is hard, full, and very much accelerated, with dry heat of the surface and internal chilliness.

Drosera.—Drosera is especially applicable to the spasmodic stage. The spasms are periodical, and are made up of quickly succeeding barking coughs, sometimes accompanied with epistaxis; the cough is excited by tickling, or a feeling of dryness in the throat; in the evening *without*, and in the morning *with*, somewhat of a yellow,

generally bitter, expectoration, which the patient has to swallow. All of the Drosera symptoms are aggravated during repose, and especially after midnight. Emotional demonstrations of any kind will likewise excite a paroxysm. The drug has much of the anxiety of Aconite, but none of the febrile symptoms of the latter; the patient is fearful of being left alone, and is easily vexed; dryness in the fauces, with absence of thirst; bitter taste of food, and especially of bread. This loathing of food is the result of gastro-intestinal complications, as is shown by the nausea and retching, with vomiting of food and mucus; severe colic, with a bloody mucous diarrhœa; constriction in the abdomen, with a severe pain in the hypochondria, which is relieved by pressure. Drosera will cure many sympathetic and mucous coughs which are not essentially spasmodic in their nature. It was suggested to Hahnemann, as a possible remedy in laryngeal phthisis, from the fact that it produced in one of his provers a hoarse voice and severe cough, with an expectoration of yellow mucus. These facts, taken in connection with "the statements of the herbals and the country people, that the sun-dew causes a violent cough in sheep, under which they waste away," and with Dr. Currie's experiments with the remedy upon animals, Drosera finds a sphere of usefulness in the last stages of whooping-cough, as well as in the second, especially where there is a predisposition to phthisis.

Corallium rubrum.—According to the testimony of M. Teste, Corallium is the most important of all remedies in laryngismus stridulus and the spasmodic stage of pertussis. In some epidemics it seems to work like a charm, while in others it is utterly useless. The fits of coughing are violent and spasmodic, commencing with gasping for breath, and continuing with repeated crowing inspiration until the child grows purple and black in the face, and is completely exhausted. Unfortunately we have but an imperfect proving of the drug, and it is hard to define its sphere of usefulness. Dr. Hughes found it of marked benefit in a case which had previously resisted all ordinary treatment. The patient was a girl of thirteen, and had not yet menstruated. "*I found her firing minute-guns of short duration.* This, I was told, went on all day; and for half an hour or so towards evening increased to a violent spasmodic paroxysm. . . . . The larynx and trachea were not tender, and the cough gave no pain. I ascertained on inquiry that she was of a nervous temperament, and had more than once manifested hysterical symptoms. After taking Corallium three times a day for nine days the cough entirely disappeared and did not return."

Belladonna.—To homœopathic physicians the word Belladonna is synonymous with cerebral congestion. In proper doses it does away with the leech and the lancet, recommended by writers of the dominant school when the congested face, the dilated pupils, and the throbbing carotids suggest the possibility of apoplexy. It is indicated in children of a sanguine temperament, when a rough, hollow, barking cough occurs every quarter of an hour, especially during the night. The cough is excited either by a tickling in the throat or a sense of constriction of the larynx. There is an absence of expectoration, or, if expectoration is had, it is scanty, and sometimes tinged with florid blood. The cough is aggravated by movement or touch, especially of the larynx and throat, by talking, crying, and deep inspiration. There may be fluent coryza, with much sneezing, and epistaxis as a result of the great congestion; sometimes drowsiness, with starting in the sleep; oppression of the chest, with great dyspnœa; and involuntary passages of fæces and urine.

Ipecacuanha.—A drug so universally employed by the old school to produce nausea and vomiting, naturally suggests itself in any affection characterized by excessive vomiting. It is, therefore, one of the grand remedies in whooping-cough, where nausea and vomiting are prominent symptoms, either during the catarrhal stage or after paroxysms of violent, shattering, or hollow coughs are established. The face becomes blue, and there is much suffocation and rattling breathing. The expectoration is of a purulent sweetish taste, and consists of mucus, mixed with light-red blood. The cough is aggravated at night by exertion, eating, taking cold, and in the warm air of the room. The child is irritable and impatient; crying and screaming, with cold sweat on the forehead. There is an aversion to all kinds of food, with *vomiting of water, food, and bile.* The intestinal tract sympathizes with the gastric irritation, and as a consequence, there is cutting and pinching in the abdomen, in the region of the umbilicus, with stools of bloody mucus, and diarrhœa of various kinds. The chief indications, however, are the gastric disturbances and disposition to hæmorrhages of various kinds, especially from the nose, lungs, and kidneys.

Cuprum.—The power of Cuprum in controlling cramps and spasms of all kinds, renders it serviceable in controlling the paroxysms of whooping-cough. This feature of the drug naturally limits its applicability to the spasmodic stage, and here it is

found to be of the greatest service. Bähr states "that by giving it as soon as the spasmodic stage sets in, he has succeeded so well that he has scarcely ever been obliged to resort to any other treatment." The paroxysms are long, uninterrupted, and last until the patient is nearly suffocated. In the evening the cough is quite dry, but in the morning there may be an expectoration of mucus with dark blood, of putrid taste and odor; it is excited by mucus in the trachea, or by spasms in the larynx; the attacks frequently recur, and are aggravated by eating solid food, by inhaling cold air, and by deep inspiration. A swallow of cold water will occasionally postpone a paroxysm. The face is pale and sunken, the lips blue, and there is frequently much retching. There may be stiffness and rigidity of the whole body, with convulsions, beginning in the fingers and toes.

Spongia tosta is indicated in sporadic cases of pertussis when the cough is deep, hollow, and barking, excited by irritation high up in the larynx, as from a plug or valve; there is a tenacious yellow or indurated mucus, which is ejected with very great difficulty. Respiration is much oppressed and inspiration wheezing. The throat feels rough and dry, and the larynx is sensitive to touch. Paroxysms of anxiety are not uncommon, with rush of blood to the head, and disposition to weep.

Chelidonium is frequently indicated after Corallium has prepared a way for it, or when catarrhal pneumonia threatens to supervene. Its grand sphere of action is in affections of the portal system and lungs; when there is acute or dull pain in the liver, extending to the right shoulder, with jaundice and a deeply-tinged urine, the drug is doubly indicated. The stools are either soft and bright-yellow, or whitish and hard. The cough occurs in frequent paroxysms, and is *dry*, violent, hollow, and exhausting; it is excited by a sensation of dust in the trachea, throat, and behind the sternum, which is not relieved by cough. It is always worse in the morning, and accompanied with a sensation as if the larynx were pressed from without on the œsophagus, whereby swallowing and breathing are rendered difficult. There is slight hoarseness, with short and quick respiration from oppression. Stitches under the left clavicle and right mammary region.

Hyoscyamus.—Hyoscyamus, when given in doses sufficiently large, is capable of irritating both the nervous centres and the mucous membrane. The degree of functional excitement is, however, not very great, and the circulatory disturbance never goes on to actual inflammation. When, therefore, the phenomena stop this side of true inflammation, and there is a shattering spasmodic cough, accompanied with giddiness and weight across the forehead, flushed cheeks, and injected eyes, Hyoscyamus may become a useful remedy. The cough is aggravated at night when lying down, by breathing cold air, by eating, and especially by drinking. The patient has anxious apprehensions, is loquacious and quarrelsome. The eyes protrude and are distorted; the face is livid and puffed; epistaxis, consisting of bright-red blood, not unfrequently occurs. The thirst is violent, but there is great difficulty in swallowing liquids. Hyoscyamus is closely allied to Belladonna, and is frequently useful in convulsions when the symptoms are not violent enough to indicate the latter drug.

Stramonium.—In many of its symptoms, and especially in its effects upon the brain, Stramonium holds an intermediate position between Belladonna and Hyoscyamus. The determination of blood which it causes to the head is greater than that of Hyoscyamus, and less than that of Belladonna. There are delirium and hallucinations, dilated pupils, amaurosis, and diminished general sensibility. The paroxysms of cough are barking and spasmodic, but *painless;* the attacks result in vomiting and a discharge of blood from the nose, and the little patient becomes greatly emaciated and prostrated. The cough is excited by constriction of the larynx and of the chest. It is aggravated on waking in the morning, on deep inspiration, from cold air, from touching the throat, and from looking at water or any shining object. There is inflammatory redness of the eyes, with distortion of the features; the face is alternately pale and deep red; trembling of the limbs, with jerkings and convulsions, or there may be stupor, with snoring.

Bryonia.—The reputation which Bryonia has won in various pulmonary affections, makes it necessary to include it in the list of remedies for whooping-cough. In uncomplicated pertussis, however, it is not by any means frequently indicated. It is useful, according to Bœnninghausen, in spasmodic whooping-cough, as if arising from the vapor of sulphur, or excited by tickling in the throat and in the epigastrium. In the *evening* and *night without* expectoration, in the *morning* and *daytime* with expectoration of mucus, which is yellow, or mixed with coagulated brownish blood. The cough is aggravated in the evening and night by motion, talking, and laughing. There is much peevishness, irritability, and violence. Stitches in the head, with pressure

and bursting pain. Thirst for cold water; he drinks a great deal at a time. Vomiting, first of bile, then of food, with severe pains in the gastric region. Stitching pains in the chest and throughout the body, aggravated by coughing and motion.

Chamomilla is indicated in irritable, whimpering children with a dry spasmodic cough, worse at night or in cold air. The child is very restless and fretful, and wants to be carried all the time. Dryness in the throat and dark inflammatory redness of the fauces. Rattling of mucus, purring and wheezing in the trachea; *oversensitiveness* of the nerves. One cheek red and the other pale.

Kali bichromicum.—The cough of this remedy is short, wheezing, and hard, excited by insupportable tickling in larynx, or by tickling at the bifurcation of the trachea. The secretions are exceedingly tough and stringy, and hang in strings from the lips. It is indicated in strumous subjects affected with catarrhal ophthalmia. Burning in the throat and chest, with excavated ulcers in the fauces, filled with tenacious yellow matter. Wheezing and panting precede the cough, nausea and retching following it. Should membranous croup become a complication, the remedy is invaluable.

Dulcamara.—The cough is aggravated by every change of weather, by taking cold from getting wet, by deep inspiration, and from repercussion of eruptions of various kinds. The expectoration is easily raised, and consists of a copious, tasteless mucus, and often of florid blood. There is much mucus in the fauces, which causes difficulty of speaking, and oppression of the chest. Mucous diarrhœa, which, like the cough, is aggravated by every change of weather.

Kali carbonicum.—Spasmodic coughs, with attacks of suffocation and vomiturition. Stitches and spasms in the chest. The cough is aggravated by motion and sitting upright. Dry nasal catarrh, with much sneezing, whistling respiration, and spasmodic dyspnœa.

Nux vomica.—Hard, dry cough, worse in the morning, with blueness of the face, and bleeding at the nose and mouth with every coughing-spell. Gagging, vomiting, and constipation.

Euphrasia is occasionally indicated at the onset of the disease instead of Aconite, but may be indicated at any stage. The cough is suffocating in character, and accompanied with lachrymation and fluid coryza. Expectoration of flat-tasting watery mucus, only in the morning, which is exceedingly difficult to dislodge. *All of the secretions are thin, acrid, and watery.* The Euphrasia cough rarely occurs after the patient retires.

Veratrum.—After every fit of coughing the child falls over exhausted, with cold sweat on its forehead. Spasmodic cough, blue face, and suffocation.

Aurum muriaticum natronatum.—Dr. G. L. Magruder reports in the *American Journal of Obstetrics* (vol. xviii., page 163) a case of pertussis treated by the Chloride of gold and sodium. The patient was a boy aged three years, and after the usual remedies of the old school had been given in vain, this remedy was administered with marked success. Nausea and vomiting accompanied the paroxysms, which rapidly increased in severity. No nourishment was retained, and as a result the child was rapidly becoming much emaciated. He continued to grow worse until there seemed but little help, when Dr. Magruder was prompted to give the drug by reading an article by Roberts Bartholow "On the Chloride of Gold and Sodium in some Nervous Affections," which had been read before the "American Neurological Association." Two grains of the remedy in an ounce of water was accordingly prepared, and five drops given every two hours. The nausea and vomiting ceased after the first dose, the paroxysms of coughing began to grow lighter, and entirely disappeared at the end of two weeks.

The writer wishes to record this case in connection with the treatment of whooping-cough, because he believes the drug homœopathic to the conditions, and thinks its merits will warrant its recommendation in certain forms and complications of the disease. According to Bartholow, the Chloride of gold, in toxic doses, produces violent gastro-enteritis, accompanied by such nervous phenomena as cramps, convulsive trembling, insomnia, and insensibility. In smaller doses, epigastric pain and distress are excited, nausea is induced, and loss of appetite follows. Its general reputation in old-school hands, "in affections characterized by spasm, as asthma, laryngismus stridulus, and singultus," in connection with its physiological action and the clinical case recorded, makes it a remedy to be thought of in whooping-cough, when the nausea and vomiting are particularly obstinate.

The following remedies are to be consulted, and are occasionally indicated: Arsenicum, Causticum, Pulsatilla, Phosphorus, Sulphur,

Mercurius, Grindelia, Hepar sulphur., Hydrocyanic acid, Iodine, Conium, Lobelia, Lachesis, Tartar emetic, Ferrum, Arnica, Cina, and Ambra grisea.

Treatment of Paroxysm.—It is impossible to administer any remedy during the paroxysm. In some cases, and especially in infants, they are often so violent as to place the little one in imminent danger of suffocation or of convulsions. The asphyxia rarely reaches this dangerous point when the whoop is clear and distinct, for when that is present, the larynx cannot be tightly closed by the spasmodic closure of the glottis.

When the above alarming symptoms occur, the child should be gently raised and supported in the sitting posture, or, if an infant, it ought to be held lightly in the arms, so that its strength will not be too much embarrassed. If the weather be warm, the child should be taken to an open window; if cold, it should be gently fanned. Cold water sprinkled upon the face, or dipping the hands into cold water, will often cause a relaxation of the respiratory muscles. If a premonition of the paroxysm is given in time, it may sometimes be modified for the better by placing the feet in mustard water. Compresses dipped in cold water and applied to the sternum are likewise effectual, but it seems too hazardous to be recommended unless the patient be very strong and other methods have failed. A piece of ice wrapped in linen and placed to the epigastrium, as recommended by Dr. C. D. Meigs, is preferable, and accomplishes the same end.

The inhalation of chloroform or ether during the paroxysm was long ago recommended by Dr. Fleetwood Churchill. In a letter to Professor Simpson, published in the *Monthly Journal of Medical Science* (August, 1853), several cases are given where the chloroform not only arrested the paroxysm for the time being, but entirely cured the cough. But he always found, he remarks, "two obstacles to its full and fair administration to young children. In the first place, you cannot get them to give notice of the approach of the cough, so as to enable you to have the chloroform in readiness before the paroxysm commences; and when the paroxysm has commenced, as it consists of eight or ten expirations to one inspiration, the chloroform will have evaporated before it is inhaled; and secondly, young children have such a horror of anything near their mouths during the cough, that they will resist your trying the chloroform as much as possible, until they themselves have felt its power in relieving cough. Owing to these two causes and, perhaps, also to the want of clever management on the part of the mother, we shall find it fails altogether, occasionally, and in other cases only partially succeeds. But when it is fairly tried, as I have already remarked, its use is most beneficial."

M. Bell prefers ether to the chloroform, and speaks very highly of the results obtained by sprinkling a little of it on the clothes of the

patient at the onset of the paroxysm. Both of these anæsthetics, however, must be used with great circumspection. If the physician is able to supervise personally their administration, he will often be able to cut short the paroxysm; but the writer, in a trial of several cases, has failed to see that the duration of the disease was in any way diminished by the use of ether. Anæsthesia should never be induced, and the attendant should be chary in entrusting so powerful an agent to the use of mothers—especially ignorant persons.

Half a drachm of sulphuric ether should be spilt on the hand and held before the child's nose and mouth at the commencement of a fit of coughing.

The practice of daily submitting the patient to séances at gas-works has fallen rather into disrepute; at least the good which has resulted from the performance has not seemed to compensate for the dangers encountered from exposure. Attempts to cut short the disease by inhalations or insufflations of germicides have likewise failed.

The writer cannot indorse the topical use of nitrate of silver to the pharynx, recommended by so many of the writers of the older school with a view of lessening the reflex excitability of the parts, for, to prove of any avail, it has to be used sufficiently strong to prove injurious. The power which hydrochlorate of cocaine has in inducing local anæsthesia upon mucous surfaces generally would suggest it as a probable substitute for the silver when the paroxysms are so violent as to demand some immediate measure. The writer, however, has had no experience with the drug, nor is he familiar with any literature bearing upon its use in whooping-cough.

Much good seems to result from the use of steam inhalations during the intervals of the paroxysms. Dr. J. Lewis Smith is particularly enthusiastic in advocating its use. He says: "This instrument (steam atomizer) was first used for the treatment of pertussis during a severe epidemic in the New York Foundling Asylum, and the result was so satisfactory that it has been uniformly employed since in this institution, during the epidemics, to the almost total exclusion of other remedies. With this treatment very few complications have occurred, such as eclampsia or pulmonary inflammation, and the spasmodic cough has been almost uniformly so modified that the usual remedies did not seem to be required, and what often promised in the beginning to be a severe attack became mild. The same success has attended the treatment of cases in my private practice."

The medicines used in the atomizer have been preparations of bromide and chloride of potassium, glycerine, and carbolic acid. The latter remedy is more highly recommended than any other, and its good effects are ascribed to its anæsthetic influence "upon the terminal filaments of the sensitive nerves in the laryngeal surface." Possibly this is the modus operandi by which it controls the paroxysm; but

the manner in which, in toxic doses, it congests and prostrates the nerve centres, producing convulsions, coma, and paralysis; the power it has of inducing vomiting and also pseudo-membranous and purulent inflammation of the bronchial tubes with congestion of the lungs, or else disseminated lobular pneumonia; and in smaller doses, its marked effect upon the stomach, inducing obstinate vomiting,—all these would seem to indicate that carbolic acid is exquisitely homœopathic to many of the complications of whooping-cough, if not to the paroxysm itself. This homœopathicity is further substantiated by the statement of Professor H. L. Obetz, who says that it proved specific in his hands, and in the practice of several of his colleagues, during an epidemic which several years ago prevailed in certain portions of Illinois and Indiana. It was used in the 2d and 3d decimal dilution—doses far too small to preserve either its anæsthetic or germicide properties.

There can be no objection to resorting to the atomizer whenever the symptoms are violent enough to demand its use, and of thus administering the indicated remedy, whatever it may be.

Of the treatment of the special complications little more is to be said than has already been included in the general treatment. The first object of the physician should be to prevent these accidents, if possible. Convulsions are usually secondary to collapse of lung tissue, catarrhal pneumonia, thrombosis of the intra-cranial sinuses, digestive disturbances, great nervous agitation, or partial asphyxia from the severity of the spasms, all of which require special treatment.

In pulmonary catarrh it will be necessary to resort to warm and stimulating applications to the chest, giving internally, in connection with the indicated remedy, alcohol in appreciable doses. The prostration is very great, and in order to prevent collapse, brandy and eggnog must be used freely.

Change of air, when the patient resides in a damp and low region, is sometimes necessary before convalescence is completed. Altitude and a dry and bracing atmosphere are the objects to be sought for in making the change. If there is any tendency to tuberculosis, this point is particularly important, and it is necessary in counteracting this tendency to resort also to such remedies as Kali carbonicum, Iodine, Calcarea, and Cod-liver oil.

EPILEPSY.

BY SAMUEL WORCESTER, M.D.

Synonyms.—Morbus sacer, Morbus comitialis, Falling sickness, Fits (?); L'épilepsie, Fallsucht, Mal caduco.

Definition.—Epilepsy is a chronic cerebral neurosis, often preceded by a well-marked prodromal period, characterized by paroxysms of unconsciousness, by general or partial convulsions, and by mental

disturbances of a peculiar kind. Any or all of these symptoms may be present in a given case, but the loss of consciousness, even if it be trifling and momentary, is the essential feature; without it there is no fully developed paroxysm.

Formerly the term epilepsy had a much wider significance than now, and under it were classed convulsions arising from gross and well-defined cerebral lesions, such as tumors, exostosis of the skull, syphilis, etc.; but now the tendency is, when any organic morbid condition can be detected, to allow it to determine the name of the disease, and to designate as *epileptiform* any convulsive symptoms resulting therefrom. The term epilepsy would now be confined to that class of cases where there are no tangible lesions other than those produced by the convulsions. In other words, epilepsy proper is now regarded as a pure neurosis; but it is exceedingly difficult to make this distinction in practice.

From time immemorial epilepsy has been recognized as one of the most formidable of all diseases of the nervous system, while the violent and horrible nature of the paroxysm and the inefficacy of medical treatment combined to give rise to the belief that the disease was some mysterious and direct infliction from the gods.

Varieties.—The two great divisions into which epilepsy is commonly divided are: 1st. The more severe attack, marked by loss of consciousness and more or less violent tonic and clonic convulsion; this form is also called the greater evil, *le grand mal* and *epilepsia gravior*. 2d. The milder attack, *le petit mal*, *epilepsia milior*, having slight loss of consciousness, but no marked convulsion. To some cases of this variety the term epileptic vertigo is applied. Other subordinate terms are nocturnal epilepsy, thalamic epilepsy, cortical epilepsy, vaso-motor epilepsy, hystero-epilepsy, and epileptic insanity.

Again, epilepsy is spoken of as central, idiopathic, and direct when it results from a morbid condition of the Pons varolii and medulla oblongata; and as eccentric, sympathetic, and symptomatic when caused by the presence of some palpable source of irritation outside of the nervous centres, such as disease of the kidneys or uterus, intestinal worms, indigestion, fracture of the skull, or injury to the spine, or by some cachexia of the system, such as anæmia, chlorosis, scrofulosis, or syphilis.

Ætiology.—Hereditary predisposition is the most important and frequent predisposing cause. Its frequency is variously estimated by different authorities, but all are agreed as to its importance, and it seems fair to state it as present in at least a third of all the cases. It is said that almost all the children of epileptics die during the first years of life, otherwise it would be more frequently transmitted. In order to establish the existence of an hereditary predisposition in a

given case, it is not necessary that there should be actual epilepsy in either parent. In many cases it will be necessary to enter carefully into the history and antecedents of the patient, when it will be found that the term predisposition must be taken in a broader sense, and implies the existence in the immediate ancestry of any well-defined neurosis, as neuralgia, headaches, chorea, hysteria, hypochondriasis, insanity, or the like, which may plant itself in the next generation as a germ to be developed under favorable conditions into epilepsy, for these neuroses seem interchangeable. Instances, too, are not wanting where, in connection with a mere nervousness of the ancestors, epilepsy made its appearance in the descendants. Doubtless, epilepsy is more likely to become developed in persons who are very impressionable, excitable, and show the *neuropathic* disposition in a general way. It is stated that the offspring of consanguineous marriages suffer from epilepsy in greater proportion than other children. Statistics upon this point are limited, but it is evident that all family peculiarities, whether good or bad, are intensified in the children by intermarriage; and when both parents are of an unstable nervous organization, the probability of some nervous disorder appearing in the offspring is greatly increased.

Alcoholism in the parents is sometimes noted as a predisposing cause, and a number of cases are recorded where the birth of an epileptic child was due to the occurrence of conception while the father was intoxicated.

Whilst hereditary predisposition in its different forms surpasses all other contributing influences put together, these latter seem able in many instances to cause the first paroxysm, or even to establish the epileptic habit. Among these causes intemperance holds the first place, but we should carefully distinguish between alcoholism as an ætiological factor, and a drunken spree as coincident with the epileptic paroxysm. Gowers states that out of 608 cases analyzed by him with reference to ætiology only thirteen were traceable to alcoholism. Other exciting causes are excessive mental work, grief, fright, anger, and perhaps mal-nutrition. Masturbation and sexual excesses are by no means so important as causes as they were formerly supposed to be. Epilepsy is sometimes established in the course of, or during convalescence from, acute febrile or infectious diseases, Gowers reporting nineteen cases due to scarlatina.

℔ **Symptoms.**—The symptoms may be divided into those occurring before the paroxysm, during the paroxysm, and those observed in the interval between the attacks.

Premonitory Symptoms.—These are present in rather more than one-third of all the cases, and are classified as remote and immediate. The former, which are the more rare, and are said to be chiefly observed in children, may last for one, two, or three days, and often

manifest themselves by a change in the disposition of the patient. He may become depressed and gloomy, and liable to attacks of violence and anger, or he may be excited, lively, and over-cheerful. At the same time various physical symptoms are to be noticed. There is general tremor; dizziness; pallor of the face, alternating sometimes with blushing; headache and noises in the head; a confused, troubled expression of the countenance, and even slight convulsive shocks in the hands and feet. After this condition has lasted a few days, the epileptic fit generally occurs, and afterwards the ordinary state of things returns. In some cases these remote warnings show themselves in persons who have remained free from paroxysms for a considerable time, and are not followed by the fully developed fit; these precursory symptoms may then be looked upon as incomplete attacks.

Auræ Epilepticæ.—The word *aura* in its literal meaning would indicate the sensation of a breath blowing upon the patient, but this is seldom the case, and the term is now employed in a general way to designate the widely varying warning symptoms which immediately precede the epileptic paroxysm. In a general way it may be said that the aura is a sensation which seems to arise from some peripheral part of the body and proceeds to the head, or as Dr. Ross graphically remarks: "The aura is the mental correlative of the commencing molecular change in the brain, which is the physical cause of the epileptic attack." In more than half the cases the interval elapsing before consciousness is lost, is so brief that no aura can be perceived by the patient.

The aura may be cerebral or mental, vaso-motor and secretory, motor, sensory, sentient, and indefinite. In the majority of cases they are general in character, and consist in indescribable feelings in the head or abdomen, spreading thence over the body, or in a universal creeping, tingling and thrilling of the skin.

The cerebral auræ consist of vertigo, swimming in the head, a sense of fulness, or an indescribable feeling which may last long enough to allow the patient time to seek help or a place of safety ere the paroxysm occurs.

Few writers upon epilepsy lay sufficient stress upon the very characteristic features of the mental aura. Just as different bodily derangements may precede the epilepsy by a few moments or a few hours, so also the convulsive attacks may be preceded, either immediately or at a greater or less distance, by different disorders of mind and temper. Thus it happens that certain epileptics become sad, peevish, irritable, quarrelsome, often for several hours before the fits. Others, again, complain of slowness of conception, failure of memory, obtuseness of ideas, or of a kind of hebetude or physical or moral prostration, which, to those used to their society, or to themselves, are sure presages of an approaching fit. Others, lastly, display for several hours before

the epileptic attack an unusual gayety, an exaggerated sense of physical and moral well-being, an unbounded confidence in their own strength, and even sometimes a state of restlessness and loquacity which may be pushed on to violent outbursts of passion or to maniacal excitement. Apart from these percursory symptoms, which may come on at a variable time previous to an epileptic seizure, there are other more immediate intellectual prodromata, a sort of *intellectual aura*, which only precedes the convulsive paroxysm by a few minutes, and constitutes in a certain measure the first symptoms thereof. We see, for example, some epileptics in whom the same idea, the same recollection, or the same hallucination, springs up spontaneously at the moment of the invasion of the fit and invariably precedes its appearance. The patient sees flames, fiery circles, red or purple objects, a ghost or a phantom; he hears the sound of bells, or a determined voice always uttering the same word, or lastly, he may perceive the smell of some peculiar substance. These ideas and recollections, or these false sensations, which are excessively variable as to individuals, ordinarily reproduce themselves with singular uniformity in the same individual in each successive attack. Dr. Watson speaks of a patient who always, when he had a fit of epilepsy approaching, fancied that he saw a little old woman in a red cloak, who came up to him and struck him a blow on the head, and then he immediately lost all recollection and fell down. It is further a curious fact that, very often, this recollection, this idea, or this image is the reproduction of an idea or a sensation which provoked the first fit in the patient. Many, in fact, who have become epileptic after strong mental exertion or intense terror, behold again in spirit or before their eyes, on each succeeding seizure, the painful or the dreadful scene which first produced their complaint.

In some cases the aura is what Dr. Hughlings-Jackson terms a "dreamy" state, or "voluminous" mental condition. This is said to be similar to that experienced by persons in the act of drowning, when all the past events of life seem to crowd upon the memory.

The sensory auræ have been alluded to in the preceding paragraphs; they seem to involve and proceed from any or all the nerves of special sense. The visual auræ consist of sensations of light, the red color predominating, the so-called "epilepsy of the retina," viz.: a sensation of colored light or stars floating about, the appearance of stars, people, etc. The auditory, olfactory, and gustatory nerves are also affected, though more rarely. Thus the patient may experience buzzing or roaring noises or hear voices; may smell peculiar stenches, or have peculiar tastes in the mouth.

The *sentient* aura consists of various sensations, as of headache, frontal, vertical, or unilateral; or of tingling, numbness, or pain at the extremities. A peculiar sensation, it may be of cold, pain, heat, or

itching is developed suddenly in a toe, a finger, a limb, in the belly or the back, and from the point where it originates mounts gradually to the head. Instead of pain, true anæsthesia may be present. Some patients complain of a lump or ball starting from the epigastrium and rapidly rising to the throat.

The *motor aura* consists of muscular contractions in certain muscles or sets of muscles. These not unfrequently begin in the side of the face, in the tongue, finger, or hand. Sometimes the patient performs rotatory movements, or even walks a few paces, as in the case of a soldier, mentioned by Dr. Hughlings-Jackson, who, five minutes before his first attack of epilepsy, had been "counting off" in the ranks. Then, whilst marching past, he suddenly turned "right about face," and marched to the rear. In some instances there may be clearly marked inability to speak,—a temporary aphasia, or the disturbance may be shown in perverted speech. Forbes Winslow speaks of a lady who in attempting to repeat the Lord's prayer gave utterance to "Our Father which art in hell." Dr. Beddoes knew a man who, previous to an attack of epilepsy, misplaced his words in a singular manner. For example, he would say, "Everybody feels very languid this *wet* weather,—I mean this *hot* weather."

Dr. Ross says that one of the most remarkable features presented by motor auræ is that, as a rule, all of them begin in small muscles, such as those of the eyeball, tongue, face, and hands. These muscles are engaged in the most special actions, and consequently the motor auræ may be said to begin in the more special, and to pass gradually to the more general, actions.

Vaso-motor, Secretory, and Visceral Auræ.—The two former consist of flashes of heat with redness of the skin, or more commonly of chilliness in the extremities, the parts becoming cold, pallid, and anæsthetic, as when the blood is driven from the periphery by vaso-motor spasm. The aura may take the form of profuse perspiration or salivation, or the reverse. The visceral auræ, which are quite common, are the peculiar sensations referred to the different portions of the area of the pneumogastric.

The duration of the aura varies exceedingly. It is said to last in some instances for two hours, but generally runs its course with great rapidity. The average duration is given from half a minute to five minutes.

The Epileptic Paroxysm.—In considering the epileptic paroxysm we will first study that of the more pronounced form, *le grand mal*, in which there is loss of consciousness with well-marked tonic and clonic convulsions. The paroxysm is generally divided into three stages or periods: 1st. That of invasion, marked by sudden loss of consciousness and tonic spasm; 2d. That of continued unconsciousness and clonic spasm; and 3d. That of a cessation of the spasm, and a gradual

return to consciousness. To these three might very properly be added a fourth, marked by a tendency to drowsiness and irritability.

The attack commences with a peculiar shrill cry; the patient, as if shot, falls to the ground unconscious, whether he be sitting or standing, and in only rare cases has he time to lie down safely, and the convulsive phenomena at once begin. It may almost be said that these three prominent symptoms occur simultaneously. The epileptic cry which is present in many cases cannot be considered as indicating any pain, fear, or surprise, although in rare cases patients are not at the moment wholly unconscious; it is really owing to the spasm of the respiratory centre in the medulla oblongata, which causes a sudden convulsive action of the laryngeal muscles, by which the glottis is closed, and the air forcibly expelled. Unconsciousness is sudden and complete, sensation is entirely lost, and the patient falls on his face, side, or back, regardless of where he may be or what injuries he may receive. This fall is due to the sudden convulsion of the muscles, and not to the loss of consciousness, for this latter is equally present in the milder form of *le petit mal*, where nevertheless the patient does not lose his balance, and retains his position. The face is usually pale at the onset of the attack, and later becomes dark red or dusky-hued; the pallor is owing to irritation of the vaso-motor centre in the medulla causing anæmia. This pallor may last through the whole of the first period, or may be quickly followed by the livid and purplish hue just mentioned, which is attended with swelling of the cheeks, lips, and tongue. This is especially noticeable when, from the beginning, there is present a spasm of the muscles of the throat and rigidity of the chest walls.

The tonic spasm is of varying severity and extent, involving the whole or a part only of the mucular system. If general, the twitchings begin in the muscles of the face or the smaller muscles of the extremities, and thence extend to the other parts of the body. The face, and especially the mouth, is fearfully distorted, with rotation of the head and neck; the eyes become fixed and staring, and usually drawn to one side; the pupils are dilated, do not respond to light, and the conjunctiva is insensible; the thumb is firmly pressed into the palm of the hand, the fingers clenched. The jaws are set, and the tongue or mucous membrane of the mouth may be bitten. At the same time the respiratory muscles, including the diaphragm, are in the same state of tonic spasm, breathing is impeded, and the carotids throb violently. The examination of the pulse is attended with difficulty; it is usually unchanged or imperceptible, and the heart's action is normal. During the clonic stage, however, the pulse is full and rapid and the heart beats tumultuously. In this first stage the whole body is in a state of tetanus, and the head is forcibly drawn to the side or forwards or backwards, the contraction being generally stronger on one side than the other. After this condition has lasted

for a period varying from a few seconds to a couple of minutes, the patient enters the *second stage*, marked by continued unconsciousness and *clonic* convulsions. These usually affect the muscles of the face, tongue, pharynx, and larynx first, and afterward attack those of the trunk and extremities. They consist of sharp, quick, short, violent muscular contractions separated by more quiet intervals; they begin mildly and rapidly become more violent until the whole body is in convulsive action, by which bones may be broken or dislocated, muscles torn, or the teeth broken out. Still, as Althaus remarks, the very occurrence of these clonic convulsions shows that the excitability of the pons and medulla is diminished.

The facial expression becomes even more hideous and distorted than during the first period; the features are disfigured by horrible grimaces and contortions. The head is rapidly and forcibly thrown backwards and forwards or from side to side, and the staring eyeballs are rolled about; the jaws are convulsively worked, the teeth often broken and the tongue bitten through. The patient foams at the mouth, and the pharyngeal or buccal mucus rattles as it is thrown back and forward by the rapid breathing, or it oozes from the mouth mixed with blood and saliva. Flatus, urine, fæces, or semen may be discharged unconsciously and involuntarily. The face is dusky and turgid, the jugular veins full, and the eyeballs prominent, showing marked venous hyperæmia. The skin may now be bathed in perspiration of an unpleasant odor. The heart beats forcibly, and the pulse is fuller than in the earlier stage. The patient now begins to moan, and may do so for several minutes, which is not owing to pain, but to irritation of the corpora quadrigemina. This stage may last from a few seconds to five or, in rare instances, ten minutes, but to the observer it seems much longer.

The *third period* is that of relaxation; in it the clonic convulsion ceases either suddenly or more often gradually, and the transition is marked by localized twitchings or by a kind of general tremor which seems to run through the whole frame. The coma continues for a short time longer, when the patient begins to rouse from his stupor, to look around, and make some attempts at voluntary movement. The face loses its dusky hue, the eyes become sensible to light, the patient looks about him in a dreamy fashion, utters a few words, and seems inclined to sleep. At the same time respiration and the heart's action become normal.

The entire period of the paroxysm, as thus far described, may last from two to ten or fifteen minutes. In some instances the patient may awake after his fifteen minutes' experience, perfectly unconscious of anything having happened, except as he feels bruised, lame, and sore. Generally, however, there is an *after period* marked by a deep, heavy sleep, lasting half an hour or several hours, and from which he

may awake fresh and natural with the exception of the aforesaid soreness; he may again be irritable, morose, or excitable for several days, or the drowsiness and lassitude may be of like duration.

Epilepsia mitior, or *le petit mal*.—Under this head are grouped the lighter forms of epilepsy which are marked by loss of consciousness without convulsion. The attack may, or may not, be preceded by vertigo or some form of aura, and followed by cerebral confusion. In some instances it may be so slight as to pass almost unnoticed; the patient may be engaged in conversation, stop a moment, and then continue as though nothing had happened; if walking, he may sway a little, or stagger, but rarely falls. That the unconsciousness is profound is evident from the following case, which was that of a man aged 47, who had an attack of *petit mal* while standing with his back to the fire. He remained standing, but leaned heavily against the mantle shelf, so that his clothes caught fire. He was found, still standing erect and unconscious, with his clothes burned to cinders, and a deep burn on his back, yet he had experienced no pain.

The loss of consciousness is generally brief, lasting from a few seconds to a minute or two, but in exceptional cases may last much longer.

There are also instances where the loss of consciousness is attended with muscular spasm of a mild type, but yet perceptible to the observer; the hands, fingers, or facial muscles twitch, and the eyes are staring. Any of the numerous auræ, combined with vertigo and confusion of mind may constitute a minor attack.

Epileptic Vertigo.—In some cases the epileptic fit is a mere dizziness or vertigo, and in some cases the giddiness even is not apparent to the observer, and all that is observable is the transient mental disturbance. The importance of recognizing the existence of such cases is readily seen if it is true, as taught by Hughlings-Jackson and others, that cases of epilepsy in which there are the slightest attacks are the worst for the mind. The greatest injury to the intellect is not inflicted by the most frightful and violent convulsions, nor when the mature and muscular man struggles like a chain-bound Hercules. Absence of mind, momentary obliviousness, vertiginous feelings, a pause, a stoppage or an intermission in consciousness, such as has been described as the *petit mal*, as surely and swiftly produce enfeeblement. (W. A. Browne.)

Children three and four years of age are sometimes seized with sudden fits of shrieking, desperate stubbornness, or furious rage, in which they bite, tear, and destroy what they can lay hands upon, and such attacks may occur periodically, either alternating with epileptiform paroxysms or represent a *latent* or vicarious epilepsy. Similar attacks occurring in a woman may be erroneously attributed to hysteria, and in a man to criminal intent. The gravity of these cases is

not because the paroxysms are slight, but because the discharging lesion is of the highest and most intellectual nervous arrangements, viz., the substrata of consciousness. The resemblance between this paralyzed condition of the higher brain centres and somnambulism is well marked; and has been clearly pointed out by Falret, who says: "There are certain incomplete attacks of epilepsy which hold an intermediate place between the simple vertigo and the full paroxysm, and which appear while the patient seems perfectly conscious of everything about him. Such persons pronounce words or commit acts which would make one doubt the real epileptic nature of the attack, and would lead us to ascribe to them a freedom of will and moral sense to which they can lay no claim. This singular mental condition in many respects resembles ordinary somnambulism."

A remarkable phenomenon which frequently occurs in these incomplete attacks of epilepsy, or in the interval between two complete attacks, should here be noted. The patient seems to have come to himself, enters into conversation with those around, and performs acts apparently dictated by the will. Then the epileptic attack recommences, and when the patient again emerges from its influence, he has no remembrance of the words or acts of the interval between the two paroxysms. Occasionally this second epileptic attack may be omitted, and the period of automatic action continued for days. Many instances of this kind are on record, and a few have come under my own observation. The most notable and typical, however, is thus reported by Dr. W. A. Hammond: "The patient, who was engaged in active business as a manufacturer, left his office at about 9 A.M., saying he was going to a florist to purchase some bulbs. He remained absent eight days. He was tracked all over the city, but the detectives and friends were always an hour or more behind him. It was ascertained that he had been to theatres, to hotels where he slept, to shops where he had made purchases, and that he had made a journey of a hundred miles from New York, and, losing his ticket and not being able to give a satisfactory account of himself, was put off the train at a way station. He had then returned to New York, passed the night at a hotel, and on the eighth day, at about ten o'clock, made his appearance at his office. He had no recollection of any one event which had taken place after leaving his place of business, eight days previously, till he awoke on the morning after his return to the city, and found himself in an hotel at which he was a stranger. It was ascertained beyond question that in all this time his actions had been entirely correct to all appearance, that his speech was coherent, and that he had acted in all respects as any man in the full possession of his mental faculties would have acted. He had drank nothing but a glass of ale which he took with some oysters at a restaurant."

In these cases, the very confused recollection, if not the complete

oblivion of what has happened, is almost always a striking essential symptom of the mental state, so much resembling the awakening from a dream.

I am unwilling to leave this topic without quoting the views of Dr. Hughlings-Jackson, and I do so the more readily since it is only of late that the important mental changes connected with epilepsy are receiving the attention they deserve. He says: "It is convenient to have one name for all kinds of doings after epileptic fits, from slight vagaries up to homicidal actions. They have one common character, they are *automatic;* they are done unconsciously, and the agent is irresponsible. Hence I use the word *mental automatism.* I say mental, as the doings are probably external signs of crude mental states—external signs of 'epileptic dreams.'

"I have spoken of mental automatism as occurring *after* the paroxysm, but it does not always do so. It sometimes *replaces* the fit. A patient who is subject to ordinary epileptic attacks may have, as it were, *instead,* a paroxysm of mania. It has been said that the patient who is subject to attacks in which there is convulsion of muscles may, at another time, have an attack in which there is 'convulsion of ideas,' and corresponding excess of external action. I think it is probable that there is a transitory epileptic paroxysm in every case of mental automatism occurring in epileptics before their mental automatism sets in. I am fully aware, and freely admit, that occasionally no signs of a prior fit are *discoverable.* I believe there is in such cases, during the paroxysm, an internal discharge too slight to cause obvious external effects, but strong enough to put out of use for a time more or less of the highest nervous centres."

Sequelæ and Mental Characteristics.—A few writers, among whom Dr. Reynolds is the most prominent, argue that epilepsy does not necessarily affect the memory or intelligence, and that considerable intellectual impairment is the exception rather than the rule. The vast majority of physicians, however, will testify that among confirmed epileptics perfect integrity of the intellect and emotions is of exceedingly rare occurrence, and it is useless to cite the history of a few great men, such as Cæsar, Mahomet, and Napoleon, who are alleged to have been epileptics, against the testimony of daily experience. It is true that remarkable intellectual activity has sometimes signalized the commencement of epilepsy among the young, but ere long they show signs of mental weakening, either in the volitional or intellectual sphere.

Dr. Althaus says: "Even where there is no epileptic vertigo and automatic action of the lower nervous centres, the mental condition of epileptics is almost always peculiar. They are not really insane, but eccentric, suspicious, ill-tempered, quarrelsome, fault-finding, fretful, and difficult to get along with. They seem to expand only with

those who are similarly affected, but are otherwise shy, peevish, gloomy, and exclusive. Their intellect is below the average, and their memory impaired, more especially after attacks; their judgment is often incorrect, and they are generally unhappy."

At times the conduct of epileptics undergoes strange vicissitudes, in a very short time passing from gay to grave, and from grave to gay. They may become, without apparent cause, peevish, desponding, sad, or depressed; or they may become irritable, magnify little worries into annoyances of great moment, engage in rash and hazardous undertakings incompatible with sound judgment, or lend themselves to quarrels or to violence, which have no seeming origin, and which are inexplicable unless the epilepsy be recognized. Again, they may suffer from confusion of ideas and loss of memory; or their memory was never so powerful or their intellect so brilliant.

Violence and perversity are not all that characterize the epileptic; there is also the impassioned state produced by the emotions which he experiences. These emotions, excited by the disease, often become so vivid that they control the whole mind, and stifle all manifestations of the moral sentiments which oppose them, and which the person would feel were he in his normal state. Thus we see one of these epileptics in the impassioned state at times controlled by violence and anger, sometimes by ambitious and haughty passions, and at others by shame and discouragement. Under the influence imposed by disease, and of the impassioned state produced thereby, deliriums arise and strong desires, which make of him an insane man. The abnormal excitement of his nervous system, together with the nerves of sense, is especially favorable to the production of hallucinations and of delusions.

Frequency of Attacks.—The frequency with which epileptic fits may occur varies exceedingly. In some cases they may take place at long intervals through life, and in others may be numbered by hundreds or thousands, or the seizure may appear in a group of four to a hundred fits in the twenty-four hours. Delasiauve saw in a boy of fifteen, within one month, a "collective seizure" which was composed of 2500 fragmentary seizures. It is well to bear in mind that some persons suffer exclusively from the nocturnal attacks, and only know of their occurrence from the bruised and weary feeling experienced on awaking.

Diagnosis and Prognosis.—It would seem that enough has been said to render the diagnosis a matter of certainty in most cases. There is danger of overlooking the probable presence of epilepsy in many of the convulsions of childhood which are generally ascribed to other causes. An important paper upon this subject was lately published by Dr. Seguin. The history of the case ought to enable us to distinguish between epilepsy proper and the epileptiform attacks resulting

from gross brain lesion or injury, and also from the convulsions of Bright's disease.

Our prognosis should always be given very guardedly, as so many elements must be taken into account. Contrary to what might be supposed, the general health of the patient seems to exercise but little influence in the production of the fits, in their severity or frequency, or in their curability. In most instances the carefully selected remedy judiciously persevered in will result in at least a palliation of the disease and a lessening of the frequency of the attacks. In favorable cases we may expect a cure. I have never known death to take place during the paroxysm.

Pathology.—It is difficult to state anything positive as to the pathology of this, or any other pure, neurosis, and post-mortem examinations in the majority of cases yield only negative results. Leaving aside the cases of an epileptiform character, which are dependent upon some well-defined lesion, the remark of Dr. Wilks seems very applicable, as follows: "The conclusion, however, which must be arrived at, is that epilepsy is not a disease in the strict sense of the word, and that the symptoms must be regarded as physiological phenomena rather than pathological. If a person have only a few fits during a long life, and in the intervals be able to follow the ordinary pursuits of life, he cannot have a diseased brain. The organ is, in fact, healthy; it is producing as usual its nerve force, when, from some slight derangement, an explosion takes place."

The researches of Schroeder van der Kolk tend to show that the principal seat of this disease is in the medulla oblongata, and that the cerebro-spinal nervous centres are secondarily implicated. Further investigations, together with the discovery of a so-called "convulsive centre" in the floor of the fourth ventricle, irritation of which causes tonic and clonic spasm of the whole of the voluntary muscles, have led Nothnagel and others to believe that the pons Varolii and medulla oblongata are the seat of trouble, and that irritation of this centre is a necessary concomitant of every epileptic convulsion.

The points which seem fairly well established and meet with a general degree of acceptance, are thus summed up by Dr. Reynolds:

"1. That the seat of primary derangement is the medulla oblongata and upper portion of the spinal cord.

"2. That the derangement consists in an increased and perverted readiness of action in these organs, the result of such action being the induction of spasm in the contractile fibres of the vessels supplying the brain, and in those of the muscles of the face, pharynx, larynx, respiratory apparatus, and limbs generally.

"By contraction of the vessels the brain is deprived of blood, and consciousness is arrested; the face is, or may be, deprived of blood, and there is pallor; by contraction of the vessels which have been

mentioned, there is arrest of respiration, the chest-walls are fixed, and the other phenomena of the first stage of the attack are brought about.

"3. That the arrest of breathing leads to the special convulsions of asphyxia, and that the amount of these is in direct proportion to the perfection and continuance of the asphyxia.

"4. That the subsequent phenomena are those of poisoned blood, *i. e.*, of blood poisoned by the retention of carbonic acid, and altered by the absence of a due amount of oxygen."

While the views above set forth satisfactorily account for the phenomena observed in a well-developed paroxysm, they still leave us in ignorance as to the essential nature of the disease, and do not explain those cases where the mental obscuration is *the only* symptom observed. In such cases we must seek for the changes in the cortical layer and the higher centres. And here we are met by the theory of an explosion of nerve-force first suggested by Dr. Todd, and since advocated by Dr. Jackson. Briefly stated, this theory is, that in the ordinary workings of the body there is an accumulation and giving off of nerve force, which goes on in a quiet, unnoticeable way. When from any cause an anæmic condition of the nervous system, especially of the brain, exists, there is an excess of irritability, and a lessened ability to withstand any shock coming from within or without. Hence there is a state of unstable equilibrium; there is a lack of power to retain nerve force, an upsetting of the balance between power and resistance. The nature of the epileptic paroxysm and its periodic recurrence point to the existence of a rupture of the natural balance between the degree of irritability of different parts of the nervous system, or, in other words, to a state in which some part or parts develop increased irritability, while the remaining portions retain the normal amount. The idea seems to be that there is a sudden discharge of nerve-force from the brain which sets the whole muscular system in commotion, and that this shock and emptying of the brain leaves the patient for the moment unconscious, followed for some time afterward by enfeeblement of the mind or body. When the discharge is of a mild character, and confined to the cortical layer, mental rather than motor disturbance is produced.

This last theory seems to cover most of the symptoms noticed, but it will require further study and investigation before it can be considered as proved.

Medical Treatment.—Epilepsy has often been called the opprobrium of medicine, from the unsatisfactory results of treatment; few diseases require, or will so well repay, such close and minute study. We should bear in mind that there is always some cause for every symptom observed in every patient, and for every genuine symptom in the drug pathogenesis, and he will do his work most successfully who

reads both understandingly and adapts the one to the other. Again, it should be noted that in selecting a remedy for a given case careful attention should be paid to the special symptoms present, to those which distinguish the case under consideration from all other cases of epilepsy.

It is known to every one that the Bromine salts have long been considered by the allopathic school as the palliatives par excellence, if not the main curative agents in the treatment of epilepsy. The principal preparations employed are the Bromides of potassium, of sodium, and of ammonium, and they seem to be used rather indiscriminately; the Bromide of potassium is generally tried first, and if it fails to cure, or to check the paroxysms, or if the system becomes habituated to its use, the others are given. Although the Bromide of potassium does not cure many cases, it does seem to postpone and diminish the frequency of the epileptic paroxysm, and, as a consequence, quiets the mental disturbance. But in order to do this, in order even to use it as a direct sedative, it is not necessary or safe to use the massive doses recommended by Hammond, Gowers, and others; doses of ten or fifteen grains will answer every purpose. It should, however, not be given in such doses except as a last resort, or until all hopes of curing the patient with the ordinary doses of this, or some other homœopathically indicated, remedy have been abandoned. While in many cases the *continued use* of this drug will keep the paroxysms in check, there is no doubt that the Bromide exerts in time a lasting influence upon the intellectual faculties, ending in dementia, but less harm is done than by repeated epileptic fits. This tendency of the drug to produce intellectual stupidness is perceptible even to non-professional observers. The homœopathic school, however, condemns in too sweeping a manner the use of the Bromide of potassium in epilepsy, as it does that of Quinine in malaria, instead of judging impartially and investigating closely to see whether the alleged cures or palliations, made with these drugs, do not rest upon our great law *similia similibus curantur*.

Dr. Hughes says that his experience is against the Bromide treatment of epilepsy, except when from their frequency the attacks are threatening life or reason.

Bromide of potassium.—The symptoms caused by, and hence indicating the use of, this drug are: Profound melancholic delusions, with either a religious depression, or a feeling of moral deficiency; loss of memory, and absentmindedness; he forgets how to talk, and cannot apply himself to work or study; the brain feels heavy and sluggish; delusions that his friends have neglected him, or are leagued against him; also cerebral indifference and apathy.

Nux vomica is a remedy often indicated both in recent and chronic cases; the patient is generally of an excitable temperament, active, busy and cheerful as a rule, but very easily provoked and of a spiteful, malicious disposition; the mental indications for this remedy are of especial value, and besides the above are irritability and desire to be alone, or a desire to talk about his disease; despondent and buoyant alternately; over-sensitiveness to trifles, and thinks that people are finding fault with him;

the aura proceeds from the epigastrium; the paroxysms are generally associated with gastric or hepatic disturbance, and the patient falls forward. Nux vomica is especially indicated in *le grand mal*, but its use, as well as that of all other remedies in this disease, must be continued for a long time, at unfrequent intervals and in the middle or higher potencies, if a cure is hoped for. In my experience the lowest potencies will not cure.

Ignatia may be useful in recent cases when there is no hereditary disposition, and the attack is brought on from the shock of some mental grief and anxiety.

Sulphur is a remedy that will prove useful in those cases where there is some scrofulous taint; there will usually be some strong religious feelings present, and the patient is puffed up with a sense of his own importance. The aura seems to proceed from the extremities up the back as a creeping sensation. It is said that the Sulphur patient is apt to fall to the left side; I cannot say that I have confirmed this symptom, but we know that some patients always fall on one side, and others on the other; some on the back and others on the face; some give a cry, and others never utter a sound.

Calcarea carbonica.—When indicated in cases of younger children, Calcarea carb. is exceedingly valuable; in my experience several cases have been cured by it after the paroxysms had continued two or three years. The remedy was given in the 3d centesimal trituration, and later in the 30th. In one case, three years has now elapsed since a paroxysm. The indications were the ordinary ones calling for Calcarea as a constitutional remedy, together with timidity, poor appetite, pale complexion, flabby skin, and cold sweat on forehead immediately after the paroxysm and during the following drowsy stage. Sulphur and Calcarea carb. are both indicated, especially in cases of pseudo-epilepsy, when children start up in sleep as if frightened, look around, mutter a few words, drop back again quietly, go to sleep, and break out in a warm or cold sweat. If this latter symptom is wanting, Belladonna, Gelsemium, or Hyoscyamus may be indicated.

Under Calcarea we also find: Great anxiety and palpitation; frightened, apprehensive mood, as if some misfortune were about to happen, which he could in no way overcome; despondency, fretfulness, and irritability; great weakness of memory; vertigo on suddenly turning the head; before the attack, sensation of something running in the arm, or from pit of stomach down through abdomen to feet; screaming at night, with restless sleep, or a stupid-like sleep from which he could be roused with difficulty.

Hepar sulphuris.—Kafka recommends *Hepar sulph.* for nocturnal epilepsy, inasmuch as we find among its symptoms: Over-sensitiveness and irritability; sad mood for many hours; depressed, sad, apprehensive; great weakness of memory while peevish; frequent short attacks of unconsciousness when walking in the open air; vertigo; enuresis nocturna; weariness in the morning on waking.

Cuprum met. will render good service in cases where the paroxysm is especially violent, and is followed by a tendency to maniacal excitement. It has unconquerable sadness; constant restlessness, as if some misfortune were approaching him; fears he will lose his reason or become a confirmed epileptic. He says words not intended; incoherent delirious talk; is afraid of everyone who approaches him; shrinks away and tries to escape. Frequent headache and tendency of the head to fall forwards.

Argentum nitricum is a remedy which I frequently use; not in the massive doses of the old school, which barely stop short of discoloring the skin, but in the usual doses of the homœopathic triturations. In my treatment of epilepsy I generally use at first the lower triturations, prepared freshly, and gradually work up to the 6th, 12th, and 30th centesimal dilutions. It has among its symptoms, disposition to fall sideways, with great dizziness. The patient is low-spirited, easily discouraged and frightened; there is also weakness and trembling of the limbs, and great forgetfulness.

Argentum metallicum.—The *Argentum met.* patient is more irascible, especially after the attack, when he will have blind fits of rage. He is restless and uneasy, going from place to place. The epileptic paroxysms are more apt to occur on entering a room from the open air; before midnight and while slumbering in bed.

Œnanthe crocata has been used by me rather empirically in several cases with good results, the third decimal dilution being given twice daily for periods of a fortnight. In one case where there was a strong hereditary predisposition, both parents being intemperate and the father epileptic, but two paroxysms have thus far

followed the use of this drug, which was given empirically. It certainly is worthy of further investigation, as it has produced such a picture of epilepsy as the following: Sudden and complete loss of consciousness; much confusion of intellect and vacancy of expression; consciousness has quite returned, but he remembers nothing that has happened; complained of giddiness and immediately fell to the ground; rapid convulsive twitching of muscles of the face, which is livid and turgid; tongue sore, swollen, and protruded; foaming at the mouth; bloody mucus oozed from the mouth; loss of speech; violent vertigo, with falling and convulsions, followed by excessive prostration and great drowsiness; deep sleep with loud snoring and moaning.

These symptoms are mainly derived from cases of poisoning. Further provings with the higher potencies would probably give us more characteristic and special symptoms, especially in the mental sphere, in which case Œnanthe would prove one of the most valuable remedies in this disease.

Hydrocyanic acid.—Hughes brings forward *Hydrocyanic acid* as *the* remedy in epilepsy. Allen gives us the following characteristics: Sudden loss of consciousness and sensation; confusion of the head; vertigo and obscuration of sight; wild-looking and bloated countenance; involuntary excretion of urine; noisy and agitated breathing; gurgling noise in the throat; general convulsions with loss of consciousness. My own experience with this remedy has not been satisfactory.

Belladonna, *Atropine*, *Gelsemium*, *Hyoscyamus*, *Stramonium*, and *Cicuta* seem useful according to the usual well-known indications to relieve the abnormal conditions accompanying a well-defined paroxysm, or to postpone an attack of epileptic vertigo, or even of *le petit mal*, but I have seen no evidences of their power to cure a fully developed case. For this the more deeply acting remedies seem needed, whether, or not, the convulsive symptoms are prominent in their pathogenesis. In this connection the remarks of Dr. Lilienthal, in regard to the value of Silicea, seem to me worthy of careful thought and study. He says: "A remedy which, though in its symptomatology it shows not the epileptic fit nor the epileptic mania, may still be the great constitutional remedy which may restore the sufferer of long years to comparative health. We beg the reader to ponder well over the case published by the late Carrol Dunham, and we will see its close relationship to the chronic state of epilepsy, this exalted susceptibility of the nervous system, especially of the upper spinal cord and medulla oblongata, simultaneously with an exhausted condition of the nerves which may finish up with an explosion. No wonder that such patients are morose and depressed in mind, restless, and fidgety, starting at the least thing or noise. That it is indicated in epilepsy more frequently than it is prescribed we have the testimony of Hahnemann, who recorded: epileptic attack at night about the time of the new moon; in the evening after lying down and slumbering, she began unconsciously to thrash about with her hands and feet and to jerk, with closed eyes and loud snoring; froth oozed out from the mouth, after which she lay motionless as if dead; great coldness of the whole left side of the body, followed by frequent slumbering and starting up; then she loses consciousness, recognizes no one, and becomes so weak that she cannot turn over alone; after this, violent convulsions, with staring look, distortion of the eyes, twitching of the lips, stretching of

the head and limbs, followed by warm perspiration and gradual recovery of consciousness."

In cases where there is sufficient warning, the attack may sometimes be warded off or lightened in severity by inhaling a few drops of the Nitrite of amyl which may be carried in a vial for that purpose.

EPIDEMIC CEREBRO-SPINAL MENINGITIS.

BY H. R. ARNDT, M.D.

Synonyms.—Cerebro-spinal fever, Epidemic meningitis, Malignant meningitis, Typhoid meningitis, Cerebro-spinal arachnitis, Cerebral typhus, Typhus petechialis, Typhus syncopalis, Febris nigre, Petechial fever, Spotted fever, Malignant purpura, Pestilential purpura, Malignant purpuric fever; (Fr.) Méningite cérébro-rachidienne, Méningite cérébro-spinale épidémique; (Ger.) Genickkrampf, Genickstarre.

Definition.*—An acute epidemic febrile disease of unknown origin,

* "A malignant epidemic fever, attended by painful contraction of the muscles of the neck and retraction of the head. In certain epidemics it is frequently accompanied by a profuse purpuric eruption, and occasionally by secondary effusions into certain joints. Lesions of the brain and spinal cord and their membranes are found on dissection." (Definition adopted by the Royal College of Physicians.)

"An acute epidemic febrile disease, characterized by sudden invasion, with extreme nervous shock, vomiting, excessive pain referred to the back of the neck and spine, spasmodic contraction of muscles, excessive sensibility of the skin, and frequently delirium; accompanied by purpuric eruptions, either circumscribed, raised, hard and shotty to the feel, or extensive purpuric spots or patches, frequently accompanied by vesicular eruptions, usually of herpetic but sometimes of a pemphigoid character, and frequently purulent inflammation of the eyes. *Post mortem* there are found: inflammation of the membranes of the brain and spinal cord, especially of the arachnoid, with deposit of white, yellow, or greenish-yellow lymph upon the surface of the arachnoid, especially at the base of the brain and anterior portion of the medulla oblongata and spinal cord, and effusion of serum into the ventricles and sub-arachnoid spaces." (T. W. Grimshaw, in Quain's Dictionary of Medicine.)

"An acute, epidemic disease, characterized by profound disturbance of the central nervous system; indicated, at the onset, chiefly by shivering, intense headache, or vertigo, or both, and persistent vomiting; subsequently by delirium, often violent, alternating with somnolence, or with a state of apathy or stupor; an acute painful condition with spasm—sometimes tetanoid—of certain groups of muscles, especially the posterior muscles of the neck, occasioning retraction of the head; and an increased sensitiveness of the surface of the body. Throughout the disease there is marked depression of the vital powers; not unfrequently, collapse; and in its course an eruption of vesicles, petechiæ, or purpuric spots, or mottling of the skin is apt to occur. If the disease tends to recovery, the symptoms gradually subside without any critical phenomena, and convalescence is protracted; if to a fatal termination, death is almost invariably preceded by coma. After death, the enveloping membranes of the brain and spinal cord are found in a morbid state, of which the most notable signs are engorgement of the bloodvessels, usually excessive, and an effusion of sero-purulent matter

characterized by profound disturbance in the central nervous system, such as agonizing cephalalgia and intense myalgic pains in various parts of the body, often tetanic rigidity of the muscular fibre, especially of the posterior muscles of the neck, hyperæsthesia, vomiting of cerebral origin, lowered arterial tension, as shown in the radial pulse, a moderate elevation of temperature, great depression of the vital power, and the presence, usually, of herpetic or vesicular eruptions, purpuric spots, or petechiæ, and the occurrence, nearly always, of coma before death. Convalescence from the disease is usually protracted, and recovery from it is often incomplete. Examination after death shows excessive engorgement of the bloodvessels of the cerebral and spinal meninges, and the formation of inflammatory exudates beneath them.

Ætiology.—In studying the probable causes of epidemic cerebro-spinal meningitis it is necessary to bear in mind the conditions under which such epidemics have made their appearance, the circumstances surrounding the outbreaks, the character of the localities infected, the climatic conditions prevailing, and the age, sex, occupation, and habits of the victims selected.

The disease has been carefully studied since the beginning of this century. Its medical history abounds in valuable data and in carefully detailed observations made by intelligent observers, giving us the progress of different epidemics, step by step, from the moment of their first appearance until their departure, with clear statements of all the facts bearing upon the subject. In spite of the valuable aid thus afforded in the study of this unique affection, the problem of its specific cause has not yet been solved.

Its appearance, often simultaneously, in countries or places widely separated, and not at all connected by any of the great avenues of travel, argues strongly in favor of the presence in the atmosphere of an intangible "something" which under proper conditions gives rise to the morbid phenomena here considered. The fact that the disease seems to attack indiscriminately rich and poor, and that it is almost as likely to infest a salubrious locality as one in which unsanitary conditions abound, also adds weight to this view.

The various epidemics noted have been confined to the temperate zone; the disease has shown a marked preference for northern por-

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into the meshes of the pia mater, and beneath the arachnoid." (J. Netten Radcliffe, in Reynolds's System of Medicine.)

"A febrile, and often malignant, but non-contagious disease of unknown origin; usually occurring as a local epidemic; confined hitherto to the North American and European continents, and to the vicinity of the latter; characterized by its rapid and irregular course, and usually by a tetanic rigidity or retraction of the neck, a tendency to disorganization of the blood, and the formation of inflammatory exudates beneath the membranes of the brain and spinal cord." (Alfred Stillé, in Pepper's System of Medicine.)

tions of the temperate zone, appearing with particular violence in cold countries and during cold seasons; to the latter statement, however, epidemics of the disease, in a severe form, in France and Sweden, during the hot months of the year form notable exceptions, strongly indicating that cold, *per se*, though an important, is by no means an absolute or indispensable factor in the causation of this disease.

The epidemics at no time have swept swiftly over large territories, devastating extensive tracts of countries, but after appearing at some point, with more or less violence of onset and with varying degrees of fatality, the disease often would next break out at some locality remote from the place of its first appearance, with numerous repetitions of the same phenomena, to eventually die away after having traversed various countries in the course of a period of time covering years. The disease would thus rage at the same time in localities often widely separated; for instance, after its appearance at Geneva, in 1805, it appeared simultaneously in Germany and in the United States. During the second great epidemic, covering the years from 1837 to 1850, it again, in 1842, appeared in this country, not at seaports or in places most exposed to the effects of transatlantic communication, but in towns remote from the seashore and the great avenues of travel, and separated from each other by intervening large tracts of territory.

The same peculiarities have been observed during later epidemics, both in this country and in Europe, and during the occasional outbreaks of the affection within the last decade in different portions of the United States the epidemics have been limited to small tracts of territory, afflicting some village or city, then suddenly leaving, to appear unexpectedly at a point commonly quite remote from the locality first invaded, and not unfrequently presenting local surroundings the very reverse from those which in the first instance were presumed to have acted as possible ætiological factors.

The almost universal tendency to avoid the common routes of travel, to appear simultaneously at localities remote from each other, and between which no communication was had, argue strongly against the contagiousness of this disease; and the fact that the disease is only in rare instances communicated to the medical attendant, or to the nurses, or even to sick persons occupying the same room and closely associated with a patient affected with this illness, furnishes further confirmation of the probable correctness of this view. On the other hand, the actual presence of a principle of contagium seems to be demonstrated from the persistency with which the disease localizes itself in a certain room, or house, or part of a town. During the epidemic in France,* 1837–43, the soldiery in certain portions of that

* It began in the southern departments, with Bayonne as a centre, and extended gradually westward and northward, in some places attacking only military garrisons,

country suffered most severely, the disease, in some cases, being practically limited to certain barracks, the troops successively occupying the infected quarters continuously suffering from the disease, or the disease recurring again and again in the same locality. It seemed also to affect certain regiments or corps of the army, a fact also clearly observed in the American army, change of quarters in such cases proving ineffective.

The non-communicability of epidemic cerebro-spinal meningitis from the sick to the well is then very generally accepted. Testimony is, however, furnished strongly suggestive of the possibility that, after all, the cause of this disease is portable, and that it thus may be communicated to the persons exposed to its action. M. Boudin in this connection especially emphasizes the fact that in many localities, during the great epidemic in France, the disease in certain towns did not occur until after the advent of troops who had suffered from it; cases are cited in this country of the disease making its appearance in northern towns after the return home of soldiers from camps which were infected, and Hirsch (*Transactions of Epidemiological Society*, vol. ii.) and Stokes (*Medical Press and Circular*, June 19, 1867) cite cases in proof that their objection to the non-communicability of the disease from the sick to the well is founded upon good grounds. The case cited by Prof. Hirsch is of particular interest: "On the 8th of February, 1865, a youth, aged twenty years, was attacked with the characteristic symptoms of epidemic cerebro-spinal meningitis. He was nursed by a woman from another village. The youth died, and after his death the woman returned home. She soon sickened, and died of the epidemic disease on the 26th of February. There had been but one case previously in the village. To the interment of the woman came a family from another locality, the funeral obsequies, as customary in the district, being performed with the coffin opened. After the return home of this family, a child, three months old, sick-

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and in others only civilians. Elsewhere the predilection was reversed, or, again, civilians and soldiers were equally affected. As Boudin has pointed out, it located itself in certain districts; in garrison towns it seemed to affect certain barracks only, and in them only certain rooms. In one place it broke out in a prison, and spared the soldiers; in another its victims were among the soldiers and the citizens, while the prisoners were untouched. Thus the disease spread over the whole of France, and was more fatal almost everywhere than in Paris itself. Almost at the gates of the capital, at Versailles, and among the garrison, it was very destructive in 1839, causing a mortality among those attacked of from 50 to 75 per cent. . . . About the same time it occasioned a great mortality at other military posts, especially at Rochefort and Metz, and in 1840–41 at Strasbourg. In 1843 the disease had almost ceased to prevail in France, but in 1846 it appeared at Lyons, and in the following years, and until 1849, affected the garrisons of Orléans, Cambrai, St. Étienne, Metz again, Lunéville, Dijon, Bourges, and Toulon. In some of these places the military experienced five, and even seven, successive epidemics. (Alfred Stillé, M.D., in Pepper's System of Medicine.)

ened immediately of meningitis, and died within twenty-four hours. Then a man who had accompanied the family to the interment was attacked with the disease, and died on the 2d of March. Lastly, a girl, in the same locality, who had also been at the funeral, was seized, and died on the 7th of March." The same authority states also the case of a child who died of epidemic cerebro-spinal meningitis within a week after she had become possessed of the clothing of two children of a neighboring village who had died of the disease.

The question has been raised whether, or not, unhealthy surroundings may be looked upon as causative factors. Hirsch,* without, however, answering this question affirmatively, emphasizes the insanitary condition of the District of Dantzig when, in 1865, the disease appeared within its limits. It seems evident that insanitary surroundings, the crowding together of many people in small rooms, lack of ventilation, disregard of the laws of cleanliness and hygiene, and those results of inclement weather which markedly affect the improvident and the poor, must necessarily render more stubborn and fatal an existing epidemic of this disease, just as the same conditions would greatly aggravate the severity and fatality of any other disease. That the affection under consideration cannot well be a filth-disease is, however, pretty conclusively shown by the remarkable immunity from the disease of England and Scotland, countries which are overcrowded with population, and by the experience of the large cities in nearly all countries, which escaped, wholly or largely, the ravages of this disease, when rural communities, small healthful villages, often in close proximity to these cities, suffered most severely.

Of the direct exciting causes of epidemic cerebro-spinal meningitis we are then, as yet, practically ignorant. The theory, advanced by Dr. W. B. Richardson, that the disease may be due to the consumption of diseased grain seems, in the main, intangible, and the experiments of Dr. H. Day, made with "unsound grain" upon animals, showing that in all cases there were produced spasmodic affections during life, and after death a considerable congestion of the membranes of the spinal cord, do not tend to greatly strengthen the plausibility of this view.

Of the *predisposing* causes *season* is probably one of the most important. While, as has already been stated, the disease *may* prevail during hot weather, it does so only in exceptional cases, an overwhelming majority of epidemics occurring during the winter months and in early spring. It may be said, with equal force, that while the disease may occur in hot countries, it shows a very marked preference for the temperate zone, especially for the northern portion of it.

Age is a possible predisposing cause in so far as the young and robust suffer especially from this disease. The liability of soldiers, particu-

* Transactions of the Epidemiological Society, vol. ii.

larly in camps and barracks, to fall victims has been discussed; in many epidemics children have suffered most severely, and statistics seem to prove the particular liability to this disease of children from the sixth to the fifteenth year of age. "In Sweden, according to Hirsch, of 1267 fatal cases of the disease, 889 occurred in persons under fifteen years of age, 328 between sixteen and forty years, and 50 in persons of forty years and upward. In 1866, in the Kronach district, Germany, of 115 cases, 75 occurred under the seventh year, 22 between the seventh and twelfth years, and 10 between the thirteenth and twentieth years (Schweitzer). During 1865 a local outbreak of the disease in Bavaria affected 53 persons, of whom 22 were children under ten years of age, 18 between ten and twenty years, and 11 between twenty and thirty years. Under the fifth year few were attacked (Orth). Dr. J. L. Smith * found that, according to the reports of the Board of Health of New York, out of 975 cases, 771 occurred in persons under fifteen years of age, the greatest number of any quinquennial period being 336 in children under five years of age. Of the 469 deaths occurring in this epidemic, 216 were of children under five years of age, and the next largest number for an equal period was 99, which represented the deaths between the ages of five and ten years. Of adults or persons beyond the age of twenty, the whole number was but 39." (Alfred Stillé, M.D.)

Sex.—Both sexes seem equally liable to be attacked, although in some epidemics a marked preponderance of male victims was found, a fact possibly due, particularly in Europe, to the large number of victims furnished by the soldiery.

Occupation.—With the exception of the epidemics which showed a decided preference for soldiers, no special liability of any class of society has been noted.

Fatigue, or Exhaustion from privation or previous illness.—Several observers are inclined to believe that great fatigue predisposes the victim to yield more readily to the influences determining this affection. In corroboration of this claim, emphasis is placed upon the frequency with which raw recruits were attacked, the greater liability of soldiers engaged in especially irksome duties, such as fall to the lot of outposts during war, and the fact that persons have been taken with the affection soon after their return from an exhausting hunting expedition. Exhaustion from privation or previous illness, or any conditions lowering the tone of the system, are likely to become predisposing factors here as elsewhere, simply because constitutions thus temporarily broken down are not capable of offering a vigorous resistance to the action of any untoward, morbific influence. The same applies to existing *sanitary conditions and to surroundings.* That epidemic cerebro-spinal meningitis is no filth-disease is pretty well established;

* American Journal of the Medical Sciences, October, 1873.

it attacks with equal readiness the poor and the rich, the depraved and the virtuous, the shiftless and the provident, the filthy and the cleanly, the drunken and the abstemious; yet, the existence of depraved habits and of bad surroundings, if they are not directly predisposing causes, in the nature of things must unfavorably affect the severity, tediousness, and fatality of so violent a disease, because people so depraved or so unfavorably placed are almost invariably deficient in powers of resistance to morbid action, and usually fall ready victims, while others, possessed of normal vigor, overcome severe onsets of equally dangerous diseases. In the same manner, the very poor, who have not at their command the means of procuring for their sick all the aids and conveniences within easy reach of their wealthier neighbors, considerations of far-reaching importance in the sick-room, at least, should they unfortunately fail to escape the disease, are very liable to suffer more severely from its consequences than the prosperous and well-to-do.

Varieties.—The nature and the symptomatic expressions of this disorder are such that a classification at once simple and expressive, hence of practical value, is exceedingly difficult, if possible; that this statement is based upon facts is proved by the many different classifications offered by as many different authors. It seems that the disease assumes one of two types, the one being essentially inflammatory, the other being characterized by disorganization of the blood and tending even in its early stages to a typhoid state. These types are not always clear-cut, but blend into each other, one or the other predominating sufficiently to give character to the case, or so evenly balanced as to leave the observer in doubt as to the type to which the case belongs. Many subdivisions may be made, as dictated by the fancy of the observer, based upon the degree of severity of the disease, the rapidity with which it develops, the presence or absence of a tendency to intermittency, the absence or predominance, and the character, of the cutaneous symptoms, and other conditions which suggest themselves as peculiar to the methodical student.

Torget distinguishes the *cerebro-spinal* from the *cerebral* type, dividing the former into, *a*, explosive; *b*, comatose-convulsive; *c*, inflammatory; *d*, typhoid; *e*, neuralgic; *f*, hectic; *g*, paralytic; and the latter into, *a*, cephalalgic; *b*, cephalalgic-delirious; *c*, delirious; *d*, comatose. Ames, an American observer (1848), speaks of the *congestive: a*, malignant; *b*, mild type; and of the *inflammatory: a*, purely inflammatory; *b*, malignant; *c*, grave; *d*, mild type. Hirsch, an excellent and much-quoted observer, distinguishes four forms: 1, the *abortive;* 2, the *explosive;* 3, the *intermittent;* 4, the *typhoid.* Dr. Bedford Brown, another American writer, enumerates, 1, the *inflammatory* form, which is of rare occurrence, and is marked by high fever, excessive pain, and delirium bordering upon mania; 2, the *neuralgic* form, the most com-

mon form by him observed in the epidemics prevalent in North Carolina from 1862 to 1864, and the form in which the termination usually is favorable; 3, the *ataxic* form, a dangerous type, with great nervous depression, low temperature, and muttering delirium; 4, the *paralytic* form, with stupor and insensibility as early symptoms, and the prospect of a fatal termination. Kippax, in his "Lectures on Fevers," gives a *simple* or *ordinary* variety, representing the simple, uncomplicated type of the disease, the *abortive* variety, lasting but a few days, and occurring at the height and during the decline of an epidemic; the *intermittent* variety, characterized by intermissions and exacerbations; the *fulminant* variety, characterized by violence of onset and a rapidly fatal termination.

Stillé recognizes, *a*, the *abortive; b*, the *malignant; c*, the *nervous; d*, the *inflammatory; e*, the *intermittent.*

The classification adopted by J. Netten Radcliffe commends itself by its simplicity. He distinguishes the following forms: *a*, the *simple; b*, the *fulminant*, coming on suddenly and with great violence, ending fatally in a brief period of time, a few hours to a few days; *c*, the *purpuric*, characterized by a simultaneous occurrence of the cerebro-spinal symptoms, flagging of the vital powers, and the symptoms denoting blood-changes.

Semeiology.—The premonitory symptoms of this disease are indisposition, chilliness, prostration, vomiting, and headache. In the lighter form of the affection they make their appearance while the patient is about his business, and they may not at first occur with sufficient severity to disable him from following, for a few days, his usual avocation. The vomiting, being of cerebral origin, is not accompanied with nausea or with gastric irritation. Gradually the lassitude grows into a profound prostration, accompanied with vague achings and soreness in different parts of the body, the sense of chilliness becomes more constant and more pronounced, the headache assumes a characteristic, excruciating severity, the heretofore vague pains felt become myalgic, darting with the rapidity and severity of electric shocks from the spine to almost every part of the body, and the patient complains of severe aching in the upper third of the spinal column. General muscular soreness is now present, and hyperæsthesia of the skin exists, not unfrequently to a marked degree. The pulse-rate is rarely disturbed, usually indicating mere weakness. The head at this time is drawn backward, from contraction of the spinal muscles, and in some cases this contraction is so marked that the entire body is bent in an arch; trismus, clonic convulsions of different sets of muscles, and sometimes general convulsions, occur. Delirium, of varying degrees of intensity, has now declared itself, which, in exceptional cases, even at this early stage, betrays a tendency to drift into a coma; the delirium is interrupted by frequent outcries of the patient, produced by

the intense pain in the brain and spine. The case progressing, the spasms and the suffering become more and more severe, the mania more violent, or the tendency to coma more pronounced. The pulse rises, the tongue, heretofore moist and covered with a thick, whitish coating, becomes dry, red, and glazed; moderate thirst appears, and more or less complete anorexia supervenes. The temperature rises with the pulse, but at no time is this rise very sudden or high. Eruptions now occur, if, indeed, they have not made their appearance at an earlier stage, and symptoms closely resembling the typhoid state are observed. The eruption varies in character; in some cases we find simple fever-blisters about the mouth and lips, often extending to the cheeks and face; in others it is general, partaking of the character of measles, roseola, or typhus; or blotches cover the body, varying in extent and in depth of coloring; or the cutaneous symptoms are petechial or ecchymotic. The typhoid symptoms become more and more pronounced; the tongue is very dry, red, brown, sooty; thirst is not intense, but constant; the bowels, after one or two soft stools, are stubbornly constipated, or in still graver cases a diarrhœa sets in; if the symptoms do not yield, the prostration now becomes profound, the muscular system relaxes, the slightest muscular effort shows marked tremulousness; the diarrhœa becomes colliquative, paralysis of the sphincters takes place, and death results from asphyxia or exhaustion.

It is not very unusual to note intermissions and remissions in the course of the disease. These, when they occur, are well pronounced, sufficiently so to justify the creation of an "intermittent" type described by some writers. It must, however, be remembered that there is in this fact nothing to warrant an argument in favor of malarial origin of the disease, for not only has quinine, the one great remedy for malarial conditions in the hands of the dominant school, proved utterly inefficient to cure, modify the type, or even affect the course of the disease, but epidemic cerebro-spinal meningitis in its occurrence is almost limited to the cold season, a period of the year which does not at all favor the development of malarial conditions; furthermore, the so-called intermittent type of this disease is found much more frequently among quite young children, who, as a class, are by all means least liable to fall victims to malarial poisoning.

The premonitory symptoms in duration may occupy several days, and if long-continued, they indicate a fairly light attack of the disease. In other cases they are wholly wanting, the patient being suddenly taken with a violent chill or, if a young child, with severe convulsions. In such cases the symptoms of collapse, as coldness and clamminess of the surface, cyanosis of the body, shrunken and livid countenance, and very low pulse, are unmistakable. All the characteristic symptoms of the disease appear in rapid succession and with frightful violence. The pain in the head is agonizing; the vomiting is usually

persistent, the matter ejected soon assuming a dark grumous, coffee-colored appearance. The drowsiness which accompanied the early stage of the attack gives way to violent delirium, to be in turn replaced by coma. Purpuric spots appear, quickly growing dark in color, extending their borders and coalescing into great, unsightly blotches, with, often, a tendency to gangrene. The urine, if examined, is shown to contain appreciable and even large quantities of albumin. The patient very rarely recovers, and death is likely to take place within a few hours or, at most, days.

Recovery from all but the lightest attacks is tardy and incomplete, months usually elapsing before the victim of a severe attack of the disease enjoys a fair degree of health.

Special Symptoms.—The *cerebral* and *spinal* symptoms of epidemic cerebro-spinal meningitis are of particular interest. *Cephalalgia* of great severity and persistence is found in very nearly all cases. The pain at first is liable to be general, but soon becomes occipital, or darts from the nuchæ to the forehead. It is agonizing in its severity, and in character represents everything that is painful; it may be stabbing, cutting, darting, boring, grinding, plunging, crushing. The patient groans and shrieks from the intensity of the suffering, which is so keen that even during a seemingly profound stupor his scowls or a mechanical raising of the hands to the head indicate the misery endured. The pain is persistent. Occasionally it disappears during the earlier stages of the affection; more frequently, however, it continues until convalescence approaches. Stillé states, "that it depends upon mechanical pressure upon the sensitive ganglia within the cranium and upper part of the spine is shown by the relief which revulsive and counter-irritant measures afford when applied to the occipital region and the back of the neck," and adds that "it is always present, except in those malignant cases in which the morbid poison seems to spread its fatal power upon the blood. In some, however, of a less rapid but still malignant type, in which after death no exudation is found, but only an extreme venous congestion of the membranes, or it may be an effusion of blood beneath them, this symptom may be more or less marked." Of equal pathognomonic value are the *spinal pains*. These partake of the same degree of intensity which characterizes the pain in the head, and are usually limited to some portion of the spine, more frequently to the back of the neck, although they may extend throughout the length of the spinal column. These pains are pricking or stinging, and may traverse, like flashes of electricity, the entire body, darting through the extremities, then into the head, then making the circuit of the body. They are often accompanied by a pricking, benumbing sensation, and extort from the patient bitter moanings or wild shrieks of agony. Peculiarly interesting is the pain in the back of the neck which is pathognomonic of this condition; it is described as of an intense "drag-

ging" character; associated with it is that bending backward of the head which has furnished many of the common names of this affection, and which is the result partly of a voluntary effort to relieve the strain upon the affected muscles, and partly the result of spasmodic muscular contraction. The pains are aggravated by motion, and it is not uncommon to find associated with them enteralgia, frequently with very severe and uncontrollable vomiting. In some forms of this disease the spinal and neuralgic pains are absent, notably in those very severe cases characterized by a sudden onset of the disease with immediate, profound collapse and an early fatal termination. The statement made by J. Netten Radcliffe (*Reynolds's System of Medicine*, p. 299), that "it is noteworthy that pressure on the spinous processes, during the most acute rachialgia, rarely causes pain," is not in accord with the experience of the writer, whose observation, particularly in 1873 and 1874, led him to look for tenderness to pressure along the spinous processes as quite characteristic of this affection; nor with the probably much more extensive experience of Stillé, who remarks that "these spinal pains are always aggravated by pressure made on either side of the spinous processes of the vertebræ, and, like the cephalic pains, are more or less mitigated by revulsive applications."

Great *cutaneous hyperæsthesia*—according to Burdon-Sanderson, in the present case, a mere consequence or interlude of pain—accompanies this condition, frequently rendering the gentlest touch absolutely unbearable; this hyperæsthesia, later, may give way to numbness and even complete insensibility.

Spasm very frequently, and in well-pronounced cases, almost uniformly, exists; it may show itself in a mere drawing-back of the head, tonic spasm of the muscles of the face, or jaw, opisthotonos, or a fixed rigidity of the entire trunk or limbs. Pains have been taken by some observers, notably Tourdes, to distinguish between a voluntary bending-backward, especially of the head, with a view to secure relief from pain, and the involuntary movement in the same direction which results from spasm. That the patient very often voluntarily and with good effect assumes this position is not to be denied, thus insuring relaxation of the affected muscles and a considerable amelioration of pain; it is equally well established that actual spasm constitutes a common and decidedly characteristic symptom of the disease.

Convulsions, varying from twitching of single muscles to general clonic spasms with loss of consciousness, are found in young infants or in persons naturally predisposed toward them; in exceptional cases they continue for a long time and with apparent severity, but do not in themselves constitute a source of real danger. The excess of action characterizing the spasmodic seizures naturally tends to the production of *paralysis*, and we have recorded cases of paralysis occurring in certain sets of muscles, as in the motory apparatus of the eye, in the

muscles of deglutition, or in those of the arm, leg, rectum, and bladder; even hemiplegia has been noted, and Hirsch and Hayden have recorded aphasia occurring from the same cause. Whenever general paralysis takes place, it must be considered a symptom of a near fatal termination of the case.

The organs of vision and of hearing, in many cases, show marked and characteristic disturbances. The *eyes*, in a great majority of cases, during the stage of invasion, by the redness of the conjunctiva, and by the sensitiveness of the organ to light, show even at an early day the effects of pressure upon the cerebral vessels. Visual disturbances occur, such as diplopia or, in a few cases, amaurosis. The pupils dilate or contract, dilatation existing more commonly, and being characteristic of tedious cases and indicating great weakness on the part of the patient; sometimes the pupil of one eye is dilated, while its mate is contracted. Later, as the nervous system becomes more generally and seriously disturbed, we may observe oscillation of the pupils and irregular spasmodic action of the muscles of the eyeball, producing spasmodic movements of the organ of vision, and strabismus, transient or permanent, more frequently convergent.

The disastrous affections of the eye are those which are the result of structural lesions. Inflammation of the cornea or of the iris may take place, ending in the former case in opacity or ulceration, in the latter in effusion of lymph or pus; opacity of the lens and of the vitreous humor, purulent infiltrations, and atrophic changes are some of the irremediable afflictions directly traceable to causes set up by this disease.

The sense of *hearing* is affected even much more frequently than that of vision, hardness of hearing, or even temporary deafness, often occurring in the early stage of epidemic cerebro-spinal meningitis, the sense of smell not rarely being lost at the same time. Sometimes hearing improves steadily as the patient recovers, and may eventually be entirely regained. In very many cases, however, deafness remains permanent and, generally, absolute, in a majority of cases, according to Knapp, and others, the result of purulent inflammation of the labyrinth; in others, permanent deafness is due to suppurative inflammation of the middle ear or to atrophy of the auditory nerve. In some cases, particularly in patients of a scrofulous diathesis, there has been seen a profuse and quite unmanageable purulent discharge from the ear. A large percentage of persons suffering from deafness as the result of cerebro-spinal meningitis also show disturbance of equilibrium, manifested in unsteady, swaggering gait.

The *countenance*, during the invasion, is generally pale and sunken, bordering in its expression upon the hippocratic in those very severe cases which begin with collapse. In others, it changes more or less according to the severity and constancy of the pain, and the degree to

which typhoid, apoplectic, or other, symptoms are present. If the pain becomes excessive, the features are distorted; if continuous, a rigid, almost stern, cast of countenance is observed, in adults modified somewhat by the traces of the pain borne; if the suffering continues throughout, the exhaustion resulting gives to the features a haggard, dull expression; if apoplexy or paralysis have set in, the face has the stupid look which belongs to that condition. But, as Stillé well says: "in the apoplectic form the expression may be set and stupid, but the features have neither the dark, dull, swollen, and duskily-flushed aspect of typhus, nor the languid, sleepy expression, and circumscribed flush on the cheek which are so characteristic of typhoid fever. Except during absolute insensibility in rapidly fatal cases there is a look of greater intelligence than belongs to either of the diseases mentioned."

Delirium, in epidemic cerebro-spinal meningitis, rarely declares itself until after the stage of invasion has passed. It usually begins on the second or third day, increasing in violence as the condition of the patient grows worse. It varies greatly in different persons, being mild and playful in some, serious and gloomy in others, and in very nervous, excitable persons it may partake of the hysterical; quite often these various types blend into each other, or change suddenly from one to another, and in some patients paroxysms of wild and uncontrollable delirious excitement may suddenly follow periods of perfect calm. If delirium appears with the very onset of the disease, it is likely to be violent and the attack itself commonly proves formidable; the later in the progress of the disease the delirium appears, the milder, as a general thing, and the more tractable it is likely to prove. It may be continuous, or may appear only at night. If the patient goes from bad to worse, and typhoid symptoms develop, the delirium becomes more and more incoherent, and partakes of the general prostration which now characterizes every function; exacerbations at times occur, but are rarely of long duration, and in the majority of cases which terminate in death, the delirium gently glides into a coma.

The *coma* of this disease is almost invariably the forerunner of death. The profound stupor of typhoid fever is not commonly found in this affection, and, indeed, stupor and coma, as occurring here, appear remarkably light when we take into consideration the serious cerebral and spinal lesions existing. Nevertheless, the writer has observed well-pronounced stupor for several days in a number of cases, and has seen at least one recovery from the disease when the patient had for a period of four days been utterly indifferent and insensible to all external impressions.

Vertigo often appears as one of the earliest symptoms of the disease, and is nearly always present; it is at times very severe, and is accompanied with nausea, faintness, and distressing goneness at the stomach, quickened pulse-beat, sometimes irregular action of the heart, dizziness,

staggering gait, and falling to the ground when an attempt is made to assume the erect position or to walk. These symptoms occur in varying degrees of severity, but the vertigo is always increased by attempts to sit up in bed or to arise from a recumbent position, and such an effort is pretty sure to be followed promptly by faintness, and even fainting. It is stated that children, and those who at the same time have the sight impaired, are liable to remain affected for a long time; otherwise, prolonged and systematic muscular exercise may remove the tottering walk.

Extreme debility and utter prostration of the nervous system are always present in this affection, from its inception to its close, and contribute not a little to the tediousness of convalescence from it. It shows itself chiefly in the vertigo, faintness, feeble pulse, and, above all, in the profound muscular weakness which makes even the slightest muscular effort, as the movement of a limb, an irksome and, often, impossible task.

The *organs of digestion*, in the various disturbances which are noted, show merely the effects of reflex action. *Vomiting* is by all means the most important symptom belonging to this group. It is one of the very first symptoms felt, and, being of cerebral origin, is not usually proceded by nausea, is accompanied by vertigo and general faintness, and is promptly aggravated by attempts to rise in bed or to assume an erect posture. The matter ejected first consists of the contents of the stomach, later of viscid, white mucus and bile. The persistency of this symptom does away with the possibility of retaining food, and thus soon leads to a considerable and rapid loss of flesh. There is no appetite, and thirst, commonly, is not very pronounced; occasionally, patients drink often and greedily. The disease progressing, the vomiting grows better or worse as the violence of the disease grows less or increases, every exacerbation of the general condition being promptly accompanied by an aggravation of this symptom. If the patient commences to make real improvement, the vomiting disappears, often quite rapidly, and the patient not only expresses a desire for food, but experiences slight, if any, difficulty in properly digesting it. If the patient continues to grow worse, the character of the ejecta is likely to change, and grumous, coffee-colored masses are vomited. The latter symptom occurs quite commonly in those types of the disease the onset of which is characterized by evidences of profound collapse, and in cases which early betray a tendency to marked depravity throughout the vegetative sphere.

Constipation usually exists; but diarrhœa accompanies the grave forms of the disease, and must always be considered an unwelcome symptom. The mouth, in very serious cases, especially in those characterized by general depravity of the system, may be covered with aph-

thous spots, and the parotids may be enlarged, or even suppurate, the fauces commonly being inflamed.

The *tongue* at first is clean and naturally moist; soon it becomes covered with a whitish, thick coating, especially in the centre and at the top and edges; later, as a typhoid condition develops, it partakes of the dryness and of the peculiar coating of the typhoid-tongue, without, however, remaining usually in this state for a great length of time or showing the typical features of that state in their full development.

The *urine* remains normal in all but very serious cases. It retains its acid reaction, shows no great deviation from the normal in the amount secreted or in its chemical constituents; inconsiderable deposits of lithic acid are sometimes seen. In exceptionally severe cases retention may occur, or incontinence from paralysis of the sphincter. In the rapidly fatal form of the disease, albumin, to a considerable amount, appears in the urine, as also blood-corpuscles and casts.

Respiration usually is labored, *sighing*. Burdon-Sanderson describes it as a slow, labored inspiration, followed by quick expiration and a long pause. The respiratory effort, when opisthotonos is present, naturally interferes seriously with, and eventually prevents, the expansion of the lungs, thus making the effort itself peculiarly painful, labored, and inefficient, and giving rise to œdema and sanguineous effusion into the lungs.

The *pulse* shows chiefly the extreme prostration which is peculiar to this disease; the decidedly diminished external tension is felt in the weak, feeble, almost hesitating pulse, which constantly varies in rate and rhythm. "It is no uncommon thing for the pulse-rate, at the beginning of an attack, to fall as low as 40, or even 27, and afterwards rise to 120, or more, in a minute, without necessarily indicating a fatal issue. Muscular exertion, rising from a recumbent posture, etc., will sometimes double its frequency, besides producing irregularity. Read, describing the pulse as he observed it in Boston in 1873 to 1874, speaks of cases in which both the rhythm and the force of the beats are entirely destroyed. . . . One moment, while beating very fast, it will suddenly drop to a much lower rate. These conditions, also, may outlast apparent convalescence." (Stillé.)

The *temperature* seems to hold no relation to the pulse-rate, and in the main is remarkably low for a disease characterized by such violence of morbid action. The temperature in the axilla is higher than in the normal; and on the average, after the disease is developed, ranges from 100° F. to 105° (Ziemssen : 100.4° to 103° F.). It is liable to fluctuations for which we cannot account, and there is no representative temperature-curve, the differences between morning and evening temperatures being rarely the same on any two successive days, even though they are well-marked and often excessive, Hart having found a difference of six degrees for several days. The temperature is

lower than normal in collapse; persistently high shortly before death. A steady, slow fall of the temperature is a favorable sign, indicating recovery; a sudden fall or sudden rise, remaining at the point reached, justifies a hopeless prognosis.

The *joints*, especially the small joints of the fingers and toes, the wrist, knees, and elbow, sometimes present an appearance closely resembling inflammatory rheumatism. They are enlarged, red, and often exceedingly painful to touch or motion, with a constant feeling as if they had been bruised. Effusion sometimes take place into them, producing severe pain, and rapid, *pale* swelling of the articulation.

The Skin.—Eruptions on the skin, varying in different epidemics, both as to character and intensity, have been minutely described by the various observers, and were at one time deemed sufficiently characteristic to give to the disease such terms as "spotted fever" and "malignant purpuric fever." It is, however, evident that in very many instances no eruption makes its appearance, and that, when existing, it indicates a general depravity of the system and certain blood-states rather than the primary lesion. Petechiæ and ecchymoses were observed in the epidemic which in the beginning of the century appeared in New England; in others erythematous spots appeared, differing in extent and in color with the gravity of the case, being bright red, and occupying a small area in light cases, and forming dark purple spots, from one to two inches in diameter, in the serious cases. Herpetic eruptions, sudamina, and urticaria, or "dusky mottlings," and punctated red eruptions have been recorded; and Stokes and Banks state that, in some cases which came under their observation, ecchymotic "spots ran together and coalesced over some portions of the body, so as to cover a large extent of the skin and render it completely black, as though it were wrapped in some dark shroud. The entire right arm and half of the right side of the chest in one case, and in the other the whole of the lower portion of one leg and foot, were thus affected."* The altered condition of the blood and the general tendency to disorganization are shown in the readiness with which gangrene of the skin takes place in the severest types of this affection.

J. Netten Radcliffe† thus describes the forms of eruption observed in connection with epidemic cerebro-spinal meningitis: "(*a.*) *Vesicles.* A vesicular eruption (*eczema*, Hirsch), sometimes herpetic in character, chiefly appearing in the vicinity of the lips, but occasionally extending over the sides of the face, diffused more or less on the trunk, or showing itself in patches on the limbs. This symptom has occasionally taken the form of shingles. It is most commonly noticed in the simple form of the disease, but it may take place in either of the other

* Stillé, quoted from Dublin Quarterly Journal.

† Reynolds's System of Medicine, vol. i., pp. 302 *et seq.*

forms, and when associated with purpura, the vesicles may be flattened and rest upon a livid base, presenting a horrible aspect. This form of eruption may appear as early as the second day. (*b.*) *Purpura.* 1. True *petechiæ.* 2. *Purpuric spots,* varying in size from a split pea to half a crown, with more or less extensive effusions of blood, or of its coloring-matter, into the cutis (*vibices ecchymoses*). The spots have sometimes a regular, sometimes an irregular, even a ragged, outline. Their size may remain fixed from the time of their first appearance, or it may increase largely or rapidly. They may be of a light or dark red color at the outset, subsequently becoming purple and black; or, as is most common, they may, from the beginning, be dark-purple or black, their blackness being often fittingly likened to that of ink—the eruption resembling 'spots' or 'splashes' of that fluid. They may appear on the trunk or limbs only, or they may be scattered copiously over the whole surface of the body, including the face. The purpuric spots are frequently hard to the touch, the margin being defined, and giving the impression to the fingers of being raised above the surface; sometimes a vesicle forms above several of the spots, and gangrene of the adjacent tissue takes place. Dr. S. Gordon writes of the recent epidemic in Ireland: 'Many cases are accompanied by a distinct eruption, which comes out with great rapidity; is found over all parts of the body, but chiefly on the lower extremities; is of a very dark color, sometimes a very deep brown, or purple, or even black. The spots are of various sizes and shapes, some small and round, others large and irregular; some appear like large spots of very black purpura, only more mottled and more irregular in color and shape; others are more confined, and raised above the level of the skin, consisting of an effusion into its substance—many patients die in this stage, but in some the disease progresses, and these spots are absorbed, leaving a yellowish mark under the cuticle; or they pass into superficial gangrene, which was spreading at the time of the patient's death, or is healed with loss of substance.' Purpuric spots are sometimes, although rarely, one of the earliest signs of the fulminant and purpuric forms of the malady; or they may occur at any period during the more advanced stages. Usually they appear at some period during the first four days, chiefly, perhaps, during the first or second day. Sometimes, with or without the purpuric spots, there is a cyanosed aspect of the skin, or a peculiar livid mottling. During recovery the purpuric spots gradually lose their refined character and fade away, passing through the different stages of color which mark a healing bruise. (*c.*) *Roseola, erythema,* etc. Rose-colored spots or patches are occasionally observed; also erythema, more or less diffused, a rubeoloid eruption, and urticaria."

Duration and Termination.—The duration of an attack of epidemic cerebro-spinal meningitis depends largely upon the manner in

which the disease declared itself; if setting in with symptoms of collapse, the duration is almost sure to be short, from several hours to a few days, and the termination is nearly always fatal. In several of the severe epidemics the duration was very brief indeed; during the great epidemic in Ireland many deaths occurred within ten to forty-eight hours after the onset of the disease.

The many difficulties besetting convalescence from this affection, its tendency to relapses during convalescence, and its peculiar tediousness, make it exceedingly difficult to fix upon an average duration. The majority of fatal cases occur during the first ten days, and, perhaps, the average duration of the disease may be placed at twenty-four to thirty days.* Very mild cases occur in which the characteristic symptoms of the disease appear with sufficient clearness to be quickly and positively recognized by one acquainted with it, and are yet so mild as to tax but lightly the strength of the victim; such patients may recover in from one to two, or at most three, weeks. When the prodromic symptoms are well marked, and occupy several days, especially in cases occurring when an epidemic has already spent its force in the community, the attack very probably will prove moderate, and the termination of the disease will be from two or three to five or six weeks. If prostration is well marked from the beginning, convalescence will be proportionately slow and retarded by relapses, and from six to ten weeks, and, in fact, many months, may pass before recovery is complete, and only too often, after so tedious a struggle, the patient is liable to sink into a condition of such profound prostration that death takes place at last. The duration becomes shorter, and the prognosis less hopeful, as the prodromal stage is shortened and the initiatory symptoms are more violent; collapse occurring at once, the duration is pretty sure to be brief, and the prognosis hopeless. Symptoms of disorganization of the blood, the preponderance of a typhoid state, the occurrence of complications, and the existence of unusual depression are always to be considered as indicative of a tedious prolonged illness, and as important factors in the making of an unfavorable prognosis.

The *termination* is toward perfect recovery, partial recovery, or death.

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* Dr. N. S. Davis gives the duration of the disease, as seen by him, as between twenty hours and twenty-eight days. Out of 469 fatal cases in the city of New York in 1872 334 are said to have terminated within eleven days, and of this number 270 were fatal in the first six days of the attack, including 52 who died on the first day, and 51 in from one to two days. It is, perhaps, worthy of note, that while from the eleventh to the fourteenth day only 11 deaths occurred, 20 took place on the fourteenth and fifteenth; and while from the fifteenth to the twenty-first day only 16 died, yet from the twenty-first to the twenty-second 12 deaths were reported. This would seem to indicate a peculiar danger on the days represented by multiples of seven. (Stillé, article on Epid. Cerebro-spinal Meningitis, Pepper's System of Medicine, p. 818.)

It is quite evident, from the gravity of the lesions existing, from the tendency to the most extensive blood-changes, from the utter debility attending the affection throughout its course, from the many and serious complications which may arise at any period in the progress of the disease, that it must be considered very formidable. To determine positively its rate of mortality is difficult. Different epidemics have varied in the degree of their fatality, the minimum rate being placed at 20 per cent., the Irish constabulary, on the other hand, during an epidemic in Ireland showing the maximum rate of 80 per cent. Again, all the epidemics show their highest rate of mortality during the early part of their career, and the maximum figures above given do not represent the full extent of the fatality which has attended the disease under such circumstances. Again, reports from private practice are not perfect, since they not always give the total of cases treated, referring sometimes wholly to the number of persons who have died from the disease. It is, however, probable that Hirsch is approximately correct when he states the mortality as ranging from 20 to 75 per cent.

Convalescence is sure to be tedious and beset with many dangers, arising from the great debility of the patient, from the nature of existing complications, and from the sequelæ which may arise. Even under apparently favorable circumstances, and when the type of the disease is not of the severest, relapses are constantly to be dreaded, and the patient may suffer seriously from neuralgic pains in different parts of the body, muscular soreness and stiffness, remarkable debility, and a condition bordering upon marasmus.

A very important item in discussing the length of time usually absorbed in passing through the period of convalescence is the influence of the *sequelæ*. If these are of a serious character, as they are likely to be in very many cases, they may indefinitely protract recovery, may make a perfect recovery practically impossible, and may eventually lead to fatal results months and years later. The deafness and the loss of vision, partial or complete, have already been discussed; these alone, with their attendant evils, are sufficient to constitute the affection of which they are sequels a source of terror to its victims and to the medical attendant; and the gravity of the former complication is not lessened by the knowledge that in young children affected by it, loss of speech is sure to occur. Thus, it is stated by von Ziemssen, that of 91 pupils in the deaf-mute institutions at Bamberg and Nürnberg, 80 are presumed to owe their infirmity to the ravages of this disease. Neuralgic pains, also, in various parts of the body, often become the source of no little suffering, and paralysis of certain groups of muscles, or of one or more limbs, may take place; convulsions, hyperæsthesia, and other expressions of serious nervous disturbance, retard the recovery of the patient, and prevent, by their

chronicity or even permanency, his getting thoroughly well. The memory may become defective, intelligence remain seriously impaired, and even grave lesions, like chronic hydrocephalus, are to be added to the already startling list of sequels.

Death occurs from *asthenia*, the strength of the patient lessening daily until vitality is absolutely exhausted; in such cases dissolution takes place without any of the violent symptoms which often make the closing scene of life so distressing to the beholder, the patient, often conscious to the last, gently drifting into death. Sometimes the patient dies in coma, often preceded by violent convulsions. Death from *asphyxia* is of frequent occurrence, and is the result of the pressure brought to bear upon the medulla oblongata, and its effect upon the respiratory nerve-centre. In other cases death may be due to complications existing, such as pneumonia, typhoid fever, or brain-lesions.

Pathological Anatomy.—Of the post-mortem appearances the conditions which peremptorily challenge attention are found in the cerebro-spinal system. All the membranes of the brain and the brain itself are hyperæmic to a high degree, and the sinuses of the dura mater are filled with a dark fluid, at times of considerable firmness. Serous effusions, varying somewhat in character and greatly in amount, are found in the arachnoid cavity and in the ventricles; this effusion may be clear, milky, or purulent, and may be large, one reporter, according to Stillé, alleging that "no less than three pints of turbid serum escaped in a case in which, however, death did not occur until the thirty-fifth day." Of the meningeal membranes the pia mater presents the most characteristic lesion in the fibrinous, purulent, gelatinous effusion into its meshes which has been so commonly observed. The arachnoid also is vascular, and abundant deposits of lymph give to it an opaque appearance.

The serous, purulent effusions, varying in consistency and in color, —yellowish or greenish, save in cases which proved fatal early, when it is whitish,—have been described by all observers, and seem to have occurred now within a few days, then after weeks of illness; the same observers, however, have also placed on record cases in which no such effusion existed, a general cerebral congestion being the limit of the expression of the morbid process in the cerebrum. When the deposits of lymph are present, it is often the case that the origin of the nerves is buried in the lymph or compressed by the accumulated mass.

The spinal meninges show the same changes which have been described as commonly found in the cerebral covering membranes. The bloodvessels are engorged with dark fluid, the meshes of the spinal pia mater are filled with exudation; bloody, turbid serum is present in large quantities, especially at the cervical and dorsal portion, with

a preference for the posterior surface of the spine; in exceptional cases a copious effusion has been found at the lower extremity of the spine.

The substance of the brain, in a majority of cases, has been found softened, and this softening appears most marked in spots where the covering membranes are especially affected. Ziemssen is probably correct in assuming that this softening, when it occurs at the root of the auditory nerve, or the inflammation extending from the pia mater along the course of the auditory nerve, is responsible for the affections of the organ of hearing, as corresponding conditions in others may be responsible for the loss of vision. The spinal marrow shows the same tendency to softening, and various observers of unquestioned reliability have not only placed on record many cases in which this condition existed to a remarkable degree, but the opinion seems warranted that this state of the brain substance and spinal marrow is chiefly an ante-mortem symptom, and not to its full extent the result of degeneration after death.

The blood of persons sick with this disease, according to Maillot, and others, contains an increase of fibrin amounting to six parts, or more, to a thousand; the normal proportion of the red corpuscles of the blood is not disturbed. After death, according to the description of most observers, the blood is fluid and dark, "of the color and appearance of port-wine lees; under the microscope the corpuscles were shrivelled and crenated, and there was a space apparent between them as they were arranged in rouleaux" (Githens).

Stillé, one of the most careful observers of this disease, thus closes his discussion of its morbid anatomy: "Of its essential cause and of the conditions that call it into existence nothing whatever is known. The disease is most probably due to some atmospheric agency that is capable of acting at the same time upon widely separated localities. Its specific cause appears to enter the blood first of all, and doubtless through the lungs, and to be capable of destroying life by its action upon the blood alone. Failing this effect, its force is spent upon the cerebro-spinal pia mater, and it may become fatal by the mechanical interference of the products of inflammation with the nutrition of those parts of the central nervous system which are essential to life. An inflammatory and a septic element together constitute the fully developed disease, either may be in excess and overshadow the other. According to the relative predominance of the one or the other, the disease assumes more of a typhoid or more of an inflammatory type, and it is doubtless this diversity in its physiognomy, as well as in the lesions that attend it, which has led to the most opposite doctrines respecting its nature and nosological affinities."

Diagnosis.—The symptoms of epidemic cerebro-spinal meningitis are usually so well pronounced that the disease is easily recognized even by those who have not previously seen it, and the experienced

practitioner will rarely fail to diagnosticate it promptly. The peculiarly agonizing headache and myalgic pains, the bending backward of the neck and body, the vomiting of cerebral origin, appearing as one of the earliest symptoms, the excessive debility running throughout the course of the disease, the eruptions, and the serious complications and sequelæ,—all these are well calculated to arrest the attention of the physician, and to make a ready and correct diagnosis a task of no great difficulty.

The diseases which more or less resemble this affection are sporadic spinal meningitis, typhoid fever, typhus fever, malignant scarlet fever, malignant measles, possibly also pernicious intermittent fever, purpura hæmorrhagica, tetanus, and a number of functional nervous affections.

Spinal meningitis presents many features which resemble those of the epidemic under consideration. The former, however, does not appear as an epidemic; it is based upon some constitutional exciting cause which in many cases can be recognized, or upon traumatism; there is an absence of those eruptions which accompany the cerebro-spinal fever; the mortality is not so great, and permanent paralysis frequently remains as a sequel, while in the epidemic this is rarely the case.

Typhoid, as well as typhus, fever may occur in a community in which epidemic cerebro-spinal meningitis is raging, and many even exist in connection with the latter in the same patient; under such circumstances these diseases blend into each other so as to make a differential diagnosis a matter of the greatest difficulty.

Usually, the differentiation is easily made. The epidemic cerebro-spinal meningitis lacks the stupor, the general muscular relaxation, the muttering delirium of the typhoid fever, as well as the meteorism, diarrhœa, and intestinal hæmorrhage; the coating of the tongue differs; in the former the tongue is usually clear, moist, and even in cases characterized by a tendency to the typhoid state the extreme dryness and stiffness, as well as the sordes on the teeth, are wanting. The temperature is a valuable sign, being continuously high in typhoid fever, and comparatively low, at least not nearly so high, and always decidedly variable, in cerebro-spinal fever. On the other hand, the latter affection has the suddenness of onset and the peculiar and persistent vomiting which are not found in typhoid fever.

Typhus fever has many symptoms which might mislead; yet a diagnosis is not difficult. Both diseases have "eruption;" in typhus fever it is nearly always present, appears after five or six days, is characteristic of the disease, rarely ecchymotic; in cerebro-spinal fever the eruption occurs only in, perhaps, half the cases, during the first day or two, is varied, and ecchymoses occur often. Headache in the former is dull and heavy, and in the latter, agonizing. Delirium in the former almost always present, muttering, and does not appear in the early stage; in the latter it is often absent, is usually demonstrative,

vivacious, sometimes very violent, and likely to appear early, even on the first day. Vomiting, in typhus fever, is unfrequent and not severe; in epidemic cerebro-spinal meningitis it is frequent, one of the earliest and most persistent symptoms. In the former, cutaneous sensibility is blunted; in the latter, it is exalted. Strabismus is rare in the former, frequent in the latter. The pupils in the former are contracted; in the latter, more frequently dilated, and often one is dilated while the other is contracted. The former is contagious; the latter is not contagious. Typhus fever is a filth-disease; cerebro-spinal fever is *not* a filth disease. The former shows a preference for adults, the latter for the young. Temperature, in the former, is continuously and markedly elevated, and remains so until convalescence begins; in the latter it is not so high, and variations occur constantly. The characteristic "mousy" odor of the body, and the characteristic coating of the tongue which belong to typhus fever are wanting in the other affection; not to mention the many points of differentiation which may be established by a minute comparison of the phenomena of the two diseases.

Malignant measles and *malignant scarlet fever*, especially the former, have been mistaken for the disease under consideration. The dark-colored, often spotted appearance, of a case of malignant measles, and the collapse which may occur in connection with the disease might, and under certain circumstances do, favor a mistake. The eruption of measles, however, is likely to preserve its individuality; there is usually no tendency to the formation of extensive blotches or purpuric spots, and we are pretty sure to notice the catarrhal symptoms which accompany this affection. Similar considerations, with the addition of the sore throat and the absence of serious nervous disturbances, aid us in making the diagnosis of a case of malignant scarlet fever.

Pernicious fever may be distinguished from cerebro-spinal meningitis by the history of the case, if closely studied; it also differs from the latter affection chiefly in that coma is an early symptom, while in meningitis it sets in during the latter stage, following the usually long-continued delirium.

Purpura hæmorrhagica lacks the nervous symptoms and the general and well-marked feverish excitement of cerebro-spinal fever; the absence of cerebral involvement, of myalgic pains, of the extreme debility, of the characteristic vomiting, and of elevation and peculiar variability of temperature, with other diagnostic symptoms enumerated, will establish the diagnosis of functional nervous diseases from the graver affection here considered.

Prognosis.—A just estimate of the extent and gravity of the symptoms which constitute epidemic cerebro-spinal meningitis, and the remarks made when discussing the duration and termination of this disease, are quite sufficient to show the necessity of making a guarded

prognosis. The disease is always of a very serious character, and even in mild cases a patient is not out of danger until recovery has been completed.

It has been observed that the death-rate is especially high among the cases which occur during the earlier part of an epidemic, and that at all times the largest number of deaths occur during the first five or six days of the disease; in fact, as has also been stated, patients who are taken with symptoms of collapse are almost sure to die within a period varying from a few hours to a few days. The age of the patient has a direct bearing upon the prognosis in so far as the mortality is greatest among infants and young children, and persons who have passed the thirtieth or thirty-fifth year, those in the decline of life rarely escaping with their life.

Among the symptoms which are most to be dreaded, and the appearance of which must always arouse our suspicion and stimulate the physician to extreme vigilance and exertion, are exceptional coldness of the skin, very slow, languid pulse, extensive extravasation of blood in connection with the cutaneous eruption, and accompanied with extreme debility and a tendency to gangrenous disorganization. More than usual persistency of the vomiting, stubborn diarrhœa, copious sweats while the patient is lying in a semi-unconscious or stupid condition, paralysis of the vesical sphincter, and those symptoms which characterize what might be called the extreme typhoid state, are also very strong indications of a probably fatal termination.

An important item in estimating the patient's chance of recovery are the complications existing; pneumonia added to an already serious state, or pericarditis ensuing, the prognosis becomes correspondingly more hopeless. It seems hardly necessary to add that the practitioner who has already served his apprenticeship will not be likely to forget that in all serious cases of illness very much of the outcome of a case depends upon the vitality and tenacity of life of the patient, and upon circumstances not only beyond the control of the medical attendant, but often also beyond his power of recognition; he will, therefore, be guarded not only against underestimating the gravity of a serious case, but will also avoid ignoring whatever may happen to render more encouraging an otherwise discouraging outlook.

Treatment.—Knowing practically nothing of the causes of this disease, we do not know how to avoid it, and prophylaxis, if it is to be mentioned at all in connection with this subject, sums itself down to that careful observance of all sanitary rules, both as to person and home, which is calculated to maintain sufficient vitality to resist the action of morbific agents generally.

The usefulness of drugs in the treatment of this affection, in the

hands of the dominant school, has not yet been satisfactorily demonstrated. Von Ziemssen undoubtedly voices the general sentiment of his colleagues when he says that "beyond all doubt morphia may be considered the most indispensable medicine in the treatment of spinal meningitis." It is given hypodermically, at brief intervals, and in full doses. Quinia has been tried faithfully and without satisfactory success. Many American physicians still advocate its use, particularly in the early stage of the disease, but in Europe a patient test of the merits of the drug, given in varying doses, has been so unsatisfactory that it now meets few advocates. Belladonna, Bromide of potassium, Secale cornutum, and others, have also been employed,—and from various theoretical standpoints—but at no time with sufficient success to create much enthusiasm. Dr. S. N. Davis, of Chicago, made what may be considered a very good record by the exhibition of Calabar bean, in tolerably large doses.—Among the adjuvants employed may be mentioned the use of leeches, cupping, etc, in order to produce local depletion and to relieve the severe pain, the application of ice to the head and spine, blistering, external warmth (the hot bath, temperature 102° to 106°), and the free use of stimulants. The use of blisters is discussed as follows by Stillé :They were used, as they had been in other forms of meningitis, to relieve the pain and diminish the congestion in the cerebro-spinal centres. The results of their use were by no means uniform, for not only were they employed in many of the cases which must almost necessarily have been fatal before inflammation could have been established, but even in the inflammatory cases they were often applied when time enough had elapsed to allow the exudation to be fully formed, and when, therefore, they were too late to be useful. Again, they were sometimes used so as to vesicate too deeply, and thus by the pain they caused at first, and by the exhaustion that resulted from the excessive discharges they maintained, the patient was more injured than benefited. Our own experience proves that in the early stage of the inflammatory form of the disease, blisters applied below the occipital ridge and upon the back of the neck, and only allowed to vesicate superficially, not only removed the pain in the head, but diminished the delirium, spasms, and coma, and therefore contributed as directly as other remedies, if not more so, to the favorable issue of the attack. But such salutary effects are not to be looked for when the disease assumes a malignant type, nor after its constitution has become definitely fixed. The application of stimulant, and even vesicating agents, to the spine below the neck has not been generally practiced because, probably, the seat of the spinal lesions was known to be chiefly at the upper part of the organ. Still, the neuralgic pains felt in the spinal nerves may be mitigated by stimulant and anodyne liniments applied with friction to the spinal column."

The propriety of resorting to stimulants depends upon the presence of symptoms which at all times justify and, perhaps, demand the cautious use of alcohol in some form, *i. e.* a state of adynamia, resulting from some acute disease, attended with blood-changes and extreme depression of the heart and nervous system.

Therapeutics.—The symptoms of this disease are so varied, and the order and manner in which the morbid phenomena appear are so irregular and many-sided, that it is practically impossible to arrange remedies likely to be useful in its treatment in the order of their probable importance. Furthermore, since we select the remedy according to the totality of symptoms presented, it appears at once that each and every remedy capable of producing congestion and inflammation of the cerebral and spinal substance or meninges, or of exciting tetanic spasms or convulsions, or of producing a condition resembling collapse, or states which bear a similarity to those resulting from disorganization of the blood, or which comprise a condition of adynamia, or which resemble a typhoid condition, to say nothing of the very many and different complications liable to occur at any time, may at some period be the remedy homœopathic to the case. It is then evident that mention can be made of only the most important remedies, and that the list furnished is likely to be enlarged or lessened according to the clinical experience had in the future.

In cases commencing with Collapse, it is well to use heat externally, to give hot stimulating drinks, to use friction, and to resort to sinapisms. In addition to these measures, and as our chief dependence, one of the following remedies may be employed.

Camphora.—Deadly pallor of the countenance. Icy coldness of the whole body. Small, weak, slow pulse. Sudden and extreme prostration. The patient feels that death is imminent. Great anxiety and a restlessness somewhat resembling that of Arsenicum. Dizziness, with a sense of constriction at the base of the brain. Great dyspnœa; rigidity of the limbs; cramps (in the stomach and) in the extremities. Vomiting. Diarrhœa.

Veratrum album.—Pale, cold, sunken, hippocratic countenance. Cold, clammy sweat on the forehead. Icy coldness of hands and feet. Feeble, slow, somewhat intermitting pulse. Rapid sinking of strength. Violent headache, with delirium or unconsciousness. Stiffness of the neck. Spasms and convulsive motions of the extremities; violent vomiting, promptly excited or aggravated by raising the head from the pillow.

Veratrum viride.—Coldness of the surface; pallor of the face; cold sweat; loss of consciousness; slow, irregular, labored pulse.

Aconite and *Arsenicum album* may also be of great usefulness at this stage. The former is particularly valuable when the attack sets in with a chill, with a strong tendency to reaction, and the symptoms of profound collapse are rather more marked than under Camphor or Veratrum album. Arsenicum, in the treatment of this disease, finds its sphere of greatest usefulness in a later—the typhoid—stage.

If reaction has taken place, or if the first symptoms appearing are

those of violent congestion, with full, hard, throbbing pulse, we will most likely exhibit:

Belladonna.—Symptoms of violent active congestion to the face. Countenance red, eyes congested and glistening, pulse heavy, throbbing; vertigo; spasms of facial muscles, distortions, wild delirium, dilatation of pupils, double vision, squinting, photophobia. Alternate paleness and redness of the face. Heavy throbbing headache, often accompanied with a sense of stupefaction. Throbbing pain and soreness and stiffness of the neck, the patient bending the head backward. Grinding of the teeth. Tendency to convulsive movements. General hyperæsthesia.

Belladonna is the typical remedy in this condition, and it is closely followed by *Solanum nigr.* and *Glonoine.*

Veratrum viride is frequently prescribed in this stage, chiefly to reduce arterial tension; the remedy is not homœopathic to this condition, and, homœopathically, should be employed somewhat later when there is restlessness; violent headache, proceeding from the nape of the neck; constant severe aching pain in the neck and shoulders; trembling; rolling of head and eyes; sudden spasms, with (nausea), vomiting, great prostration. Hiccough, painful and almost constant; pain in extremities as from electric shocks. Opisthotonos. Paralysis. The pulse is frequent, feeble; the mouth and lips are dry; the tongue has yellow edges and is red in the centre.

In cases presenting a predominance of brain-symptoms, this fact must be borne in mind in making the selection of the remedy. Among those most frequently indicated are: *Belladonna, Opium, Cocculus, Hyoscyamus, Helleborus niger, Bryonia, Cuprum, Zincum, Æthusa cynapium.*

Belladonna.—The symptoms of the first onslaught of violent arterial excitement having passed away, the flushed face now changes into a deathly pallor, the violent delirium to stupor, the enraged and excited expression of the features becomes dull and heavy, the preternatural brightness of the eye is lost, and it is now fixed and lifeless; the delirium dies away and gradually sinks into a stupor; the extremities become cold, the head, however, remaining hot; the tongue assumes a dry dirty-brown appearance, retention of urine or involuntary micturition takes place; in fact, we now have a picture of the secondary effects of Belladonna, the characteristic brain symptoms of that state remaining and completing the group.

Opium.—The expression of the countenance is stupid, and the condition of the patient is soporous. He lies in bed motionless, the face dark red and bloated, the head thrown backward, the eyes half closed, dilated or contracted, insensible to light, the jaw often dropping; respiration deep, slow, snoring. The tongue is dry and brown, the pulse usually light and quick, sometimes very slow. The flesh feels hot, and the patient often perspires freely. If raised, it is exceedingly difficult to rouse the patient, and his head drops back like a heavy load which the neck and shoulders are not able to sustain. There is jerking and twitching of the limbs; sometimes convulsions or opisthotonos. Sweat during sleep; peculiar sensitiveness to sounds. Symptoms worse from sweating.

Cocculus.—Pale, sallow, bloated face, covered with cold sweat. Hardness of hearing, with noise in the ears like rushing water; the eyes are kept closed, with constant rolling about of the eyeballs. Violent headache in the occiput, extending into the neck, with trembling of the head; headache, with a sensation as if the eyes were being pulled out of their sockets. Dizziness, with inclination to vomit when rising. Painful stiffness of the neck, and feeling of weakness as if unable to support the head. Weakness and paralytic trembling of the extremities. Spasmodic oppression of the chest, with heavy laborious respiration. Sensation of spasmodic constriction all along the spine, aggravated by motion. Paralysis of the face, tongue, and pharynx. Miliary eruptions. Hysterical and epileptiform convulsions.

Hyoscyamus.—Lies in a condition of apathy, unwilling to reply to questions, to make known his wants, although fully conscious of his surroundings. Face pale and bloated, extremities cold. Small, quick, intermittent pulse. Stupor. Picking at bed-clothes. Eyes red, sparkling, protruding; cannot open them. Deafness. Teeth firmly closed; lockjaw. Pressive stupefying headache, with undulating sensation in the brain; sensation as if the brain were loose in the skull; pressure in the vertex and drawing in the nape of the neck, when turning the head. Paralysis of the tongue. Tongue red, dry, brown, fissured, like leather. Cadaverous smell from the mouth. Inability to swallow liquids; the attempt to swallow them, if persisted, brings on spasm. Spasmodic tightness of the chest, arresting breathing; he leans forward to breathe. Convulsions of single muscles or of sets of muscles, followed by paralysis. Grinding of teeth; starts as if frightened; shrill screams during sleep. Paralysis of rectum. Cutaneous hyperæsthesia.

Helleborus.—Face pale and œdematous. Grating of teeth. Constant chewing motion. Drinks water hurriedly. Sopor, interrupted with screaming and starting. Rapid, small, tremulous pulse; dark coffee-ground colored sediment in the scanty urine. Nausea, with vomiting of green mucus. Bruised sore pain in the occipital region of the head. Symptoms indicating effusion.

Bryonia.—The readiness with which Bryonia acts upon the serous membrane renders the remedy of greater usefulness in the treatment of this affection than is, perhaps, generally realized; the writer has seen it act very promptly in a number of cases. The countenance of the patient is dark red; he is troubled with vertigo, worse when raising the head; sense of confusion in the head, with a crowded feeling in the head. The patient is irritable, does not want anybody to speak to him or to notice him. He complains of stitching throbbing headache, extending from before backward into the occiput and neck, or a sharp splitting frontal headache. There is considerable tenderness and soreness all over the body, as if bruised, with excessive tenderness of the scalp. Feeling of dry burning heat all over. The tongue is thickly coated white; constant chewing motion of the mouth. Great thirst; vomiting of food, but not of drink; constipation. Great exhaustion. Eruption all over the body, red, like measles.

Cuprum is a remedy of particular value when the patient is an infant or young child. The little patient lies in a stupor; the eyes are sunken and surrounded with dark rings; there is coldness of the hands, twitching and jerking of the limbs, spasmodic twitching and distortions of the muscles of the face; the child lies on the belly, spasmodically thrusting the breech upward. Violent fits of dyspnœa appear suddenly, continuing for two or three hours, then suddenly disappear; threatening paralysis of the lungs. Gurgling noise when swallowing fluids. Clonic spasms beginning in the fingers and toes. Delirium, with great fear of everybody, obscuration of sight, and difficulty of hearing. Bruised soreness and pressive pain in the head, the soreness in the brain being made worse by turning the eyes. Paralysis of the muscles of the back and neck.

Zincum.—This remedy is of particular value when the case has proved very protracted, and is marked by great nervous prostration. Frequent attacks of vertigo occur, and the memory seems much impaired. There is severe pressure on the vertex and forehead, with a tearing as if the head would burst. Violent pressure, at short intervals, in a small spot in the middle of the forehead. Dizzy stupefying headache, vertigo always being prominent. Intense headache, with violent shivering. Intense or tearing pains in the brain, almost driving one mad, followed by excessive vomiting of bile and trembling. The headache is relieved, if at all, by perfect quiet. Anxiety, restlessness. Constant motion of hands and feet, rolling and tumbling of the head from side to side. Starting from sleep uttering piercing cries. Spasmodic twitching of hands and feet. Weakness of sight. Ravenous hunger; flatulent colic. Scanty, turbid urine, as if mixed with clay. Flashes of heat alternating with spells of chilliness.

Æthusa cynapium.—In children who fall victims to this disease while they are teething, this remedy is said to act finely. The face is pale, collapsed, the eyes staring, and the pupils widely dilated and insensible to light. Vomiting is sudden, excessive, and almost continuous, constituting, in fact, one of the most prominent symptoms; milk especially is not tolerated at all. Intense restlessness. Tearing, lancinating pains in the occiput, relieved by bending stiffly backward. Epileptiform convulsions; pulse light, quick, hard. The surface of the body is covered with black, blue, or red spots.

If the *spinal* symptoms predominate, the most important remedies

are: *Nux vomica, Cicuta virosa, Agaricus, Cimicifuga, Ignatia, Physostigma, Cannabis indica.*

Nux vomica.—The Nux patient suffers chiefly from a terrible ache in the occiput, which feels very sore and bruised, from stitching, lancinating pains which fly through the body, even through the brain, with the swiftness and fierceness of chain-lightning, and from violent convulsions, without loss of consciousness, which are excited by the least touch. There is also tearing pain in the nape of the neck and in the back, and various drawing, jerking pains from the orbit to the occiput. The senses are keenly active, and the patient suffers much from hyperæsthesia. Other and well-known indications may be present.

Cicuta virosa.—The patient is moody, distrustful, answers short; he weeps and laments aloud, and sometimes indulges in paroxysms of howlings. The countenance is ashy, bluish-pale, and cold; the pupils are dilated and insensible; there are jerking of the eyeballs and spasmodic contortions of the muscles of the face; the teeth are set, and there is inability to swallow. He complains of violent occipital headache, and there is severe vertigo, with reeling on stooping. Violent hiccough. Tetanic rigidity of the muscles of the neck, with retraction of the head. Dumbness and deafness. Excessive dyspnœa from tonic spasm of the muscles of the chest. Trembling of the limbs; startings and convulsive movements of the limbs; convulsions with violent cries, suspension of breathing, and foaming at the mouth. Violent sudden jerks through the head, arms, and legs. After the spasms have ceased, the body remains insensible for a long time, as if dead. Opisthotonos. Tonic spasms renewed from the slightest touch.

Agaricus muscarius.—This fungus exerts a powerful effect upon the cerebro-spinal nervous system, and deserves very careful study in connection with this group, possessing in fact a far more extensive range of action and much greater usefulness in all affections involving the nervous system than is commonly realized. It has stupefaction and vertigo, as if the brain were in a whirl. Stitches through the brain as if he were to lose his senses.

Burning at the vertex, with stupefaction and vertigo. Sensation of expansion in the forehead, as if the brain were whirling about. Painful pressure in the head and eyes. Shock in the left side of the head. Tearing pain in various parts of the body, especially in the outer side of the left leg. Pain in the sacrum as if it would fly to pieces. Digging aching pain in the posterior cervical region. Muscular twitchings at the left knee, arm, back, etc. Twitching of eyelids and eyeballs, of facial muscles. Shock of the entire body, the arm being jerked downward. Fainting-turns, with inclination to vomit. Stinging-burning pains deep in the vertebral column. Pain in the eyeballs; weakness of sight. Buzzing and puffing sensations in the ears. Stitches in the heart, with irregular and intermittent pulse. A cool current seems to spread from the spine over the whole body.

A dense crop of white vesicles, of the size of millet seeds. Paralysis of arms and legs.

Cimicifuga.—Intense pain in the head, more particularly at its base and along the spine, the latter being very sensitive. Rigidity of the muscles of the neck and back, with retraction. The brain feels too large; intense activity of the eyeballs. Marked sensitiveness of the skin, with circumscribed or diffused muscular soreness. Sleeplessness. Delirium in which he sees cats and dogs. Alternate tonic and clonic spasms, night and day. Pain in the back, of a drawing, tensive character, or dull and heavy, with tenderness on pressure. Nausea and vomiting, particularly with the headache. Spasmodic jerkings like chorea. Eruption of white pustules on the face and neck, sometimes large, red, and papular.

Ignatia amara.—This remedy, in its applicability to the condition under discussion, so closely resembles Nux vomica that a differentiation between the two often involves considerable trouble. Of the symptoms belonging to Ignatia, in contradistinction to Nux, the difficulty of breathing, with unconscious, sighing respiration, the *erratic* nature of many of the pains, such as aggravation from light touch and amelioration from heavy pressure,—the changeable, sad disposition and moodiness of the patient, and the far less violence of convulsive movements, must help to distinguish.

Physostigma.—This remedy has been used in the treatment of this disease and, it is claimed, with fair results by a few physicians of the old school. Its pathogenesy, although embodying nearly a thousand symptoms, is not sufficiently complete to more than barely suggest its proper sphere of action. Kippax (*Lectures on Fevers*) gives

these indications: Contraction of the pupils. Obstinate constipation, with flatulent distension of abdomen. Pain in the stomach immediately after eating. Tetanic spasms with irregular, tumultuous action of the heart. Epileptiform convulsions.

Cannabis indica.—Great pallor of the face; fixed gaze, dilated pupils; irregular, feeble pulse; cold face, with drowsy, stupid look. Sensitiveness to light and sound. Vertigo on rising, with stunning pain in the occiput; pain across shoulders and spine; "paralysis of lower extremities and of right arm; convulsions; emprosthotonos, with loss of consciousness; collapse; stupor; pale, clammy, and insensible skin; feeble, irregular pulse" (Hale). Hysteria and hysterical hallucinations.

In tedious cases, *typhoid symptoms* are quite sure to make their appearance, and then demand close attention. In view of the close similarity of this typhoid stage of epidemic cerebro-spinal meningitis to typhoid fever, and more superficially even to typhus fever, the remedies likely to prove of use will be those indicated in these latter fevers, and the reader is referred to the respective chapters for useful therapeutic hints. In prescribing for the present affection it will be especially necessary to the selection of the right remedy to carefully bear in mind the primary cerebro-spinal lesion, and to give a decided preference to those therapeutic agents which possess a specific action upon the cerebro-spinal system.

Among the remedies which promise to be particularly useful in this connection are: *Arsenicum album, Bryonia, Rhus toxicodendron, Arnica, Baptisia.*

Arsenicum album.—This wonderful remedy is without a rival when the symptoms from which the patient suffers indicate that disorganization of the blood is taking place or has taken place. The countenance is pale, sunken, aged, waxy, gray; there is dryness of the skin; the pulse is thread-like; mouth and tongue are parched, dry, trembling; great restlessness. There is tormenting thirst, craving for frequent drink, usually taken in small amounts, drinking followed by aggravation of many symptoms, especially pain at the stomach and vomiting. Hardness of hearing, especially of the human voice. Cadaverous smelling discharges from the ears. Paralytic condition of pharynx and œsophagus, making swallowing very difficult. Difficult breathing, with great anguish and fear of death, and irregular, rapid, weak pulse. Vomiting; foul diarrhœa; hæmorrhage, dark and foul, from the bowels. Albuminuria, and œdema of face and feet. Convulsions. Petechiæ. Rapid exhaustion of strength.

Bryonia.—The characteristic symptoms of this remedy have already been enumerated in connection with the remedies especially adapted to a preponderance of brain-symptoms. In the present instance we have the dry, brown tongue; nightly delirium in which the patient is busy with the affairs of the preceding day or with matters belonging to his avocation in life; nose-bleed, especially in the morning on rising; excessive thirst for large quantities of water; constipation, or thin, offensive diarrhœa.

Rhus toxicodendron.—Great restlessness, even though the patient seems to be in a stupor; incoherent muttering, with slow, but usually correct, reply to questions asked. Pale, sunken face, with spots of livid redness on the cheeks. Dry, red, cracked tongue, the tip of the tongue red, the red spot being triangular in shape. Sordes, great thirst for cold drinks, especially cold milk. Short, dry cough, with tickling in the throat. Tearing pains, with stiffness, in the muscles and joints. Copious thin, yellow, fetid stools, worse at night, often involuntary during sleep. Putrid taste and breath; great prostration and muscular soreness make every motion irksome, and give rise to dreams of making great muscular exertions which cause sore pain. Epistaxis in the morning and at night. Cutaneous eruptions, usually red.

Arnica.—Great sinking of strength and great apathy of mind; he seems busy thinking, but is not thinking of anything. Fancies himself well, refuses to talk. Bruised, sore feeling, so that the bed feels too hard. Great heat in the head, with

coldness of the body. Sensitiveness of the cervical vertebræ to touch and pressure. Abdomen distended; involuntary discharges of urine and stool. Epistaxis. Tongue dry, with a brown streak in the middle. Taste, breath, and perspiration offensive. Petechiæ. Ecchymoses.

Baptisia.—Depravity of the vegetative sphere. Face dark and red, with a besotted, stupid expression. Bruised and painful feeling at the base of the brain and upper part of the spinal cord; stiffness and lameness all over the body. Confusion of ideas and great nervous restlessness, the patient constantly moving about in bed from place to place in a sort of aimless, mechanical, bewildered, fashion, as if vaguely hunting for a more comfortable position which he cannot find. Tongue yellowish-brown along the centre or yellowish-white, with red edges; tongue swollen, thick, hindering speech. Foul taste in the mouth; foul breath; sordes on teeth and lips; foul, exhausting stools; foul-smelling urine. Stupid, heavy sleep; he goes to sleep while trying to answer a question.

At times, and quite frequently in connection with cases in which the typhoid state is well pronounced, ecchymotic spots exist to a degree which attracts particular attention and demands especial consideration in the selection of the remedy. Many of the remedies enumerated have this symptom quite prominent; if they are not sufficient to meet all the indications, we may look to the snake-poisons, notably *Crotalus horridus*, or to *Phosphorus*, the latter remedy being also of great value in certain pulmonary complications.

Crotalus has the great anxiety, dyspnœa, pallor of the face, and prostration which belong to the remedies of which here it stands as a type. There is severe headache as from a blow on the occiput, excessive thirst, vomiting, and marked faintness. Ecchymoses are a regularly occurring, very prominent symptom of poisoning with the venom of the snake, and the convulsions belonging to its effects are too well known to demand minute description.

Phosphorus covers a large range of peculiar cutaneous symptoms and stands in especially close relation to the hæmorrhagic diathesis. Its value in pulmonary complications has been pointed out. It has difficulty of hearing, especially of the human voice, a cadaverous looking, bloated countenance, marked dyspnœa, forbidding all exertion, sensitiveness of the spine, and various other symptoms indicating its employment in a condition denoting a general yielding of the vital forces and complete disorganization of the blood.

Of the remedies not herein mentioned, and not unfrequently needed in the treatment of this affection, Gelsemium, Apium virus, Digitalis, and Argentum nitricum deserve mention. *Gelsemium* is, perhaps, one of our most useful remedies in the early stage of that mild type of the disease which is especially liable to occur when an epidemic has pretty nearly exhausted its malignancy. Children and sensitive nervous people respond to it nicely; and when, as is occasionally the case in this light form of the disease, there seems to be a coloring of malaria to the case, Gelsemium, with its paralytic weakness, its scarcely perceptible pulse, its yellowish-white coating of the tongue, stupid expression of the countenance, its vertigo, headache, rheumatic or neuralgic pains, and other characteristics, is a remedy well adapted to the needs of such a patient. *Apium virus* has well-defined brain symptoms, which would justify its use even in cases presenting grave cerebral disturb-

ances, and the remedy must be borne in mind as possibly very useful. *Digitalis* is of service chiefly when the patient suffers from those cardiac disturbances which lie within the curative range of the drug; and *Argentum nitricum*, by its well-defined nervous symptoms, and by those indications which make it homœopathic also to states resulting from disorganization of the blood, may at any time so fully cover the totality of symptoms exhibited as to demand its administration.

All these remedies merit conscientious study in this connection, as do also Lachesis, Tarentula, Cantharides, Apocynum cannabinum, Stramonium, Laurocerasus, Sulphur.

Of *auxiliary treatment* little is to be said here, save as the term is made to cover the thousand-and-one little attentions which add to the comfort of the patient and help husband his strength. To speak of the virtue of cleanliness would be superfluous. The use of *heat* has been mentioned, and the practitioner will do well to avail himself of the benefits to be derived from its *legitimate* use, bearing in mind the fact that in so precarious a condition a limit of safety is easily reached. The use of stimulants, in the practice of the writer, has never constituted a prominent feature; it is, however, exceedingly shortsighted to overlook the fact that, in a state of complete nervous prostration, threatening failure of the heart, the result of an acute disease, *alcohol* is quite as truly indicated as any other remedy homœopathic to such a condition. And, granting even that the homœopathicity of alcohol to this condition of profound adynamia could be called into question, the unwisdom of the careful use of moderate amounts of stimulants cannot be proved, and the claim that such practice is unscientific cannot be established.

The diet of patients is very easily regulated. It must always be nutritious in the highest degree, and must be easy of digestion; hence, animal broths, in the earlier stage of the disease, while the patient is suffering from vomiting, will form the staple article of diet, and, when necessary, may be given *per rectum*. As soon as the patient desires more substantial food, and his stomach is able to digest it, his appetite may be indulged, care being only taken to see to it that the more solid articles of food are resumed in at first moderate amounts. The vomiting being of cerebral origin, and the stomach, in a vast majority of uncomplicated cases, being able to resume its functions as soon as the cerebral disturbance is sufficiently modified, the precautions commonly observed with the sick as to cautious feeding may here be largely ignored.

PYÆMIA.

BY H. POMEROY, M.D.

Synonyms.—Pyohæmia, Ichorhæmia, Purulent infection, Suppurative or Putrid fever, Acute purulent diathesis.

Definition.—Pyæmia consists of a form of septicæmia, or severe type of continued fever, resulting from the empoisonment of the blood by the absorption of the modified constituents of pus, and associated with intense congestion of, and the formation of scattered abscesses in, various organs and tissues of the body.

Ætiology.—As predisposing causes none stand out more boldly than: 1. *a*, traumatism, or some diseased condition of bone, when there exist in the system certain morbid states of the blood; *b*, blood-loss and prolonged shock also predispose the system to attack. The consideration of these two causes, however, properly belongs to the domain of surgery.

2. Some adynamic fever, with tendency to the formation of pus, *e.g.* puerperal fever, or some unhealthy inflammation, such as carbuncle, erysipelas, and dissecting wounds.

3. General debility or exhaustion from previous illness or other cause.

4. Organic disease.

5. Old age.

6. Improper sanitary or hygienic conditions, such as impure food or air.

The real exciting cause of this disorder is the presence in the blood of the elements of pus, but in an unhealthy form, since it is a demonstrated fact that healthy pus, in limited quantity, may be thrown into the blood and circulated through the system without causing untoward symptoms other than a temporary rise in the temperature. In this case the pus may be eliminated through the agency of the kidneys and bowels. Hence, the statement that the pus elements, in order to cause pyæmia, must be modified in some manner.

Some pathologists maintain that the real source of the poison is a sort of animal miasm, corresponding to the marsh miasmata which engender intermittent fever, emanating from unhealthy pus which infects the blood, causing it to become less and less fluid, until finally the flow is so much impeded in the capillaries as to form infarctions or thrombi, from which abscesses originate; or that the obstruction may be due to an embolus conveyed from some distant part of the system, arrested in the narrow capillary channels, this obstruction being followed by engorgement, extravasation, inflammation and disintegration or suppuration of the embolus and surrounding tissues.

Inasmuch as any embolus may give rise to a similar condition of

the tissues, it is evident that the main distinction between a pyæmic and any other embolus consists in the putrid state of the pyæmic clot.

Bacteria or micrococci in the blood are regarded by others as the cause of pyæmic fever, not only by rendering the blood more liable to coagulate when there is diminished rapidity of the circulation, thus forming clots which degenerate, resulting in the characteristic abscesses, but also by establishing small thrombi, formed solely of bacteria (globular bacteria). This is certainly quite an ingenious and plausible theory, although not yet proved correct.

Sometimes ulcers form upon the lining membrane of the bloodvessels themselves, from which there is a discharge of (modified) pus directly into the blood. This is the source of the poison in that form of pyæmia known as spontaneous or idiopathic.

Diagnosis.—Pyæmia is liable to be confounded not only with the condition generally considered as septicæmia, but also with other diseased conditions, among which are certain fevers, as intermittent, typhoid, and rheumatic.

The distinction between pyæmia and the condition now generally recognized as septicæmia is clearly set forth in an excellent paper read by Prof. Helmuth before the American Institute of Homœopathy, and published in the Transactions for 1884.

The distinguishing features as noted by this author are in the main as follows:

1. Pyæmia is caused by decomposing pus elements, while septicæmia results from any poison absorbed by direct contact.
2. In pyæmia the contamination of the blood takes place through the bloodvessels; in septicæmia through the lymphatics.
3. A recurrence of chills in pyæmia, with but a single chill in septicæmia.
4. The temperature is higher in pyæmia than in septicæmia.
5. Jaundice in pyæmia; paleness of the face in septicæmia.
6. Peculiar sweetish odor of breath in pyæmia, differing from septicæmia, in which the breath is offensive.
7. The progress of the disease is slower in pyæmia.
8. Pyæmia exhibits less delirium, but is attended with more prostration and pain.
9. Infarctions of the lungs, liver, spleen, and kidneys in pyæmia which are not found in septicæmia.
10. Pyæmia is attended with multiple abscesses in internal organs, while in septicæmia there is only a single abscess, or perhaps two, generally superficial.

The chill, fever, with the course of the temperature and perspiration, may cause pyæmia to be mistaken for intermittent fever, the paroxysms and high temperature being common to both. However, the recur-

rence of the chills is more regular in intermittent than in pyæmic fever, while the prostration and jaundice are not so marked. In differentiating between this and typhoid fever, the history of the case must be well considered. The characteristic eruption of typhoid, together with the typical rise and fall of the temperature, the absence of the profuse perspiration and secondary deposits of pus, will aid materially in establishing the differential diagnosis.

Rheumatism, although presenting some of the symptoms corresponding to those appearing in pyæmia, does not develop the characteristic odor of the breath, the recurring chills, nor the multiple abscesses.

To distinguish pyæmia from glanders, is a task attended with more difficulty. The fact that the subject had been among horses suffering from the disease in question would be an important consideration in arriving at a conclusion. Ulceration of the nasal mucous membrane, accompanied by an offensive, perhaps bloody, discharge and an involvement of the neighboring lymphatic glands, together with the history of an exposure to the contagion of glanders, would determine in favor of that affection.

Other disorders liable to be confounded with pyæmia are phlegmonous erysipelas and certain acute hepatic troubles.

Symptoms.—Prominent among the symptoms characterizing this disease are observed severe, irregularly recurring chills, followed by dry heat, the temperature ranging from 102° to 104°–5° F., pulse frequent and rapid, running from 100 to 140 per minute, at first full and bounding, but as the disease advances becoming weak and irregular.

This fever is followed by perspiration, usually excessive and exhausting (occasionally accompanied by sudamina) and a remission of the fever, during which the temperature reaches the lowest point occurring during the course of the disease.

Healthy suppuration, if previously existing, is arrested.

The patient is usually stupid, but may be restless, sleepless, and despondent; he complains of a dull, heavy sensation in the head, and occasionally there is present mild delirium, especially toward the later stages. The delirium is seldom active, inasmuch as the brain is in an exhausted state. Muscular debility is early manifested. The prostration, resulting from the large quantities of pus formed, is marked, and the body becomes greatly emaciated. The expression is anxious, and as the disease advances there may be seen the Hippocratic face. Epistaxis is frequent. The lips become parched, and sordes collect upon the teeth. The tongue, at the outset whitely coated, becomes dry, smooth, and glazed, or brown; aphthæ appear upon this organ, also upon the palate. There is thirst, but almost entire loss of appetite, with nausea, vomiting, and frequently pappy stools, or fœtid, dysenteric diarrhœa. In some cases constipation exists.

The urine, which is scanty, perhaps bloody, albuminous, and containing epithelial casts, also reveals an increased discharge of urea.

Severe bronchitis and hypostatic congestion, associated with cough, hurried respiration, and sometimes bloody expectoration, are accompanying symptoms. The inflammation frequently extends to the pleura, causing secondary pleurisy.

A characteristic symptom of pyæmia is a peculiar sweet breath, likened by some to the odor emitted by newly cut grass.

Pain in the hepatic region, together with the elimination of bile by vomiting or purging, indicates involvement of the liver. As a result of the interference with the hepatic function, icterus, more or less pronounced, is noticed. There may be an absence of bile, as indicated by the appearance of the alvine discharges.

Peritonitis, either idiopathic, or as a result of the extension of the inflammation from the liver, is common.

A dry, sallow condition of the skin results, and it is commonly studded with petechial spots or pustules, or it assumes an erysipelatous appearance.

There is a decided tendency to the formation of bedsores in patients suffering with this disease.

Pain of a shifting character, accompanied by swelling of the joints, and followed by the formation of pus, is by no means an unfrequent occurrence.

Pericarditis and endocarditis, when present, are alarming complications.

As to the cause of the frequency of certain complications, *e.g.* the involvement of the serous membranes, it is difficult to determine definitely, unless it be that the poison of pyæmia, like that of many other diseases, has a peculiar affinity for special tissues.

Pathology.—Death may result without any decided pathological manifestations, but pyæmia is ordinarily characterized by diffuse inflammations of various organs and tissues, with a suppurative tendency, resulting in the establishment of abscesses.

The most usual seat of these metastases, or secondary abscesses, is in the lungs, next in the liver. This preference for these organs depends upon the fact that they receive the blood more directly than do other organs. When the blood is in a condition favorable to the production of infarctions, they naturally occur most frequently in the minute ramifications of the pulmonary arteries.

The tendency to the formation of pus, however, is not confined to the lungs and liver, but reveals itself in the kidneys, spleen, brain, heart, muscles, skin, and subcutaneous tissue, as well as in the mucous and serous membranes and joints. In fact, there is scarcely a tissue of the body exempt from the ravages of this infection.

Blood.—This fluid reveals micrococci, together with an increased

coagulability. There is an increase in the number of white (pus) corpuscles, while the red show signs of disintegration.

Lungs.—The pulmonary complication consists in a consolidation of the tissue of these organs by exudation, while evidences of degeneration and the formation of abscesses exist. These secondary abscesses vary greatly in size, from that of a pin-head to that of a walnut.

Liver.—An enlarged softened liver, studded with abscesses, is the result of the involvement of this organ.

Bowels.—When the poison of pyæmia has attacked the bowels, the mucous membrane is congested, and hæmorrhagic spots are common; ulcers or abscesses are to be seen upon some portion of the mucous lining.

Spleen.—This organ is enlarged and pulpy, containing purulent deposits.

Kidneys.—The parenchyma is in a friable state, *i. e.*, a condition of granular degeneration, as a consequence of the nephritis, and Loomis states that the tubules and vessels are found crowded with micrococci.

In all these organs local stagnations and hæmorrhagic extravasations are noticed, if the condition has not already resulted in the formation of abscesses. The *bones*, if affected, are denuded of periosteum, and are necrosed.

Prognosis.—"This disease is always serious, frequently fatal."

Of 2818 cases reported,* 2747, or over 97 per cent., terminated in death. (It should be noted in this connection that in this report all forms of septicæmia are included.)

The danger is in proportion to the intensity of the infection, as determined by the temperature and pulse, as well as the severity and frequency of the chills (the shorter the remission, the more serious the attack), and the seriousness of other complications, the chances for recovery depending largely upon the resisting and recuperating powers of the system.

The affection may assume a malignant type and prove fatal in forty-eight hours; but usually it runs from ten days to three weeks, or it may assume a chronic form. Of the cases reported during the war of the Rebellion, about two-thirds died within the first seven days.

The prognosis is more favorable if the fever shows a tendency to subside, and the vital organs escape, or if the suppurative inflammation is confined to the superficial tissues.

Low muttering delirium, stupor, hiccough, parched tongue, copious perspiration or hæmorrhages, involuntary diarrhœa, icterus, and occasionally convulsions, usher in a fatal termination.

The cause of death in pyæmia is usually exhaustion, induced by the fever and excessive suppuration.

Treatment.—On account of the alarming fatality attending this

* Medical and Surgical History of the War of the Rebellion.

disorder, especial attention should be paid to prophylaxis in all conditions rendering the advent of pyæmia probable.

Therapeutics.—Aconite.—This remedy should be exhibited at the onset of the chill. It has a direct action upon the capillaries, thus controlling congestion and inflammation of the various tissues. It is indicated in the incipiency of the disease, when there is chill, fever, full bounding pulse, nervous excitability, restlessness, despondency, fear of death, heavy aching head, perspiration, constipation, retention or scanty flow of high-colored urine, with stitches in the renal region.

Acid. carbolicum.—This is employed as an antidote to the poison absorbed. Great languor and excessive prostration, with extreme fœtor of the exhalations and secretions.

Acid. muriaticum is called for more commonly in the later stages, or where the asthenic condition is manifested. Low delirium, hæmorrhagic diathesis, sordes on teeth, aphthous state of the mucous membranes of the mouth and tongue, diarrhœa, exhaustion, decubitus.

Arsenicum.—General sinking of the vital powers, face pale and shrunken or puffy, anxious expression, tongue glazed or brown, intense thirst for small quantities of water, loss of appetite, nausea, vomiting, involuntary diarrhœa, excessive debility, emaciation, restlessness, burning heat. Urine bloody or albuminous, containing tube-casts, or possibly suppression. Petechial spots.

Carbo vegetabilis.—Torpor of all the functions, Hippocratic face, dry foul tongue, easily bleeding gums, involuntary cadaverous-smelling diarrhœa, tympanitis; coldness of the extremities, which are covered with perspiration; collapse, cold breath, cold sweat, etc.

Gelsemium is particularly useful when there exists fever of a remittent character, without thirst, associated with paralytic symptoms, *i. e.*, a seeming prostration of the whole muscular system: dulness of the mental faculties. Diarrhœa, aggravated by excitement.

Lachesis.—Asthenic symptoms, stupor, low delirium, tongue dark, cracked, and bleeding easily, icterus, inflamed glands, dark-purplish appearance of all the local inflamed points, such as boils. Aggravation of the symptoms after sleeping.

Mercury.—Headache, coated tongue, offensive breath, salivation, ulceration of mucous membrane, enlarged glands, hepatic complications, copious perspirations which fail to afford relief, bloody or mucous stools, with tenesmus. Symptoms in general worse at night.

Phosphorus.—Pneumonic complications, thirst for very cold drinks, vomiting, nervous depression, sensitiveness over hepatic region, blackish discharge of decomposed blood. Pulse frequent, small, and feeble.

Quiniæ sulphas.—Tendency to periodicity in the symptoms. Patient anæmic and greatly debilitated; profuse perspiration, ringing in the ears, deafness, jaundice.

Silicea has a remarkable control over the suppurative process by establishing healthy action. Scrofulous subjects, defective assimilation, necrosis, perspiration about head, hands, and feet.

Veratrum viride.—Great arterial excitement, congestion, high temperature; rapid pulse, profuse cold clammy perspiration, yellow-coated tongue, gastric complications, tendency to convulsions.

The following remedies produce symptoms which warrant their being suggested in connection with this affection: *Acid. salicylicum*, *Baptisia*, *Bromine*, *Bryonia*, *Cantharides*, *Ferrum*, *Hepar sulphuris*, and *Rhus rad.*

General Suggestions.—Remove the cause, if possible, *e. g.*, if the disease depends upon retained pus, evacuate it. Avoid everything that may in any manner favor the development of this condition, as impure air and food. Cleanse the wound (if a wound exists) from all impurities and foreign substances. In fact, good nursing is absolutely

essential. Frequent sponging of the body with tepid water or dilute vinegar is not only grateful to the patient, but assists in diminishing the fever.

Maintain the strength of the patient by the regular administration of nourishing, easily-digested food, such as rice, milk, or some preparation of it, eggnog, buttermilk, koumiss, eggs, beef-tea, and fruit, if the state of the bowels will warrant. If necessary, use enemata of milk or beef-tea. Should constipation exist, relieve the bowels by warm-water injections.

Local lesions must be met as they manifest themselves. Hot fomentations afford relief when there is effusion in an articulation.

Abscesses should be poulticed, if accessible, with flaxseed meal. Make free incision or employ the aspirator as soon as the presence of pus can be determined.

Inflammation of the bowels, with tympanitis, calls for turpentine stupes, especially if there exists an hæmorrhagic tendency.

SYPHILIS.

BY WILLIAM B. TRITES, M.D.

History of Syphilis.

Origin of Syphilis.—The origin of syphilis has been a disputed question for centuries. Volume upon volume has been written upon the subject, theory after theory has been advanced, but still the question is unsettled, and the controversy goes on. A brief examination of the history of these discussions will not only be of interest, but will also assist us in obtaining a clear idea of the pathology and real nature of the disease. We know, from unimpeached testimony, that, about the year 1494, Charles VIII., of France, invaded Italy and laid siege to the city of Naples. Among the troops engaged in the campaign an epidemic occurred, which appears to have been regarded as a new disease by the surgeons of the besieging army. From the descriptions which have been handed down to us, we are enabled to positively affirm that this new and apparently unrecognized disorder was syphilis. With the dispersion of the army of Charles, the disease rapidly invaded other nations, so that, by the end of the year 1496, it had appeared in all the European countries of which we have records, and upon its first outbreak it was invariably considered by the physicians of the day as a new and hitherto unheard-of disease.

This outbreak and spread of the disease seems clearly traceable to the soldiers of the French army which had besieged the walls of Naples. The question arises, from what source had these troops derived their contagion? The early writers upon syphilis have especially endeavored to answer this question.

Marcellus Communis, a Venetian army surgeon who had observed the disease in 1495 among the troops engaged in the siege of Navara, was the first to describe it, but gives no theory as to its origin. Conradinus Gilinus, who wrote in 1497, is also silent concerning the origin of the disease, although he was the first to recognize the fact that the affection commenced usually by a sore upon the genitals, and also that it was often acquired during sexual intercourse. The physicians of Italy united in ascribing the advent of the disease to the soldiers of France, while the French denied the allegation, and declared the disease to have originated among the Italians. Some of the writers of the day supposed it to have had its birth among the suffering citizens of the besieged cities, who in their extremity had been driven to eat the flesh of their own offspring, and syphilis had resulted as a Divine infliction for their inhumanity. The stars were blamed, and the appearance of a bright constellation in the heavens about the time was believed to have caused the outbreak.

The discovery of America, in 1492, had attracted attention to that new and far away country, and the wildest stories of the land, its people, and their habits, were current from one end of Europe to the other. Hence, it is not surprising to find that the introduction of syphilis into the Eastern hemisphere was at an early date attributed to the sailors who had accompanied Columbus on his voyage of discovery. This theory of its origin seems to have pleased the popular fancy, for it was at once accepted, and until quite recently syphilographers taught that syphilis had originated in America. Upon what basis rests the charge that syphilis originated in America? Leonhard Schmaus, a Professor in the University of Saltzberg, in 1518, was the first physician to take up the popular theory and to ascribe the outbreak in Italy to the sailors of Columbus. Diaz de Isla, a Spanish physician, assisted in spreading the theory by the statement that he had been called to attend the sailors who had accompanied the great admiral, upon their return to Spain and before they had been allowed to leave their ships, and had found them suffering with syphilis. Gonzalo de Oviedo, who, in 1513, was sent by the King of Spain to Hayti, as an inspector of mines, returned and published a book, descriptive of the country, in which he affirms that syphilis was prevalent among the natives of that island. De Isla further stated that the disease was prevailing in Barcelona before Charles VIII. of France invaded Italy, and that it was there believed to have been introduced by the companions of Columbus. Ferdinand of Spain sent an army, commanded by Hernandez de Cordova, to the assistance of the King of Naples. The troops landed at Messina in May, 1495, and marched at once to the aid of the besieged city. Many of these troops were from the neighborhood of Barcelona, and it has been conjectured that by them the disease, brought by Columbus from the Indies, was conveyed

to Naples, and from there disseminated by the French army to every part of Europe. The chain of evidence seems complete, and, if unshaken, the American origin of syphilis would seem to be proved. But, as early as the sixteenth century, the statements of both De Isla and Oviedo were questioned, and recent investigations, especially those of our own historian, Prescott, seem to still further discredit these witnesses. Bassereau has championed the cause of Oviedo, and has endeavored to acquit him of the aspersions heaped upon him, but Bassereau believes that Europe derived syphilis from America, and finds in the statements of Oviedo his strongest argument upon which to base this belief.

Opposed to this theory, the American origin of the disease, we have the statement of Delicado, a Spanish priest, who describes the disease and states that he, himself, suffered from it as early as 1488, having acquired it at Rapallo, in Italy, and that the sailors of Columbus carried the disease to America with them, on their first voyage. Gaspar Torella states that the disease existed in Spain as early as 1493. Certainly, if these writers are to be credited, syphilis prevailed in Spain, and probably in Italy, before Charles VIII. laid siege to Naples. But admitting the American origin of the disease, we still have a mass of testimony, proving that the disease had existed in Europe ages before the keels of Columbus grated upon the sands of San Salvador. The letter of Peter Martyr, dated April 15th, 1488, in which he commiserates the condition of his friend Aries Barbosa, who was suffering from syphilis, has long been looked upon as positive proof of the existence of the disease in Europe prior to the siege of Naples. But recent critics have decided that the date of the letter is unreliable, and as the Opus Epistolarum was written between 1488 and 1525, if the date of this letter is disturbed it ceases to be of value in proving the existence of syphilis in Europe prior to 1495. But we are not dependent upon this source alone for proof of the early existence of the disease in the countries mentioned. Lancereaux, in his treatise on Syphilis, has carefully examined the writings of physicians of the middle ages for descriptions of syphilis, and finds that their works abound with cases which may fairly be considered syphilitic. Not that they recognized the disorders treated, but the symptoms recorded and the lesions described could belong to no other disease. Sometimes merely the local changes observed in the genital organs are recorded, in others we find lengthy descriptions of symptoms attributed to lepra, by which name the secondary and tertiary manifestations of syphilis were known. Guillaume de Salicet, writing about the middle of the thirteenth century, describes an ulcer of the penis which resulted from intercourse with unclean women; and Valescus, of Tarentum, in 1480, clearly describes what we now know as the hard or Hunterian chancre. Daremberg has found evidences of the existence

of syphilis in manuscripts dating as far back as the ninth century. The Latin and Greek poets frequently refer to a disease contracted during coition, contagious in its nature, and followed by condylomatous excrescences, ulcers of the mouth and throat, destructive ulceration of the nasal cavities, and producing:

> "Illi fœda cicatrix
> Setosam lævi frontem turpaverit oris." *

The physicians of Greece and Rome also bear testimony to the existence of a contagious disease of the genitals which was often followed by serious constitutional disturbances. Celsus, who flourished at the beginning of the Christian Era, has devoted an entire chapter to diseases of the genitals in which he appears to have recognized both the hard and soft sore, and he describes various skin affections which might very properly be classed as syphilitic. Both Aretæus and Galen have described diseases which resemble none of the disorders of modern life, except syphilis. Hippocrates, the father of medicine, has described an epidemic in which "many suffered with aphthæ, ulcerations of the mouth, frequent fluxions from the genital organs, ulcers, tumors, and swellings in the groins. Moist, chronic, and painful ophthalmias; granulations on the inner and outer surfaces of the eyelids, which destroyed the sight of many persons. The other sores and the genital organs were also the seat of numerous fungous growths. In the summer were seen a great number of anthrax, and other affections which are called septic; also pustular eruptions and extensive vesicular eruptions."†

What could have been the nature of this epidemic if we exclude syphilis? Surely, in this age there is no disease, except syphilis, capable of producing such varied manifestations. We admit that the description says nothing of the venereal origin of the epidemic, nor is there anything said of the contagious character of the discharges from the various lesions, but when we remember that these discoveries have been made in the present century, and after four hundred years of observation, we will not be surprised to find that the father of medicine has not recorded them.

We have now shown that syphilis existed in the eastern hemisphere before the Christian era, but we need not stop here, if students of the literature of the far East are to be credited.

Captain Dabry, late consul of the French to China, has discovered in the medical writings of that ancient people statements which prove conclusively that syphilis has existed among them from the most remote period.

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* Horace, Sat. v., lib. i.

† Works of Hippocrates, book iii., chapter iii., section 7.

The writings in which these descriptions were found date back to Hoang-ty, 2637 B.C. But traces of the disease have been found in ages even more remote than this. At a meeting of the Anthropological Society of Berlin in 1872, Professor Virchow presented a number of ancient skulls from a cavern on the island of Nippa—one of the Philippine group—which displayed unmistakable signs of syphilis, and as these cave-dwellers were a race of prehistoric men, it is hardly necessary to pursue the topic further.

In America syphilis is also an old disease, as shown very conclusively by the researches of Dr. Joseph Jones, who has found evidences of it in bones dug from the ancient mounds scattered throughout the Mississippi valley, and which were erected by a people of greater antiquity than the race which inhabited the country when Columbus discovered it. M. Anzias Turenne recently stated at a meeting of the Academy of Medicine of Paris that all the appellations of the disease and its symptoms are to be found in the vocabulary of the Caribbean Indians. The Abbé Bratteur de Bourbourg, in his history of the races inhabiting Mexico and Central America prior to the discovery of Columbus, states that numerous original documents, in the languages of the tribes of the valley of Anahuac, have proved to him, incontestably, the existence of the disease among them long before the advent of Europeans.

How did syphilis originate among this ancient and secluded people?

Ethnologists are united in the belief that the semi-civilized races which first peopled the new world were of Mongolian extraction; that they came from Asia by way of the Behring Straits, and, in search of a more salubrious climate than that of northern America, wandered along the great mountain chains of the west until they reached the fertile valley of the Mississippi and the semi-tropical climate of Mexico and Central America. The early existence of syphilis in eastern Asia and the islands of the Pacific has been shown; what more natural than the conclusion that the syphilis of America came with her first inhabitants from the steppes and jungles of Asia? From the above it seems evident that syphilis has existed from the earliest ages and among all races of men.

How then is the modern outbreak of the disease, which commenced about the time of the siege of Naples, to be explained? Baumler has answered this inquiry in the following words: "It is probable that syphilis existed in certain parts of Europe, more especially in Southern Europe, prior to the epidemic outbreak of the disease in Italy at the end of the fifteenth century, in the same way, perhaps, as it yet prevails in certain retired localities in the form of an endemic disease. But at the end of the fifteenth century various circumstances combined to favor a great, general, epidemic outbreak. The previous centuries, by means of the crusades and the peculiar pilgrimages of

the fourteenth century, had already set people in motion, and established more intimate relations between the different nations. The unsettled mode of life had tended to deprave the morals, and the rough bands of soldiers roving through the country gave occasion to all kinds of licentiousness. In Italy, just before the outbreak, an epidemic disease, probably typhus, had been raging, and had destroyed many people; besides, the years 1494–95 were marked by great rainfalls, so that floods occurred in Rome and other places.* All these circumstances, added to the pernicious meteorological and the hygienic influences which always accompany war and siege, would naturally impart to the already existing disease a more acute and a severer character than it had had before, just as we now observe worse forms of the disease in persons reduced in health or living under unfavorable hygienic conditions.

History of the Theories of Syphilis.—The uncertainty which overhangs the history of the origin of syphilis seems to have extended to all questions pertaining to the disease. Innumerable theories in explanation of the pathology, the symptomatology, and the treatment of syphilis have been advanced and each for a time accepted, but, one after another, they have been proved erroneous and have given place to others more modern, if not more exact.

Physicians, prior to the outbreak of 1495, did not recognize syphilis as a distinct disease. The works of Celsus, of Galen, and of Aretæus contain descriptions of genital ulcers which we recognize as hard and soft chancres. The tendency to destroy tissue, which is so marked in the soft sore, attracted their attention, but the hard sore, so trivial in its appearance and apparent results, seems to have escaped their notice. The various manifestations of the disease, which we know as its more advanced stages, were not recognized as having any relation to the venereal ulcers, but were described under such general names as lepra, anthrax, and elephantiasis. The violent epidemic to which we have referred, attracted the attention of medical men of all countries to this formidable disease, and inaugurated that systematic study, the fruit of which we are enjoying to-day in a complete differentiation between these various diseases, their pathology and treatment. The first result of the outbreak of 1495 was a reign of confusion during which writers seem to have given the widest liberty to their imaginations, and to have evolved those fanciful theories of the origin and pathology of the disease which now form a part of the curiosities of medicine. Prior to this, gonorrhœa seems to have been clearly separated from other venereal diseases, but in the excitement of the day it

* Commines, in his Memoirs, says: "In that year all the wines of Italy were sour, at which our people were much displeased, *as well as at the great heat of the air.*"

became a part of syphilis, and for centuries continued to be so classed.

Chancroid, known as that form of venereal ulcer which caused the suppurating bubo, had also been recognized by the older authors as a distinctly local disease, but during this reign of confusion it also became classed as a form of syphilis, and even to this day the error is perpetuated. Vella, who wrote in 1508, was among the first to advocate this unity of all the venereal diseases; Francis Massa, the great French authority of the sixteenth century, embraced the error. In 1551 Anthony Musa Brassavolius published his treatise on the "French Disease," in which he accepts this view, and combines with it many others equally as destitute of truth and as fantastic as dreams. This book, which was widely read and considered an authority, led the medical world astray by offering to the physician the dreams of visionaries as the proved facts of experience.

That blind submission to authority, which is so characteristic of the medicine of the middle ages, accepted the teachings of Brassavolius as final; hence the pathology and treatment of venereal disorders became fixed until the early part of the eighteenth century, when, owing to the advancement of medical education, the thraldom of the opinions of antiquity was broken, and physicians began again to observe and think. But the absolute overthrow of these errors was not accomplished until the middle of the present century, and was due to the investigations of Ricord and Bassereau.

As early as 1740 Astruc had denied that gonorrhœa and syphilis were the products of the same virus, but the truth fell upon stony ears. Balfour, in 1772, questioned the identity of their origin, and in 1792 Bell proclaimed that gonorrhœa and syphilis were distinct diseases. In the article on Gonorrhœa* we have referred to Hunter's advocacy of the syphilitic origin of clap, and have shown how it defeated the more truthful and correct theory of Bell, and how half a century elapsed, and thousands of experiments were required, before Ricord, in 1838, finally settled the fact that gonorrhœa is not a form of syphilis.

To Hunter's work on Venereal Diseases, published in 1786, however, we must ascribe that interest in the study of these maladies which developed at the beginning of the present century. His powers of observation were of the first order, and his description of the indurated chancre has become classical, and this chancre is even now known as the Hunterian sore.

Hunter was the first to perform inoculation with the virus of these diseases for the purpose of study, and, led by the results thus attained he opposed the views of his predecessors, and denied that secondary

* See Arndt's System of Medicine, vol. ii., p. 278.

manifestations are contagious, or that the disease can be transmitted to the patient's offspring, the latter an assertion which previously had also been believed.

We have alluded to the great influence which John Hunter possessed in his day, and how his advocacy of these erroneous views gave them currency throughout Europe. When Ricord entered the *Hotel du Midi*, in 1831, as one of the surgeons in charge, the views of Hunter were universally accepted; becoming dissatisfied with them, Ricord addressed himself to the task of examining the evidences upon which they were based, and later he undertook to study, and if possible to discover, the true nature of syphilis. His first inquiry was to determine whether syphilis has a special virus, and he proposed to himself two lines of research: first, the pure and simple observation of phenomena; and secondly, experimental studies with the material itself, taking it from a known source, placing it on a region of the body open to observation, and watching the effect produced.

The result of this systematic study was shown in 1838, when he denied the syphilitic nature of gonorrhœa, and presented the following as his views of syphilis:

1. That the pus of chancre, properly inoculated, always produces a chancre, provided the pus be taken during the period of progress, and not during the period of repair.

2. That the pus from the inoculated pustule again produces chancre, and that the series may be continued *ad infinitum*.

3. That there is no period of incubation, but a continuous evolution from the moment of contact to the complete formation of the ulcer.

4. That the matter of a suppurating syphilitic bubo—*i.e.* a bubo caused by direct absorption from a syphilitic sore—is as inoculable as the matter of the original sore itself.

5. That it is rarely, if ever, before the fifth day that the induration of a chancre commences; that it is usually the indurated chancre which is followed by secondary symptoms, the induration appearing to indicate that the poison has penetrated deeper into the system.

6. That the secretions from mucous tubercles, or any other form of secondary or tertiary affections, will produce no result when inoculated, and that secondary affections are never communicable in any other way than by hereditary transmission.

7. That in tertiary affections the virulent principle seems to be completely transformed, and that they are neither inoculable nor hereditarily transmissible, but may be the cause of the transmission of scrofula, which is often only a degenerated form of syphilis."*

Examined in the light of to-day, many of Ricord's conclusions are found to be erroneous. This resulted, not from any carelessness on

* Lectures on Syphilis—Lane.

the part of the observer, but as the result of faulty methods. Ricord was extremely conscientious, and absolutely refused to inoculate healthy persons with the virus of syphilis; hence, his inoculations were always practiced upon persons who either were or had been the subjects of the disease; and, as we now know, this virus exerts no influence upon those who have already been its subjects; it is on this account that his inoculations were so frequently followed by negative results. His experiments with the discharges of secondary lesions were also confined to persons already syphilitic, hence, here again his inoculations were unsuccessful. Finally, failing to distinguish between the hard and soft sore, he has hopelessly mingled their effects and in this way filled his conclusions with error.

The soundness of Ricord's teaching was received by the medical world, and for twenty years was hardly questioned. In 1850 Ricord published his *Letters on Syphilis*, in which he did much to correct the errors of his earlier work. In these epistles he divides chancres into two classes, those which become, and those which do not become, indurated. Chancres which become hard, he further taught, alone are followed by constitutional syphilis. A marked difference will be noted between these conclusions and those published in 1838, but he still adhered to the theory that there is but one virus from which these two sores originate, and that this virus is syphilitic in its nature.

In 1852 Leon Bassereau, a pupil of Ricord, dissatisfied with the teachings of his master, promulgated the doctrine that soft and hard sores are manifestations of distinct diseases, and that the secretions of soft sores always produce soft sores, and that those of hard sores invariably cause hard sores and constitutional symptoms, when properly inoculated. Bassereau reached these conclusions by a process of investigation which he called confrontation. When called to treat a venereal sore, he sought the person from whom it had been contracted, and carefully examined this source. After thousands of such investigations he ascertained that in every instance persons bearing hard sores traced their disease to persons who still bore evidences of primary or secondary disease; while soft or local sores had always been derived from persons in whom a local sore with suppurating bubo only had existed.

At the time Bassereau announced these views, the doctrine that syphilis does not repeat itself in the same individual was quite extensively held, but the inoculability of the individual bearing it had not as yet been seriously called in question.

It had been noticed that such inoculations were extremely difficult and, when successful, gave rise to a sore precisely similar to that caused by inoculation from a soft chancre. Therefore, it was argued by Clerc, it was not necessary to imagine with Bassereau the existence of two poisons, but that the soft sore was the product of the hard sore

when conveyed to a patient already syphilitic; that it had permanently lost its infecting property, so that if transmitted further to a person who had never had syphilis it would still be transmitted as a soft sore without power of constitutional infection. To this hybrid or degenerated sore Clerc gave the name of Chancroid.

The theory of two distinct poisons, as taught by Bassereau, is called the dual theory of syphilis. The theory that soft chancre is but a modification of the syphilitic virus due to the soil in which it has been implanted, as taught by Clerc, is called the unity theory of syphilis. The believers in the first theory are called "dualists," those believing in the second are called "unicists."

The doctrine of Bassereau is the one most generally accepted in America, and the one which impresses us most favorably; but many of the great names in this connection are arrayed on the side of Clerc. In England, under the leadership of Mr. Hutchinson, the unit theory has many followers, but from a careful examination of the literature of the subject one is compelled to admit that the dual theory is by far the most popular and best explains the phenomena of the two diseases. Not but that the theory has its weak points, which its opponents have not been slow to point out. One of these difficulties was found in the fact that in practice we have sores which partake of the nature of both the hard and soft chancre. A sore, for instance, is developed a few days after coition, and for the first two or three weeks presents only such symptoms as are peculiar to the soft sore; but at the expiration of that time the base becomes indurated, the destructive process is arrested, and after the lapse of another period general constitutional symptoms develop. The unicist very pertinently asks, why this blending of symptoms if the two diseases are distinct? If under certain conditions a soft sore can become hard and produce constitutional effects so similar to syphilis as to be undistinguishable, what need to dispute about the sources of the virus when the results are identical?

So queried the unicist, and his queries were unanswerable until Rollét, of Lyons, in 1858 propounded the theory of the mixed chancre. He had observed sores like those just described, and offered the following explanation: That during coition with a person suffering from both kinds of sores, one could receive both poisons upon the same spot, and that the effect of each would be regularly developed; that first the soft sore would appear, and then, after the expiration of the stage of incubation, the indurated base would be developed and constitutional symptoms follow in due course of time. The possibility of the mixed chancre was at first denied, but Hebra demonstrated by experiment that it was perfectly feasible to transmit both the hard and soft sore simultaneously. His conclusions were confirmed by Waller and Von Bärensprung. The unicists now accept the mixed

chancre, as the following extract from a lecture delivered by Jonathan Hutchinson in the London Hospital shows, but they differ from dualists as to the cause of the soft sore: "Mixed chancres," he says, "are indeed very common, and they result from the receipt of two distinct poisons during the act of coition; one poison, the one without incubation, springs from pus secreted from syphilitic inflammation; the other, developing slowly, springs from the real syphilitic virus, the secretion of the chancre."

This admission but shifts the grounds of dispute. Bassereau taught that the soft sore springs from a distinct virus and has no connection whatever with syphilis; Clerc held that the soft sore is caused by inoculating a person already syphilitic, with the virus of syphilis.

Clerc's statement was the result of experiment, it is true, but the method which he practiced was faulty. The hard chancre secretes but little pus, hence, when experiments were to be made, some process had to be used whereby the amount of secretion could be increased. Lane introduced the method of covering the sore with savine ointment, others resorted to a seton passed through the base; with products thus derived the various inoculations were made. Mr. Hutchinson, a follower of Clerc, says, in the lecture referred to above:

"My position is, that the soft sore results simply from pus contagion, this pus being more or less peculiar, and its peculiarity being due to its having originated in syphilitic inflammation." Being a unicist, he adheres to the belief that the pus is syphilitic in its nature.

The dualists of to-day, in consequence of more extended observation, differ somewhat with the early teachings of Bassereau. They admit, with Mr. Hutchinson, that the soft sore results from pus inoculation, but differ with him when he limits this to pus derived from a syphilitic lesion. In other words, they believe that soft sores, or chancroids, are not the result of virus at all, but are produced from inoculations with simple pus. The results of those investigators who used pus derived from irritated chancres are explained by the theory that they did not use syphilitic virus at all, but simply pus, the product of inflammation. The experiments of Pick, Ziessel, and Wigglesworth have been most conclusive upon this point, and the fact that chancroid may originate *de novo* from inoculation of simple pus is becoming more and more accepted.

Chronology of Syphilis.

1495. The general outbreak in Europe.
1495. First description published by Marcellus Communis.
1497. Its venereal origin recognized by Gilinus.
1497. Widman first uses Mercury in the treatment of syphilis.
1508. The unity of all venereal diseases taught by Vella.

1518. American origin suggested by Schmaus.
1563. Botalli attributes certain nervous diseases to syphilis.
1564. Fallopius taught the hereditary nature of syphilis.
1740. Astruc denies the syphilitic origin of gonorrhœa.
1776. Balfour denies the syphilitic origin of gonorrhœa.
1786. Hunter's work on venereal diseases published.
1792. Bell denies the syphilitic origin of gonorrhœa.
1819. Evans describes the soft sore, and notices that Mercury is not necessary in its treatment.
1831. Dr. Williams introduces the Iodide of potassium as a remedy for tertiary syphilis.
1835. Wallace, of Dublin, discovered that secretions of secondary lesions are contagious.
1838. Ricord proves by experiment that gonorrhœa is not syphilitic either in origin or nature.
1849. Dittrich discovers that syphilis causes diseases of the liver.
1850. Ricord teaches that only hard chancres are followed by constitutional symptoms.
1850. Waller, of Prague, discovers that the blood in secondary syphilis is contagious.
1852. Bassereau propounds the "*dual*" theory of syphilis.
1856. Clerc propounds the "*unit*" theory, and names the soft sore chancroid.
1858. Rollet describes the "mixed chancre."
1868. Wigglesworth ascribes the origin of the soft sore to pus inoculation.

Symptomatology, Definition, and Nature of Syphilis.

A person who has suffered from syphilis will relate a history like the following: From three weeks to a month after exposure to the syphilitic virus a red papule made its appearance. The base of this papule soon became hard or indurated, and ulceration may, or may not, have occurred. A few days after the appearance of the papule, the lymphatic glands in anatomical relation with it were found hard, slightly enlarged, but painless; at first only one group was affected, but in a few weeks several groups were found presenting the evidences of infection noted above. From six to eight weeks after the appearance of the papule, or from nine to eleven weeks after exposure to the virus, the patient may have had an attack of what is known as syphilitic fever. His bones ached, and his muscles felt as though they had been bruised. He felt tired and weary; chills may, or may not, have been noticed, followed by fever, with a temperature of 103° F., attended by violent headache. This condition continued from twenty-four to forty-eight hours, and was followed by an erythematous eruption upon the back, chest, and limbs. No itching or other discomfort

attended this outbreak. About this time the throat became sore, a simple catarrhal soreness, but this was soon followed by ulcerations and the development of flat white growths upon the mucous membranes of the throat and buccal cavity. The disease is now said to be constitutional. The erythema gives way to papular eruptions, the hair falls out, the nails become diseased, and the periosteum covering the long bones becomes affected, causing the dreaded nightly bone-pains. During this stage iritis is sometimes developed, and later the deeper tissues of the eye, especially the retina, become affected. General lymphatic enlargement takes place, usually during the first six months, the lymphatic glands throughout the body taking on the condition which has been described as affecting those in anatomical relation with the chancre. New crops of eruption continue to appear and disappear upon the skin and mucous membranes; small papules appear upon the tongue, and isolated patches of psoriasis develop in the palms of the hands and soles of the feet. By this time the general health of the patient will also be noticeably affected; he will be emaciated, and debility will be marked; his breath will be short, and his appetite impaired. The eruptions will now involve the deeper layers of the skin, and vesicles and pustules appear, and incrustations and stratified scabs will be noticed covering superficial ulcers. The ulcerations in the throat now become more profound, and tissues are rapidly destroyed. The nasal passages are invaded, and the covering of the bones being destroyed, necrosis ensues and horrid deformity results.

After a time the symptoms subside, the course of the disease is temporarily arrested, and the period of latency is developed. This interval is of variable duration, sometimes lasting from eight to ten months, in other cases continuing for years, until even the memory of the initial lesion has been forgotten. The period of latency is followed by symptoms so varied that only recently they have been recognized as syphilitic. Some of the manifestations of this stage are purely local, others are deep-seated and destructive in their tendency, and, in rare instances, a syphilitic marasmus is developed, which tends rapidly to a fatal termination.

The local manifestations consist in the development of tumors which may appear in any of the tissues of the body, and exhibit no tendency to resorption, as did the earlier forms of syphilitic growths. These tumors tend to disintegration and necrosis. They may occur in any organ, and, owing to the gum-like substance of which they are composed, have been called gummata. When developed in the skin, mucous membrane, or periosteum, they discharge their contents at the surface, as in ordinary abscesses. When located in the deeper organs, the fibrous envelop shrivels, fatty degeneration sets up in the mass of the tumor, and it is in this way finally effaced. If they occur n the subcutaneous cellular tissue, persistent wide-spreading ulcers

result; if located over superficial bones, destruction of the periosteum and necrosis is not an uncommon termination. Finally, a marasmus develops, the patient becomes extremely pale, is emaciated, and presents symptoms of a remittent type, the late syphilitic fever; the joints become swollen, and symptoms similar to acute articular rheumatism appear; albuminuria, with or without dropsy, anasarca, dysenteric affections, uræmia, pneumonias, nervous diseases, and a host of other disorders attend the last stage of syphilis, until finally the virus loses its force, and the system rallies from the intoxication, or death supervenes and ends the patient's sufferings. We do not mean to say that ordinary cases of syphilis pursue any such extended course as this; in the great majority of instances, when properly treated, the disorder is arrested in its earlier stages, but in depraved constitutions, without proper care or treatment, all the varied phenomena described above may appear.

From the study of such a typical case we are enabled to recognize the following stages or steps in the development of the effects of syphilitic contagion:

1. The infection; 2, the local affection; 3, the acute general affection, from six to eight months in duration, followed by restoration to health; or else, 4, a stage of latency of variable duration; 5, period of gummous tumors and ulcerations; 6, syphilitic marasmus.

This is syphilis, and well has it been named the "king of diseases," for no other virus produces such profound or long-lasting effects, no other so riots upon every tissue of the human body. It assumes almost every form of known pathological development, and the name of Proteus may be applied to this disease with far greater truthfulness than to hysteria, for hysteria but simulates disease, while syphilis is disease in a thousand forms.

* * * *

Definition.—Syphilis is a chronic infectious disease, communicated to the sound tissues solely by contact with the fluids of the diseased; an interval exists between the absorption of the poison and the manifestation of its effects. The poison is conveyed gradually through the lymphatic circulation and blood to the entire body, and all the tissues become in time contaminated; it manifests itself both upon the surface and internally, in the parenchyma of the various organs. Its natural course is to recovery. It is of two kinds: Acquired and hereditary syphilis.

Acquired Syphilis.

Acquired syphilis is always the result of contact with the fluids of a person already diseased; hence it becomes of importance to study the nature and sources of this subtle virus, as well as the modes by which it is conveyed, and the conditions which favor its development.

The Virus, its Nature.—There can be no doubt that syphilitic virus exists, though its existence was at one time denied; but numerous experiments and careful observations have placed the question beyond the range of doubt. The virus has thus far eluded the most careful research, and while its sources and effects have been thoroughly studied, it still remains unknown, and to present appearances unknowable. The active research for micro-organisms as the cause of disease, which the present decade has witnessed, seems to have searched the fluids of the syphilitic in vain for an offending bacillus. Lostorfer, in 1872, announced that he had discovered certain shining bodies in the blood of those suffering from syphilis, but more careful observers showed that these bodies were not peculiar to the fluids of this disease alone. In 1880 Pisarewski noticed a granular material in the indurated tissue of the hard chancre. This granular material, owing to its arrangement and reactions, he regarded as groups of lower organisms, and considered them as the development stage of the micro-organisms of syphilis. Klebs found micrococci and bacteria in culture fluids of non-ulcerated hard chancre; these he named helico-monads, and believes them to be the *materies morbi* of syphilis, holding that the granular material described by Pisarewski consists of these in the early stage of their existence. Both observers agree in the statement that these forms are found most profusely obstructing the lumen of lymphatic vessels. Aufrecht, in 1881, described a micrococcus which he had found in the secretions of broad condylomatous growths, but Leistikow, who, in 1882, repeated his observations, failed to find anything peculiar in these discharges. Birch-Hirschfeld, who has recently made an exhaustive study of syphilitic lesions for the purpose of discovering the existence or non-existence of a specific organism, states that he has found bacteria in all forms of the disease, but has failed to detect them in the blood; he thinks that while they are not the cause of syphilis, they are probably the bearers of the syphilitic contagion. Babes, in *Le Progrès Médical* for June 9th, 1883, after a careful examination of the conclusions of Birch-Hirschfeld, denies them, and says that what he has called the microbe of syphilis is nothing more than granules of protoplasm belonging to the so-called granular cells which have been described by Ehrlich.

Bricon, in the journal quoted above, for October 11th, 1884, after reviewing the history of the search for a specific germ as the origin of syphilis, sums up his conclusion as follows:

1st. Syphilis is a parasitical disease.

2d. Its microbe is probably a micrococcus whose nature is still to be ascertained.

3d. Inoculations with the direct products of syphilis have been negative, or, at least, doubtful, in the lower animals.

4th. Inoculations with culture fluids have been entirely unsuccessful, owing, perhaps, in part, at least, to the defective methods pursued.

Lustgarten, of Vienna, has recently* made a careful study of sixteen cases of syphilis, and has found in each what he considers to be the bacilli of syphilis. He found the microbes remarkably abundant in the discharges from secondary lesions, and found their number to *decrease* after a short course of local treatment.

Pathology.—Hutchinson has classed syphilis among the eruptive diseases, making it a congener of measles, small-pox, and scarlet fever. He supports his position by arguments based on analogies existing between syphilis and the exanthemata, such as their stages of incubation, their communication from individual to individual, never appearing *de novo*, their not occurring twice in the same person, peculiarities of development, and numerous other similarities, fancied or real. With pathologists of this school syphilis ends with the secondary stage, the tertiary manifestations being ranked as sequelæ, and considered as the analogues of the sequelæ which so frequently follow the contagious exanthemata.

Salisbury, some years ago, advanced a theory that there existed in the blood of syphilitics a peculiar cryptogam which was the contagious principle of the disease; he gave to it the name *crypta syphilitica*. Other observers have failed to detect the fungus, and hence the theory has fallen into oblivion.

Despres explained the varied manifestations of the disease on the theory that syphilis is a purulent diathesis. He considers that, at the time of infection, the blood is contaminated by an animal virus which gradually alters the blood, infecting its globules, and that this pus-infected fluid seeks to escape by the skin in the form of eruptions.

Kuss, of Strasburg, has advanced the theory that syphilis is a disease of the connective tissue. Bumstead and Taylor are advocates of this theory, and from them we draw the following epitomized statement of this view: "We have found that the contagion of syphilis originates in the secretion of active lesions and in the blood during an active stage of syphilis. These fluids, inserted beneath the integument, do not at once pass into the circulation, but cause a local cell increase, the induration of the local sore. This is followed by glandular enlargement, which is caused by these cells, like those of cancer, finding their way into the lymphatic ganglia. There, owing to the profusion of lymphatic elements, which we know to be protoplasm, or living matter of the most active kind, these new cells undergo a great change, increasing in numbers according to the susceptibility of the patient." They pass from the lymphatic system into the blood, and then are carried over the system, chiefly at first, however, to the periphery, where

* April 25th, 1885.

they are deposited in the connective tissue, and here take root, this tissue being peculiarly susceptible to the action of the disease. Here they are still further developed, not attacking primarily other tissues. Thus located they induce, in circumscribed spots, cell-proliferation of the middle layer of the blastoderm, cause an increase of the cellular elements of the connective tissue, and develop a new tissue, the granular tissue, also called gummatous tissue, and syphiloma. This is a young, transitory tissue, composed of cells which resemble white blood-corpuscles. The hyperæmia, which so constantly attends the manifestations of syphilis, is explained on the theory that the contagious properties of the disease are contained in certain shining granules, which are masses of protoplasm, or germinal matter, found in the serous secretions of syphilitic lesions. These are taken into the circulation, carried over the body, and, by their proliferation in the connective material, cause alterations in the circulation which results in local congestions.

Dr. Fessenden N. Otis, in a recent work on the "Physiological Pathology of Syphilis," advances the idea that the infection of syphilis is conveyed through the lymphatic system, and that the infecting material is a diseased germ which attacks the lymph corpuscles and causes their rapid proliferation.

The following resumé of Dr. Otis's views we condense from the American edition of Cornil's work on *Syphilis:*

The infecting body in syphilis is a degraded or a diseased cell, resembling a white blood-corpuscle, but much smaller, and corresponding to the bioplastic disease germ of Beale. It is a particle of normal protoplasm which has undergone degeneration and has acquired the property of rapid proliferation and of impressing its own peculiarities upon germinal matter, wherever it comes in contact with it. These cells attack the white blood- and lymph-corpuscles, causing them to take on rapid growth and arresting their development into red blood-cells, thus producing the so-called syphilitic anæmia. These cells are always found at the point of inoculation; to their rapid proliferation and crowding together the hardened base is due, and the dryness of such sores is caused by the blocking-up of the lumen of the vessels by these cells, thus preventing the transudation of serum. The secondary incubation, on an average covering a period of six weeks, represents the time occupied in the slow passage of these diseased cells through the lymphatics to the glands; it is followed by local glandular enlargement, which shows that the diseased cells have reached the glands. The lymphatics now convey the diseased material from the glands, and empty it into the blood. After their entrance into the blood the diseased cells which, in accordance with the general properties of cells, proliferate most rapidly when arrested or slowed in motion, on reaching the capillaries probably affect their walls, and as soon as they have

accumulated sufficiently, make pressure on the sensory and vaso-motor nerves, thus producing the insensitiveness of the skin, and the roseola, caused by the irregular dilatation of the capillaries.

In the papillæ of the skin, around the circumference of which the capillary vessels wind in corkscrew fashion, we have an increase of pressure and a retardation of the blood-current, conditions favorable to cellular exudation and proliferation. Therefore, when these "syphilitic" cells reach the papillæ, they escape into their substance and multiply there. If the lymphatics were capable of taking them up again, no local symptoms would ensue, but as these vessels are themselves pressed upon, and more or less occluded, these cells accumulate until little hard tumors are produced which even become visible on the surface (papular syphilide). The epidermic layer, prevented by pressure from obtaining sufficient nutriment, dies and scales off, and we have the papulo-squamous syphilide; greater pressure produces ulceration or pustulation of various degrees, and we have the pustular and ulcerative syphilides.

The lymph channels throughout the body are subjected to more or less irritation, or even a low grade of inflammation, while the changes described above are taking place; the tendency of this is to cause deposits of fibrous material which, by its presence and subsequent contraction, tends to damage and obstruct them. This "lymphatic obstruction" is followed by certain local symptoms which are called tertiary; these consist of the formation of small tumors (gummata), or of the death of various tissues, produced by pressure (syphilitic necrosis and ulceration). These symptoms are due to the accumulation at these points of the normal nutritive elements, which are always somewhat in excess of the demand, and which should properly be taken up by the lymphatics and restored to the general circulation. The lymphatics, as we have seen, are occluded or, at least, crippled, and are unable to perform their function; hence this superabundant nutritive material is crowded together and heaped up into nodes and gummata. The non-contagiousness and the absence of symmetry of these lesions, as well as their greater frequency and severity after a serious or prolonged secondary stage, are thus explained.

We cannot conclude this view of the theories concerning the nature of syphilis any better than by quoting the following from the American editors of Cornil's work on *Syphilis:*

"It seems probable, in the light of our present knowledge, syphilis cannot be considered as *exclusively* a disease of either the blood, lymphatics, or connective tissue, but rather as one involving commonly these and all other tissues, its symptoms in the early stages resulting from the absorption and proliferation of certain contagious, immature cells or protoplasmic masses, and in the latter or tertiary period, possibly from the accumulation at certain points of normal nutrient

material and tissue waste, which the thickened or obliterated lymphatics are unable to remove. Upon any or all of these points, however, we deem it the part of wisdom to refrain from final judgment."

Modified form of Modern Syphilis.—From a comparison of recent epidemics of syphilis with those of 1495, and later, we are forced to the conclusion that the virulence of the disease is lessening. Astruc, early in the last century, noticed this, and believed that it was owing to the race having become tolerant of the poison from its universal spread and hereditary transmission. Whether its mildness is due to this cause or whether the improved condition of society, as well as of the art of medicine, has mollified the course of the disease, we cannot say, but certainly, the syphilis of to-day presents no such horrors as are recorded of it by the earlier chroniclers of its ravages.

Sources of the Syphilitic Virus.—As sources whence this virus is derived we would mention:

1. The indurated chancre. The secretions from this form of sore are serous and scanty, and it has long been known that if the smallest quantity of this fluid be brought in contact with an abraded surface of a healthy person, syphilis will, after the lapse of a little time, be developed.

2. The secretions of any of the numerous secondary manifestations of the disease have for some years been recognized as a pregnant cause of syphilis. For a long time this source of contagion seems to have escaped the observation of medical men. Hunter denied that these secretions were contagious, and Ricord, following in his footsteps, and misled, as we have seen, by his inoculations, adhered to the same belief. Wallace, of Dublin, in 1835, was the first to teach that the secretions of the secondary stage were contagious, a conclusion which he had reached by inoculating healthy persons with such discharges. At first the statement was fiercely denied, but after the numerous inoculations of the anonymous physician of the Palatinate were made known and the results found to corroborate the views of Wallace, the fact of their contagious nature was accepted.

3. The blood of persons suffering with secondary syphilis is also contagious. This fact was first proven by Waller, of Prague, and afterward confirmed by the anonymous physician mentioned above. Pellizzari, of Florence, in 1862, undertook a series of inoculations for the purpose of determining the accuracy of Waller's conclusions; and his results fully prove that the blood possesses contagious properties during the secondary stage.

In the tertiary stage this peculiarity of the blood ceases to exist, and it has also been proved that the secretions of the tertiary manifestations are destitute of contagious properties.

Since the blood in the secondary stage is contagious, we might very

fairly conclude that the physiological secretions of the body during this period would be found virulent.

From time to time statements have been made that tears, saliva, urine, sweat, milk, and semen have been found contagious, but careful investigations have shown that they are entirely innoxious.

Modes of Contagion.—A careful examination of the different channels by which the virus of syphilis is conveyed from diseased persons to those in health, is both interesting and instructive. Three modes of contagion have been recognized:

1. By direct contact.
2. By indirect contact.
3. By hereditary transmission.

Except in the third class, the virus always enters the body through a breach of surface. In the chancroid the discharges were found to possess a power of erosion by which they could make for themselves an entrance beneath the cuticle, but the virus of syphilis is destitute of any such capability, and must gain an entrance through an existing abrasion, or else remain inactive.

1. Direct Contact. This is by far the most common mode of contagion, and usually occurs during the act of coition, when the delicate covering of the penis is especially liable to abrasion, and is brought in close contact with the secreting surface of the indurated sore. But this is not the only way by which the disease may result from direct contact. Physicians engaged in the examination of syphilitics are liable to receive the secretions upon abraded surfaces, and thus become subjects of the disease, and midwives are especially exposed to this danger. Early in the secondary stage mucous patches are developed upon the lips and tongue, and as their secretions are contagious, they become active agents in the spread of syphilis, owing to the common practice of kissing. The secretions from these patches within the mouth of syphilitic infants have been known to convey the disease to healthy wet-nurses, during the act of nursing.

2. Indirect Modes of Contagion. Under this head a host of supposable cases could be presented, the virus being usually derived from the lesions of the secondary stage. Owing to the frequent existence of mucous patches within the buccal cavity, the mutual use of pipes, spoons, toothbrushes, drinking-cups, and other utensils, has been known to convey the disease from one person to another. The Eustachian catheter has been the instrument in more than one case of transporting noxious material from the diseased to the healthy. Indeed, any instrument may become the carrier of this virulent material; hence we should carefully instruct those under our care as to the extremely contagious character of their disease, and warn them of the danger of exposing their friends and families to the secretions of their lesions.

Vaccination.—Perhaps no question is more frequently asked of the general practitioner than this: "Can disease be conveyed by vaccination?" The laity are apt to believe that all constitutional diseases, such as syphilis, scrofulosis, and tuberculosis, may, in some mysterious way, be conveyed by the lymph of the vaccine vesicle. The opposition, so often manifested to this protective agency of Jenner's, will be found to have its root in the general spread of this erroneous belief, and hence the frequency with which the question is propounded. In answer to this query we think that modern investigation has proved that syphilis is the only disease which is at all likely to be transmitted in this way. Numerous cases are reported in which syphilis has undoubtedly been acquired by using lymph from vaccine vesicles developed upon persons suffering from that disease. It is right that we should recognize this source of contagion and endeavor to save our patients from its disastrous consequences.

Two theories have been advanced to explain this mode of contagion:

a. That the contagious quality does not reside in the lymph of the vaccine vesicle produced upon a syphilitic, but is owing to the admixture of blood which, we have already seen, is highly contagious during the secondary stage.

b. The second theory is that the lymph itself is contagious, and even if every precaution is taken to avoid the admixture of blood, it will still be found contagious.

The first of these theories seems the most plausible, and is the one most generally adopted, but in practice we should remember them both and reject the lymph from sources which present the slightest traces of this terrible disease.

Owing to the universal existence of syphilis, we think the safest method is to reject the use of humanized lymph entirely and to perform all operations with the pure vaccine directly from the heifer.

The lance is another source of danger, and he is a careless man indeed, who, knowing the contagious character of syphilitic blood, will vaccinate arm after arm without each time carefully and thoroughly cleansing his knife. In my own practice I have thrown the lance away, lest I should even inadvertently convey this terrible disease to the flesh of some innocent person. Owing to the sharp point of the ivory strip upon which the virus is now furnished, the need for the lance no longer exists.

The observation of Viennois that vaccination with pure vaccine virus is sometimes the exciting cause of the appearance of a syphilitic eruption in infants already under the syphilitic diathesis, is of importance. In such instances the vaccination seems to arouse the sleeping syphilis; but we must remember that this would certainly have occurred even if vaccination had not been done. The appearance of

the eruption within a few days or weeks after the vaccination, without a period of incubation, would render it probable that the disease was latent in the system.

Who are liable to infection? All persons are; but we must remember that, while syphilis recognizes neither age, sex, nor condition, yet occasionally we find persons who seem proof against this virus. This, though peculiar, is paralleled in the other contagious diseases; persons are often met with who, though frequently exposed, have never taken small-pox, scarlet fever, or measles. Experience has proved that certain conditions exist which greatly augment the contagious nature of the disease and aggravate the symptoms which follow in its train.

Climate.—Among these unfavorable conditions may be mentioned the influence of climate. Inhabitants of cold countries, it has been found, when infected with syphilis, develop its most intractable forms, and in them the disease is followed by destructive tendencies in its later stages. The extreme cold seems to lower the vital energy and to leave the system open to the inroads of the disease. This, together with the filthy habits, the improper food, and the tendency which such people have to herd together in badly ventilated dwellings, explains why syphilis under such conditions takes on so virulent a form.

In strange contradiction to the above we have the statement that the disease has never become epidemic in Iceland, though visited yearly by vessels from Norway and Sweden, with sailors known to be affected. Even when cases have occurred among native women, the disease runs a mild course and soon loses its infectious character. This peculiarity has not been explained.

In hot climates foreigners have been found to suffer very severely when contracting the disease from natives; some of our most terrible cases occur among sailors who have been infected in the East Indies and the Islands of the South Pacific. The natives of such countries, even when affected, seem to suffer but a mild form of the disease.

Sudden changes of temperature and to countries whose atmosphere is saturated with moisture seem especially favorable for the development of the destructive tendencies of syphilis.

The Influence of Race.—All races are liable to the action of this infectious material, and hence we find the disease existing in every quarter of the globe. When it spreads to races which never before have been afflicted, it takes on its most virulent forms and rages as an epidemic. Owing to this peculiarity, syphilis has received a variety of names, as for instance pian, yaws, frambœsia, names applied to epidemics which have prevailed along the coast of Africa; sibbens or sewens, a name applied to an outbreak which occurred in the southern counties of Scotland; radesyge a name applied in Sweden and Norway, and many others which could be mentioned.

Age.—While infancy, youth, manhood, and old age are all alike vulnerable to this poison, we find syphilis most commonly developed in young persons, between the ages of 18 and 25 years. This is owing not to any peculiarity of the age, but rather to the strong sexual appetites of youth which lead to more frequent violations of the laws of chastity.

If the disease is acquired after middle life, its course is slow, and relapses are frequent. Langston Parker believes that syphilis acquired after the age of 40 becomes an incurable disease. We are not prepared to accept this statement, but it should be borne in mind when obliged to make a prognosis in such cases.

Quinquand has recently * made an exhaustive study of the course of syphilis when it occurs in persons advanced in life. He finds that the incubation and duration of the chancre, as well as of the lymphatic engorgement, are longer than in middle life. The tertiary and secondary symptoms are quite as severe as in the young, and visceral, and other grave, lesions may occur. Two marked characteristics display themselves in the early syphilitic eruptions of the aged: 1. Their resistance to therapeutic measures; 2. Their tendency to relapse. These peculiarities are also noted throughout the tertiary stage, during which such patients are especially liable to develop rebellious nervous disturbances.

Individual Conditions.—The condition of the individual has an undoubted influence upon the activity of the virus. While no condition seems to preclude its action, still, we usually find that persons in robust health, living in obedience to sanitary laws, are less liable to develop the grave forms of the disease, while broken-down constitutions, improper diet, filthy habits, want, and alcoholic excess are pregnant causes of its most terrible consequences.

The sexes seem equally liable to infection, and the course of the disease is the same in both men and women. If the disease occurs in women during pregnancy, it becomes tedious and resists medicine. The irregular habits of prostitutes, combined with intemperance, their favorite vice, explains the havoc syphilis plays among this class.

Persons of light complexion, with reddish hair and of nervous temperament, are apt to have the disease more severely than persons of dark complexion; the same thing has been noted in persons of a lymphatic temperament or of a scrofulous habit, they being particularly liable to prolonged attacks of syphilis with special tendency to extensive ulcerations.

Duration.—The duration of syphilis is a question of great interest, and from numerous cases which have recovered without treatment we are authorized to conclude that it is a self-limiting disease. Under

* Annales de Dermatologie et de Syphilographie, Paris, 1881.

treatment, the majority of authorities hold, from two to three years are required to liberate the system from its influences, but even in the most skillful hands cases occasionally occur which resist every remedial agent, and continue on until death closes the scene. Fortunately, such grave results are not common. Another class of cases develop the early skin affection quite profusely, and then rapidly lose all traces of the disease, health being restored without the advent of tertiary manifestations. From the foregoing we may conclude that while syphilis is easily and quickly cured in the great majority of instances, cases may occur which, from some individual peculiarity, defy our best efforts.

In the present state of our knowledge we cannot, in the beginning, tell to which of these classes a given case belongs; but it has been observed that those which have been improperly treated or entirely neglected during their earlier stages, are much more apt to be inveterate than cases carefully treated from the first.

Communication of Syphilis to the Lower Animals.—Anzias Turenne made numerous attempts, as early as 1844, to implant syphilis by inoculation into the bodies of the lower animals, but his experiments were always unsuccessful. Lanceraux succeeded in producing a chain of symptoms in a guinea pig which resembled syphilis, but he considered them due not to the virus but to septic influences caused by inserting pus under the skin. Klebs has published two cases of infection of monkeys, but the results are doubted, as the symptoms were more those of tuberculosis than of syphilis. Martineau has recently (1883) inoculated pigs and monkeys with culture fluid derived from a fresh lesion, and has produced in both cases indurated sores followed by skin manifestations, loss of hair and, after ten months, ulceration of the mucous membrane of the palatine arch. Hunter's dictum that syphilis occurs only in man may be found to be untrue, although with the exception of Martineau's cases all efforts to induce the disease in lower animals have failed.

Syphilitic Chancre.

When the virus of syphilis has been introduced beneath the surface by any of the several modes of contagion just examined, there results, at the point of inoculation, a primary lesion which has been called syphilitic chancre, the initial lesion, the indurated sore, the non-suppurating chancre, the infecting chancre, and the primary lesion. Good reasons for the adoption of each of these appellations have been presented, but as the term chancre has been long and intimately associated with syphilis, we question the advisability of superseding it, even though the new term may better describe the pathological condition which it names.

Incubation.—In studying the development of the chancroid,* it will be remembered that we called attention to the fact that the sore follows immediately upon the introduction of the contagious material. A marked difference will be noted in the syphilitic chancre, a time elapsing between the introduction of the virus and the occurrence of the sore. This interval is called the stage of incubation, and its recognition is of great value in diagnosis.

The duration of the stage of incubation has been carefully studied. Berkley Hill tabulates the results of 42 experimental inoculations of syphilis, in which the shortest stage of incubation was 10 days, the longest 46 days, and the average, for the whole 42 cases, was 24 days.

A few cases have been reported in which a much less time has elapsed, as will be seen by the following:

TABLE OF SHORT STAGES OF INCUBATION.

Name of Author.	No. of cases.	Stage of Incubation.
R. W. Taylor,	1	24 hours.
Wm. Hammond,	1	36 "
Diday,	1	24 "
Otis,	1	24 "
Le Fort,	16	From 3 to 8 days.

Such rapid progress in the development of the disease must be extremely uncommon, for the above 21 cases are all there are recorded.

The surgeon should be on his guard in inquiries concerning the stage of incubation, or he may be led astray, the patient attributing the sore to an intercourse had only a few days before its appearance, when close questioning will elicit the fact that frequent exposures have occurred at close intervals. Should the sore become indurated, it will be certain proof that it was *not* acquired at the last exposure.

The stage of incubation is sometimes much longer than the average mentioned above. Fornier has reported a case in which 71 days elapsed; Aimé Martin one of 72 days, and Bumstead and Taylor a case in which 50 days elapsed. From these various observations and numerous confirmatory cases in practice the following rule may be established: *a venereal sore, appearing at an interval of ten days after a suspicious intercourse, is probably syphilitic in its nature.*

This stage of incubation is followed by the appearance of the syphilitic chancre, but it should be remembered that long before this makes its appearance, the system has been saturated with the virus, and that all local treatment of the chancre, with the hope of destroying the virulent material, is worse than useless.

Description of Syphilitic Chancre.—The syphilitic chancre assumes a variety of appearances; sometimes it is large, attracting

* See vol. ii. of this work.

attention by its very size; again, it is so trivial as to remain unnoticed, and this, coupled with an evanescent character which it sometimes assumes, has given origin to the theory that constitutional syphilis may be acquired without a preceding lesion, the so-called *syphilis d'emblée.* This idea is erroneous, for acquired syphilis is always preceded by a pathological change at the point of entrance of the virus. If the history of a given case differs from this in its mode of origin, it must be attributed to careless observation, and not to the absence of the chancre.

In the majority of cases, after the expiration of the stage of incubation, a faint, erythematous spot presents itself at the point where the virus gained its entrance; this spot rapidly develops into a small, flat papule which increases in size, involves more tissue, becomes hard, and after a little time its surface becomes scaly, the epidermis peeling off, or it may break down and real ulceration ensue. Several varieties of the syphilitic chancre have been described.

1. *The Elevated Desquamating Papule.*—In this, the rarest, form of the primary sore, the erythematous spot developed at the point of entrance of the virus is soon converted into a small, solid elevation or papule, not much larger than the head of a pin, hence easily overlooked. It is freely movable under the skin, which presents the reddish, raw-ham color so characteristic of all syphilitic manifestations. The surface of the papule, which has been flat and smooth, is noticed after a few days to present a few dry scales, desquamation having began. It remains in this condition from five to six weeks, and then gradually disappears, leaving a copper-colored stain which is often quite persistent. Otis believes that the papule may simply remain a dense neoplasm freely movable under the skin, without desquamation, a variety which he calls the indurated papule.

2. *The Superficial Hard Ulcer or Erosion.*—This is the most common variety, and is usually found in moist places, such as the inner surface of the prepuce or upon opposed mucous surfaces, as the labia and nymphæ. Its genesis is like that of the variety just described, commencing as an erythematous patch and rapidly changing to a papule, the surface of which becomes quite red and covered with thin scales; finally, erosion occurs, accompanied by a scanty, serous secretion. The induration developed by such sores is but slight, and frequently assumes the parchment-like variety. In some cases the discharges from the chancre dry and form crusts or scabs over the secreting surface, which will require removal before the lesion can be seen. This form of sore has no destructive tendency, and, hence, does not spread. Its edges are well defined. It usually continues for from six weeks to two months, and then gradually disappears, leaving a copper-colored cicatrix.

3. *The Indolent, Indurated Chancre.*—This variety of sore is devel-

oped from an erythematous patch, just as in the two other varieties. The papule forms, the epidermis scales, and the serous, scanty discharge is exhibited; but another step is taken by this form of chancre: the summit of the papule suffers ulceration. The ulcer is usually quite superficial, but if the attending induration deeply involves the tissues it may be deep, in which case the sides will be found to be sloping and the base covered with a grayish deposit. The Hunterian chancre is a form of this variety in which the induration is excessive and feels like a cut of gristle or cartilage imbedded in the tissues. The sides are sloping, the edges never undermined, which gives to the sore a funnel-shape not seen in any other form. The shape of the sore is usually round or oval, and the discharge like that mentioned above.

Under any of the above forms the syphilitic chancre may appear, and we should remember that such lesions are usually small, and present no indications to the eye which would lead one to recognize it as the parent of such long-lasting and destructive processes as follow in its train. It has been compared to a fortified citadel, stored with implements of destruction, and from which forays are made upon every part of the body. We must remember that the citadel looks as harmless as a dove-cot. The progress of the chancre is always slow, but if kept clear and free from irritation, it terminates by cicatrization after a duration of from three weeks to as many months, secondary symptoms often occurring while the chancre is still open. If the chancre is irritated, the pus produced will have a double power, producing first the chancroid, which in due time will be followed by the syphilitic chancre, the so-called *mixed chancre*, to which reference has been made in another place.

Number of Chancres.—The chancre is usually single, and this fact is of great value in diagnosis. The reason of this is that the virus of syphilis is never inoculable upon a person already suffering from its effects. Where more than one sore exists, and this not unfrequently occurs, it will be found that the several points were inoculated simultaneously, and hence all "took."

Seat of Lesion.—The chancre may occur upon any part of the body, but in the majority of cases it will be found situated upon the genital apparatus, and usually upon those parts which are brought into close contact during the act of copulation. Fournier has prepared the following table of the site of genital chancres in 445 men and 249 women under his care:

In Men.

Glans penis,	314
Preputial furrow,	60
Involving furrow and prepuce or furrow and glans penis,	11
Meatus urinarius,	32
Intra-urethral,	17
Scrotum,	7
Peno-scrotal angle,	4
Total,	445

In Women.

Labia majora,	114
Labia minora,	55
Fourchette,	38
Neck of uterus,	13
Clitoris and neighborhood,	10
Vulvo-vaginal orifice,	9
Meatus of urethra,	7
Superior commissure of vulva,	2
Vagina,	1
Total,	249

When situated within the urethra, they are sometimes found at a considerable distance from the meatus. Hyde has observed cases in the fossa, and Keys has discovered one situated one inch and a quarter beyond the meatus. When so situated, there is a liability to mistake the inflammation excited by the chancre for gonorrhœa, a serious error, as their treatment is so different.

The chief aids upon which we must rely in diagnosis are exhibited in the following table:

Chancre of the Urethra.	Gonorrhœa.
Discharge slight, gluey, perhaps bloody.	Discharge profuse, purulent, and rarely bloody.
Localized tenderness to pressure, and burning on urination.	Tenderness and burning on urination felt along entire canal.
An indurated spot in the canal, which is quite prominent.	The entire urethra feels rigid.
Inguinal glands indurated, painless and movable.	Inguinal glands usually unaffected; if affected, painful and immovable.
Course of chancre subacute.	Course of gonorrhœa acute.

Bumstead and Taylor call especial attention to a non-inflammatory thickening of the prepuce on either side of the frænum, which occurs so frequently when the chancre is deeply seated in the urethra as to be considered by them of real diagnostic value.

Owing to the contagious nature of the discharges of the secondary lesions of syphilis, it is not an uncommon thing to find chancres

developed in other parts of the body beside the genitalia. In 476 cases among men in the Hôpital du Midi, in 1856, the distribution was as follows:

On and about the genitals,	445
Anus,	6
Lips,	12
Tongue,	8
Nose,	1
Pituitary membrane,	1
Eyelids,	1
Fingers,	1
Leg,	1
Total,	476

In 131 women, observed by M. Carrier, of Lyons, the seat was found to be:

On and about the genitals,	89
Anus,	12
Buttocks,	1
Thighs,	1
Under lip,	6
Upper lip,	4
Labial commissures,	1
Nostrils,	2
Both breasts,	1
Right breast,	1
Left breast,	5
Region undetermined,	5
Total,	130

Obstetricians are especially liable to acquire chancre of the fingers, from examining unclean women. The wide distribution which the above tables exhibit, constitutes a valuable aid in diagnosis between syphilis and chancroid; the latter, it will be remembered, is confined almost entirely to the genital apparatus, and very rarely is seen about the mouth, head, or face.

The location of the chancre sometimes so modifies and alters its appearance that recognition becomes difficult, unless this peculiarity is kept in mind.

When developed about the anal region, they may be situated either at the verge of the anus or within the sphincter. In either case a hard, thick, brawny mass is seen, sometimes fissured, and in other cases ulcerated. The development of such chancres is slow and painless, thus affording a marked distinction between this lesion and ordinary anal fissures. Such sacs are also often attended by early developed mucous patches about the anus.

Chancres of the lips are quite common, and usually begin as slight painful fissures, which enlarge and become indurated. The large amount of induration developed in the sore, when thus situated, has become of diagnostic value; it often everts the lip, and prevents the patient from closing his mouth. The submaxillary glands, at an early day after the appearance of the sore, become enlarged and painful.

Chancres are often developed within the buccal cavity, rarely upon the tongue, though cases of this lesion so seated have been reported. The tonsils, pharynx, gums, internal surfaces of the cheeks, have been known as the seat of chancre, but none of these sites are of common occurrence.

In women we have all the varieties of the sore developing, nor is the induration, which we have so dwelt upon as of value in diagnosis, usually absent in this class of patients. It may take on the "parchment form," and be difficult to distinguish, but still, in the great majority of cases, if carefully looked for, it will be found.

Chancre of the uterus was formerly regarded as an extremely rare lesion, but, owing to the recent study of this class of cases by Fournier, Rasumow, and others, it is found to be not an uncommon site for chancre. Such ones are usually solitary, and are seated, generally, on the lower lip of the cervix or else within the canal. The sore begins as a bright-red erosion of the mucous membrane, gradually enlarges, and, in some instances, becomes somewhat elevated. The secretion is scanty, and the flow smooth and of a grayish or yellowish-red color. The degree of induration varies and is very difficult to make out by palpation; frequently the lymphatics are not enlarged, hence the diagnosis of this variety of the sore is sometimes extremely difficult. We must depend on the history of the case, the solitary sore and its chronic, painless character, to direct us to a proper conclusion.

Chancres of the mammary region are especially liable to occur to nurses engaged in nursing syphilitic children, from the development of mucous patches within the mouth of the infants. Usually, such sores, if situated on the breast, are easily diagnosed, but when seated upon the nipple or at its base, a correct conclusion becomes difficult. Owing to the slight and inoffensive appearance of such lesions they are often taken for fissures, due to nursing. But careful examination will detect the indurated base and the enlarged ganglia in the axillary region, a symptom never wanting in such cases.

Induration.—One of the marked symptoms of the syphilitic chancre is the development of a peculiar hardness in the tissues immediately around and beneath the sore. This appears a few days after the erythematous patch has developed into a papule, and is usually discovered during the first week; if absent for three weeks, it would form a very strong argument in favor of the non-syphilitic nature of the lesion. The degree of hardness depends somewhat upon the situation

of the chancre, being much more pronounced when the sore is located upon the skin, or upon the nipples, lips, behind the corona glandis, and near the frænum of the penis.

Three varieties are described: *First.* The nodular form of induration. This is easily recognized, and feels as though a nodule of cartilage had been buried beneath the sore. When largely developed, it seems to lift the chancre above the surrounding tissue, the *ulcus elevatum* of some authors; when less pronounced, it is spoken of as the "split-pea" variety, a name derived from the feel when compressed between the fingers.

Second. The parchment form of induration. This is especially observed when the sore is situated upon the mucous surface. When grasped, it feels as though a layer of parchment were underlying it, owing to the induration being developed in a thin superficial layer. It may escape notice unless considerable care be employed in making the examination. The parchment form is especially found in chancres developed in women, and also in sores situated upon the sheath of the penis. Sores on the sheath *are almost invariably syphilitic*, a fact of some value in diagnosis.

Third. The writing-paper form of induration. This is mentioned by some authors as a distinct variety, but is only a less developed form of the preceding.

Induration has been said not to occur in women, but this is a mistake, being as well marked in them as in men, except in chancres at the entrance to the vagina; here it is sometimes of the writing-paper variety and evanescent, but even under such circumstances careful examination will usually discover this invaluable symptom. Specific induration may be mistaken for the ordinary thickening of inflammation. The following table fully points out the diagnostic differences:

Inflammatory Thickening.		Specific Induration.
Not defined, shades into surrounding tissue.	Boundaries.	Clearly defined; terminates abruptly.
Adherent to tissues beneath.	Motion.	Freely movable on tissue beneath.
Soft, doughy.	Feel.	Firm, hard.
Soon passes away.	Duration.	Long-continued.

Duration of Hardness.—Puchè has recorded a case in which the induration persisted ten years after the appearance of the original sore; Clerc, an instance where it was entirely absorbed in twelve days. From this we can form an idea of the variable duration of the symptom. The parchment and writing-paper forms are the most evanescent. Sometimes the hardness disappears entirely, and then, after an interval of months or even years, reappears at the point of inoculation. It

usually continues for at least two months, and hence is a sign of value in determining cases which come under treatment after the secondary symptoms have developed.

Chancres usually are painless, and from the fact that they have no tendency to destroy tissue, the secretion is scanty and serous. Should inflammation invade the sore, either from want of care or other reason, it becomes exceedingly painful, and the discharge purulent and copious.

Phagedæna sometimes complicates the syphilitic chancre, just as we have seen it do the chancroid, but it is not nearly so destructive in these cases, its ravages being usually limited to the indurated tissue about the sore, though in some instances it oversteps these limits and plays havoc with the surrounding tissues. Sores in which phagedæna has developed are followed, generally, by violent and often unmanageable secondary symptoms.

Local Glandular Enlargement.—One of the most constant attendants of the syphilitic chancre is a peculiar enlargement of the lymphatic ganglia in anatomical relation with its seat. Usually about the time we observe the hardness of the base of the sore, but in some instances from a week to ten days after, the lymphatic glanglia *nearest* the point of induration will be found enlarged; soon other contiguous glands will exhibit the same condition. They attain the size of a hazelnut or a pigeon's egg, and are painless; the skin over them is unchanged in color or texture, and, if taken between the fingers, they will be found freely movable under the integument. This painless enlargement of the lymphatic glands is of the greatest value in diagnosis, both from its peculiarity and its constant occurrence. In all suspected cases of syphilis we should make it a rule to carefully examine the neighboring ganglia. Such enlarged glands rarely suppurate, and when they do, the resulting pus is not auto-inoculable. It may possess the germs of syphilis and be inoculable upon a healthy person, but the question has never been solved by experiment.

The following table, quoted by Bumstead from Fournier, shows at a glance the glands which are likely to be indurated when the chancre occupies any of the following positions:

Seat of Chancre.	Corresponding Bubo in the
Chancres of the genital organs, *i. e.*, of the penis, scrotum, labia majora and minora, the fourchette, the meatus urinarius, the urethra, the entrance of the vagina, etc.	Inguinal ganglia.
Peri-genital chancres (those of the perinæum, the genito-crural folds, the mons veneris, the thighs, the buttocks, etc.).	Inguinal ganglia.
Chancres of the anus and margin of anus.	Inguinal ganglia.

Seat of Chancre.	Corresponding Bubo in
Chancres of the lips and chin.	The submaxillary ganglia.
Chancres of the tongue.	The subhyoidian ganglia.
Chancres of the eyelids.	The pre-auricular ganglia.
Chancres of the fingers.	The epi-trochlear and axillary ganglia.
Chancres of the arm.	The axillary region.
Chancres of the breast.	The axillary ganglia and sometimes the sub-pectoral ganglia.
Chancres of the uterine neck.	Theoretically, the pelvic ganglia.
	Generally nothing is found in the groins.
	Exceptionally an inguinal bubo.

Duration of Enlargement.—The duration of the specific enlargement of glands is exceedingly variable; usually it continues from three to four months, though to have them remain six months, and even longer, is not unusual; finally they shrink slowly, and in from ten to twelve months attain their normal size.

Occasionally the lymphatic vessels themselves take on the condition of enlargement, when they appear like cords running along the dorsum of the penis toward the pubes. They are also painless and freely movable under the skin, which remains unaltered. Indurated ganglia require no special treatment; they have no tendency to suppurate unless the patient has been exposed to hardship or fatigue, is of a scrofulous diathesis, and, should suppuration occur, it is but the opening of a simple adenitis, the result of inflammation.

Duration of the Syphilitic Chancre.—The duration of syphilitic chancre is usually more brief than that of the chancroid, but often it remains until after the development of secondary manifestations. Having no tendency to destroy tissue, the sore is not usually followed by a cicatrix, but a peculiar discoloration of the skin at the site of the chancre is a constant as well as a persistent result. This stain is of a brownish-red color, sometimes described as coppery, again as resembling the flesh of ham; after the expiration of months it loses this color and becomes a snowy white. The induration of the base long continues, and may even at a very late date become the seat of phagedæna.

Diagnosis.—The prolonged stage of incubation, the indurated base, and the glandular enlargement are the three symptoms of greatest value in the diagnosis of the syphilitic chancre. The stage of incubation may, as we have already seen, be very short, thus losing its diagnostic value; the induration of the base may be of the writing-paper variety and evanescent, thus eluding the observation of both patient and physician, but the enlargement of the lymphatic ganglia is a constant symptom, and may be relied upon as pointing out the specific character of the sore.

In the following table* the diagnostic differences between the chancre and chancroid are fully set forth:

* From Bumstead's work.

The Chancre.	The Chancroid.
Origin (Confrontation).—Always due to contagion from the secretion of a chancre, syphilitic lesion, or from the blood of a person affected with syphilis.	*Origin* (Confrontation).—In practice generally due to contagion from a chancroid or chancroidal bubo.
Incubation.—Constant; not less than ten days, usually from two to three weeks duration.	*Incubation.*—None. The sore appears within a week after exposure.
Commencement.—Commences as a papule or tubercle, which afterwards, in most cases, becomes ulcerated.	*Commencement.*—Commences as a pustule or an open ulcer.
Number.—Generally single; multiple, if at all, from the first; rarely, if ever, by successive inoculation.	*Number.*—Often multiple, either from the first or by successive inoculation.
Depth.—Most frequently a superficial erosion, "scooped out," flat or elevated above the surface; rarely deep, and then cup- or funnel-shaped; sloping edges.	*Depth.*—Perforates the whole thickness of the skin or mucous membrane; "punched out" and excavated.
Edges.—Sloping, flat or rounded, adherent.	*Edges.*—Abrupt, sharply cut, eroded, undermined.
Floor.—Red, livid, or copper-colored, often iridescent. Sometimes covered by a false membrane, scaly exfoliation, or scabs.	*Floor.*—Whitish, grayish, pultaceous, "worm-eaten."
Secretion.—Scanty and serous, in the absence of complications.	*Secretion.*—Abundant and purulent.
Auto-inoculable with great difficulty.	Readily auto-inoculable.
Induration.—Firm, cartilaginous, circumscribed, movable upon neighboring tissue; generally persistent for weeks or months. Sometimes thin, like parchment or paper.	*Induration.*—No induration of base, sometimes engorged from inflammation, then not circumscribed, shades off into surrounding tissue; of short duration.
Sensibility.—So slightly painful as often to pass unnoticed.	*Sensibility.*—Painful.
Destructive Tendency.—Phagedæna rare and limited.	*Destructive Tendency.*—Phagedæna much more common and destructive.
Frequency in same subject.—One chancre usually affords complete protection against another.	*Frequency in same subject.*—May occur an indefinite number of times.
Glandular Affections.—The superficial glands on one or both sides enlarged, painless, movable; suppuration rare, pus never auto-inoculable. The lymphatic vessels often indurated.	*Glandular Affections.*—Glands rarely affected; when present, evidences of inflammation exhibited; suppuration frequent, pus often auto-inoculable. Lymphatics rarely involved, if at all inflamed.
Prognosis.—Always followed by constitutional disease; general symptoms occur in about six weeks after the appearance of sore.	*Prognosis.*—Purely a local affection, never followed by constitutional disease.

Sometimes it becomes difficult to distinguish between the primary lesion of syphilis and herpes progenitalis, but the absence of the stage of incubation, of the indurated base and the glandular enlargement will aid us in deciding the disease to be herpes. Again, the contour of the herpetic eruption, composed, as it is, of a number of segments of circles, is markedly different from the single oval sore of syphilis.

This "polycyclic" form, as Tournier calls it, results from the fusion of a number of independent circular lesions.

The local, burning, stinging pain of herpes contrasts markedly with the painlessness of chancre, and added to these differences we have a profuse discharge in herpes, and rapid improvement under careful treatment; exactly the reverse of what occurs in the syphilitic chancre.

Excoriations received during the sexual act are sometimes mistaken for chancres, but their development without a stage of incubation and their tendency to rapidly recover should save us from this error. But in all cases of excoriation following a suspicious intercourse, be exceedingly careful about a prognosis, for the germs of syphilis may have been implanted, to develop in due season into the primary lesion. In all such cases it is wisdom to keep the patient under surveillance and not give a decided prognosis until sufficient time has elapsed to make it positive.

Pathological Anatomy of the Syphilitic Chancre.—*Kaposi gives the following account of the microscopical appearances of sections of hard chancre:

"In the histological investigation of the hard chancre the point of greatest interest is the minute anatomy of the induration. In a perpendicular section the microscope shows a uniformly and thickly distributed deposit of cells in the papillæ and in the corium throughout its whole thickness down to the subadjacent cellular tissue. This cell infiltration is limited somewhat abruptly at the sides and below, and is surrounded by a coarse (œdematous) tissue of fibres, in which are found irregularly distributed cells containing a large nucleus that strongly refracts light."

"Under a higher power the cells are roundish, corresponding in size to granulation cells, with one or two nuclei and finely dotted protoplasm, and are deposited in a network of narrow meshes. The papillæ at the sides of the ulcer are preserved, but are thickened and infiltrated with cells. The rete between them, and especially over them, is much thinned. At several points on the surface of the ulcer will be seen remnants of the epidermis and the rete, lying on the infiltrated corium. At other points traces of the papillæ are seen with indications of the slings of vessels. Within the cell-infiltrated portion there are

* Bumstead and Taylor, p. 502.

but few vessels; the walls of these are notably thickened, and their calibre diminished in size."

Treatment.—In the treatment of the syphilitic chancre we are to remember that it is but the doorway through which the intruder has entered, and that it would be as wise to expect to expel an intruder from a house by burning down the front door, as to expect to rid our patient of syphilis by cauterizing a chancre. It is a useless, senseless, antiquated procedure, a remnant of the exploded pathological theory that the virus remains in the sore until the secondary symptoms develop. The constitution is already affected when the chancre appears. The exhaustive paper of Dr. Morrow* has settled the question, if it required settling, that cauterization of a chancre is worse than useless, is harmful.

Measures to insure cleanliness and to prevent irritation will be all the local treatment required. These are best insured by keeping the sore covered with a piece of dry lint. Many, in both our own school and in the allopathic, sprinkle some preparation of Mercury upon the sore or use the celebrated Black wash; we have been unable to detect any good result from this treatment, and hence cannot advise it. If *any* external application is to be used, we would prefer the Calendula lotion of the strength of one part of the drug to four of water.

In the old school Mercury is not given during this early stage of the disease, but is held in reserve until constitutional symptoms are developed. Massive doses of Mercury may so overpower the disease that the secondary manifestations will not appear for a long time; but when they do appear, and certainly they will, it will be with increased virulence; hence their reason for avoiding the mineral in the early stages of syphilis.

In our own school there exists no such fear, and hence right from the commencement of the chancre we begin the treatment of syphilis, and Mercury, in some of its many forms, seems to be universally considered by us our sheet anchor in this disease.

It is not our purpose at this time to enter into a detailed account of the homœopathic treatment of syphilis, but will reserve our remarks for a final chapter in which the general treatment of the disease will be discussed.

Secondary Syphilis.

Ricord divided syphilis into three stages, the primary, secondary, and tertiary. This division and nomenclature has been very generally adopted. The line of demarcation between the first and second stages is distinct and definite, but the secondary and tertiary stages

* Journal of Cutaneous and Venereal Diseases, Dec., 1882.

succeed each other without broad lines of difference. Hence, in practice it is difficult to say whether the late manifestations of the secondary stage are secondary or tertiary. As the syphilis grows older, distinctive marks are developed which separate conclusively these stages.

Period of Second Incubation.—We have seen that a few days after the appearance of the syphilitic chancre the lymphatic glands in anatomical relation with its site become hard and slightly enlarged, though painless and freely movable. It is supposed that this peculiar condition of the ganglia is due to the absorption of the virus by the lymphatics, after which it is borne by them to the nearest gland in whose parenchyma it is for a time deposited. This constitutes the primary lymphatic enlargement.

From forty-five to fifty days after the appearance of the sore a second series of phenomena occur, known as general glandular engorgement. The interval between the occurrence of the sore and the development of these symptoms is called the second stage of incubation.

Glandular engorgement differs from the local lymphatic enlargement which accompanies the syphilitic chancre, in being less hard to the touch, and in involving the ganglia in every part of the body. It is one of the most constant of all the earlier symptoms of syphilis, and from the long continuance of the engorgement becomes one of the most valuable symptoms of the disease.

The glands most frequently affected are those situated at the upper two-thirds of the posterior border of the sterno-cleido-mastoid muscles, at the back of the neck below the occiput, and posterior to the ear on the mastoid process. These are not all involved in each patient, but some of them will be found engorged in every case. The number is frequently but one or two, and rarely it exceeds eight. In health these bodies cannot be detected, but when diseased, they attain the size of a filbert and are visible to the eye.

Glands situated in other parts of the body are also affected. Sigmund, of Vienna, lays particular stress upon one just above the internal condyle of the humerus, but it is not so constantly engorged as those mentioned above.

This condition invariably terminates in resolution, differing in this from other glandular enlargements. They are painless and freely movable under the skin. If this symptom is markedly developed, it denotes a profound intoxication of the system, and will be followed by long continued syphilitic manifestations.

Syphilitic Fever.—Two varieties of syphilitic fever have been described. One is an eruptive fever preceding the skin-manifestations of the secondary stage; the other occurs without reference to the condition of the surface, and has been named *essential* by Fournier; it is prone to take on an intermittent type.

The eruptive syphilitic fever seldom occurs before the fifth day, and is usually preceded by a dull headache, prostration, pain in the back, and gastric disturbance. These symptoms are followed by a more or less violent chill and fever. The temperature rarely exceeds 101° F. but occasionally may reach 105°, especially just before the outbreak of the eruption. After this the fever rapidly subsides, and the patient's temperature becomes normal.

The essential syphilitic fever of Fournier is not premonitory of an exanthem, and three types of it have been described: the intermittent, the continuous, and the irregular.

The intermittent variety is the most common, and in its perfect form closely resembles ague. It usually assumes the quotidian type; violent shivering is extremely rare; the temperature increases toward, or during, the night; the stages are not fully developed, the chill and sweat being frequently absent; the spleen is not commonly enlarged, and finally, Quinine has but little power to arrest its course, while Mercury or the Iodide of Potassium at once checks its progress. The above *résumé* will aid in diagnosticating this form of fever from intermittents of malarial origin.

The continuous form, if accompanied by general asthenia, is exceedingly difficult to distinguish from typhoid. When attended by violent bone pains, a not uncommon symptom, and followed by an erythematous or papular eruption, it is sometimes mistaken for variola. But the history of the patient, as well as "the normal performance of the more important functions of the economy, in spite of the intensity of the morbid process, will aid us in diagnosis."* Frequently, for example, the appetite is preserved, the tongue retains its normal color, and the stools are regular. Gamberini has noticed the absence of thirst, and Vajda has observed that the urinary deposits do not at all indicate the degree of mal-assimilation which would be naturally looked for with an elevated temperature.

The irregular form of the fever can hardly be described other than that it partakes of the nature of both of the other two, one day presenting a marked intermittent type, and the next day exhibiting evidences of a continued form.

The essential fever is likely to be developed in persons who afterward suffer from visceral syphilis; it usually yields to treatment, but if long continued, it breaks down the already weakened constitution, and opens the way to general anæmia and exhaustion.

Treatment.—Aconite will be found of value in this condition, as in all other febrile manifestations, but we must depend upon Mercury in some of its forms to break up the condition. The Merc. iod.[2]

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* Van Harlingen on Syphilis, in Inter. Cyclop. of Surgery.

will be found most generally useful, and should be administered in half-grain doses at intervals of three hours.

The Condition of the Blood in Early Syphilis.—M. Grassi long ago, under the direction of Ricord, analyzed the blood of persons suffering from syphilis, and found a diminution of red blood-corpuscles to be constant. The average loss was about one-seventh of the normal number, though in one case he found fully one-half of the red corpuscles absent.

Wilbonchewitch has recently re-examined the subject, and confirms the observations of M. Grassi; he finds that not only the number of red corpuscles is diminished, but that the number of white corpuscles is also increased. This condition of the blood accounts for the cachexia which sometimes attends syphilis.

Syphilitic Cachexia.

During the course of syphilis a condition of general prostration is sometimes developed to which the above title has been applied. It may occur during either the primary, secondary, or tertiary stages.

In the primary stage it is most liable to accompany chancre in which phagedenic ulceration has developed. The condition is characterized by the appearance of symptoms of impaired nutrition; emaciation and loss of strength are generally complained of, the appetite is diminished, and the countenance presents a pale, sallow appearance. The pulse is rapid, weak, and small, and the temperature slightly increased. The mental condition of the patient is peculiar, he being dejected and apprehensive; headache and general neuralgic pains add to his sufferings and are apt to be worse at night.

Cachexia of the secondary stage may begin after the onset of the disease. It is chiefly seen in weak persons or in those who have neglected treatment or else have been but partially treated. The symptoms are very similar to those described above, only more mild. Tenderness of the liver and spleen have frequently been noted in such cases, also urine of low specific gravity, deficient in mineral ingredients.* The prognosis is good, as gradual restoration to health usually follows a proper course of treatment.

Cachexia of the tertiary stage. This is most apt to occur in persons who are addicted to drink or have lived in violation of hygienic rules. It is not so severe as the condition following the primary or secondary stages, but is often long-lasting and resists treatment. No definite order is followed in the development of its symptoms; we have emaciation, extreme debility, and a pale, earthen hue of the skin. This condition is often caused by the long course of the disease and by exhaustion occasioned by the destructive ulcerations which so fre-

* *Vide* Bumstead and Taylor.

quently accompany this stage of the disease. Visceral lesions are also often accompanied by this condition. The prognosis depends very largely upon the cause and the condition of the patient. If not too far gone, proper treatment may do much to restore health.

Fournier has described a condition, sometimes noticed among syphilitic women, in which the patient's skin takes on a pale, leaden color, slightly tinged with yellow. They are emaciated and weak, suffer from palpitations on the least exertion, and complain of *muscæ volitantes*, of vertigo, and excessive nervousness. The appetite may be impaired or the patient may have ravenous desire for food which she takes in large quantities. He has bestowed the name of chloro-anæmia upon this condition.

Asthenia.—Another class of cases has been noticed, by Fournier, among syphilitic women, totally distinct from the foregoing. The patients suffering from this form of exhaustion exhibit no sign of it in the countenance. They look healthy, but complain of extreme weakness, are low-spirited and indisposed to any kind of exertion. Even the gentlest exercise induces fainting. The pulse is weak, respiration slow, digestion deranged, and the nutrition imperfect. Nervous depression is indicated by dulness of hearing and sight, and inability to sustain prolonged mental effort. This condition is often combined with chloro-anæmia and, like the latter, varies greatly in severity and is amenable to proper treatment.

Treatment.—The treatment in all forms of anæmia is that of the stage in which it appears. We do not consider it a disease, but rather a complication of syphilis. It being due to impaired nutrition, a nourishing diet, combined with Cod-liver oil, is to be prescribed, and a residence at the seashore or in the country to be advised. Ferrum iodatum has been advised in our school for this affection, and also Iodine itself.

Yeldham has found the following remedies most appropriate: *Arsenicum, Acid. phosphoricum, Acid. nitricum, Carbo vegetabilis, China, Ferrum, Kali hydriodicum, Mercurius, Sulphur.*

Of these, the *Kali hydriodicum* and *Nitric acid* hold the foremost places. Mercury, in the form of the iodides, he thinks, is sometimes useful. Arsenicum, Ferrum, and the different preparations of Phosphorus are indicated in cases where the nervous centres and the vital powers generally are much exhausted.

Syphilides.

After the second stage of incubation has terminated, and general lymphatic engorgement has taken place, a series of ailments are developed upon the skin of the syphilitic to which the name of syphilides has been applied. They resemble many of the ordinary skin erup-

tions, hence the various forms have been named in accordance with existing nomenclatures.

Syphilitic skin eruptions have their cause in two distinct morbid processes, hyperæmia and cell-infiltration.

Hyperæmic or erythematous syphilides belong to the early stages of syphilis, and are rarely seen later than two years after infection. Hyperæmia is the essential cause of these eruptions, though sufficient cell-infiltration occurs, even in the early stages, to lift the smooth eruptions into small papules.

But it is in the later stages of the disease that cell-infiltration becomes the active cause of skin manifestations.

Many systems of nomenclature have been devised, but the following is the one most commonly adopted, and is founded upon the appearance of the skin in each case:

Erythematous	syphilides.
Papular	"
Vesicular	"
Pustular	"
Tubercular	"
Bullous	"
Ulcerative	"
Gummatous	"

The first four forms belong especially to the secondary, the remainder to the tertiary, stage; this rule, however, is not absolute, for the secondary manifestations may occur during the tertiary stage, but those of the tertiary are never seen during the secondary period.

The skin affections of syphilis present certain well-marked peculiarities, readily distinguishing them from other skin diseases which they resemble, and are of great value in determining the character and age of the various manifestations.

Symmetry and Asymmetry.—The distribution of syphilitic eruptions over the body is characteristic, and varies with the age of the lesions. *The early secondary manifestations* are developed symmetrically and generally, and involve only the superficial layers of the skin; *the later lesions* of this stage, though less copious and more localized, are still symmetrical and general.

In the tertiary stage the deeper layers of the skin become involved, and the eruptions, though more profound, are not nearly so profuse, and manifest a strong tendency to localize about certain regions, thus losing the symmetrical distribution described above.

The Color of the Eruptions.—The color of the eruptions is of value in diagnosis, and is of pinkish-red hue, much more subdued than that of the exanthemata. This hue soon fades to a brownish color, which

takes on a decided coppery tint as the eruption fades. Pressure dissipates the color during the early stage, but after pigmentation has taken place it becomes permanent. This yellow-brown stain, which is sometimes described as the hue of copper, or that of the "lean of hair," is quite characteristic of syphilitic eruptions, though not absolutely peculiar to them, and is caused by a deposit of the coloring matter of the blood at the seat of lesion. In vascular or dependent situations, such as the face or lower limbs, a purplish tint is sometimes seen; where the circulation is feeble the color may be a light yellow; and if the hyperæmia has been of short duration and slight, no pigmentation may occur.

Locality.—The localities of the body upon which the syphilides develop are different from those selected by the non-venereal eruptions. Their favorite seats are the margins of the scalp, the forehead, the angles of the mouth, the wings of the nose, the anus, the genitals, the umbilicus, the soles of the feet, and the palms of the hands. The outer aspects of the extremities often escape, and the backs of the hands and feet are rarely attacked.

The form and arrangement of the eruptions exhibits another peculiarity of the syphilides. The early manifestations are distributed over the surface without definite order, but in the latter stages they take on a regular annular form which is quite distinctive. Sometimes, by coalescence, this wing-like form is destroyed, but there will remain the segments of the broken circles. This peculiarity is well developed in lesions of the mucous membrane, beautiful instances of it being seen on the tongue, hard palate, and glans penis.

Polymorphism is a peculiarity seldom absent from syphilitic eruptions. By this we mean the simultaneous occurrence of several varieties of lesions. It is due to three causes,—the chronic course of syphilitic eruptions, their relapsing tendency, and a singular proclivity which they have of one lesion being transformed into another. Polymorphism is most frequently seen during the early part of the secondary stage, when eruptions come and go with wonderful rapidity.

Absence of Irritation.—Owing to the chronic nature of the syphilides, and the absence of all inflammatory features, they usually cause no irritation, and hence may exist without the patient's knowledge. Hence, the absence of itching from a skin eruption is diagnostic of its syphilitic origin. Pain is even a rarer symptom than itching.

Scales and Crusts.—Another distinctive feature of the syphilides is found in the scales and crusts which cover them. The scales are smaller, thinner, less numerous, and less glistening than those of the simple eruptions. These peculiarities are due to the low grade of inflammation which attends these chronic skin affections. The crusts which crown the later lesions are also peculiar. Those seated upon small pustules soon dry, and are found resting *upon* a hard base.

In impetigo and eczema, which might be confounded with lesions of this character, the crusts seem to rest *in* depressions of the inflamed skin. The crusts upon larger pustules have a dark-brown or greenish-black color, and a rough, uneven, imbricated surface, looking not unlike small oyster-shells.

Ulcers and Scars.—The ulcers of syphilis are usually round or oval in shape, and are likely to be situated in the vicinity of joints. The cicatrices which they leave are also peculiar, being smooth, oval, and frequently perforated with minute holes, the sites of former follicles. After the coppery-red color, which attends the scars of all syphilitic lesions, has faded, they become of a white, silvery color, surrounded by a ring of brownish pigment, which is often persistent.

The early eruptions of syphilis are contagious; the discharges from them, if brought in contact with an abrasion upon a healthy person, will cause a chancre, which, in due course of time, will produce lymphatic induration and general constitutional symptoms. This is a fact which should never be forgotten, and should be impressed upon the minds of persons suffering from such diseases. The later lesions lose this contagious character, and are as harmless as the simple skin diseases of non-venereal origin.

For the descriptions of the following syphilides we are indebted to the works of Lancereaux, Bumstead, Baumler, Van Buren and Keyes, Hill and Cooper, Otis, Jahr, Yeldham, beside numerous smaller works and journals.

Erythematous Syphilide.

Synonyms.—Syphilitic roseola, Macular syphilide, Exanthematous syphilide, etc.

Description.—The erythematous syphilide is the earliest of the skin manifestations of syphilis, not unfrequently occurring during the existence of the chancre. It is usually preceded by syphilitic fever, but in many cases the febrile symptoms are so slight that the patient fails to notice them. The eruption is sometimes sudden, the whole body being covered with the rash in twenty-four hours, but in the majority of cases a week or ten days elapse before the development is complete. Owing to the absence of irritation, the patient may fail to detect the rash, and in mild cases, where the skin is but slightly reddened, the physician will need the aid of oblique illumination to discover its presence. Exposure to cold will also be of service in exhibiting the rash.

Eruption usually takes place from six to twelve weeks after the appearance of the chancre, in the form of numerous smooth, rose-colored spots, round or oval in shape, and with an average diameter of one-third of an inch. They first appear about the umbilicus, soon extending to the thorax, and in severe outbreaks they are scattered

abundantly over the entire body. In milder cases the eruption is most copious upon the sides of the trunk and the inner surfaces of the extremities. Occasionally it is developed upon the forehead, at the roots of the hair, forming the so-called "Corona Veneris." It also, in rare instances, invades the palms of the hands and the soles of the feet, and is then apt to be covered with fine but not numerous scales.

The rose-colored rash quickly fades to a coppery hue, and this, after slight desquamation, disappears, and leaves no trace of its existence.

The duration of erythematous syphilide is from three to six weeks, but is shortened by appropriate treatment. During the first year it is liable to reappear, and, when so relapsing, takes on the annular form of the later skin manifestations.

Erythema is due to simple capillary states; in chronic cases cell-proliferation may occur, when the smooth rash will be lifted up in the form of small papules. Owing to this fact, some writers divide erythemas into two varieties, Erythema maculatum and Erythema papulatum. This tendency to develop papules is quite marked in the later stages of the disease, forming a connecting link between erythematous and papular syphilide.

Owing to the early appearance of this affection, it is often associated with other lesions, such as the fully developed chancre, indurated ganglia, and mucous patches of the fauces.

Where two surfaces of the integument are in contact, we have large inflamed patches, sometimes mistaken for intertrigo. About the genitals and anus, from the heat and moisture there found, the erythematous patches may hypertrophy and later cause condylomata.

Alopecia and affections of the nails sometimes occur at this period, while slight periostitis and, in bad cases, osseous affections may be present. Nightly bone-pains usually add to the sufferings of the patient.

Diagnosis.—To determine the syphilitic character of an erythema we are to bear in mind the peculiar features which are common to all venereal skin affections. These, taken with the history of the case and the condition of the lymphatic ganglia, ought in every instance to clearly point out the nature of the normal lesion. Erythematous syphilide is especially liable to be mistaken for measles or scarlet fever, but the mode of invasion and the circumscribed character of the rash will distinguish between them; moreover, the catarrhal symptoms and suffusion of the eyes in measles, and the high temperature and the gastric and throat symptoms of scarlatina, will aid in the diagnosis.

The prognosis in erythema is good, but we are to remember its tendency to relapse.

Treatment.—The constitutional treatment of erythema consists in the use of *Mercurius sol.*, or some other preparation of mercury, in

the lower triturations. Locally the eruption will require but little attention. If the spots are deep-colored and disfigure the patient, a five per cent. oleate of mercury, well rubbed in twice a day, will speedily remove them. If a deep copper-colored stain remains after this or any of the other syphilides, the following lotion, recommended by Bumstead, may be used:

℞. Mercurius corr., ... gr. iv.
Ammonii chloridi, ... gr. x.
Aq. Colog., ... ℥ss.
Aquæ, ... ℥iv.—M.

This should be freely sponged over the discolored portions of the skin, and in obstinate cases rags moistened with the lotion may be applied.

The Papular Syphilides.

The papular syphilides may constitute the first symptom of the secondary stage, or it may be combined with erythematous syphilide, but usually follows the last-named skin affection.

It is caused by circumscribed cell infiltration, and involves the superficial layers of the skin. Two varieties of the lesion are recognized, the miliary and the lenticular.

The Miliary Papular Syphilide.

The miliary papular syphilide occurs in two forms, one composed of small, the other of large, papules.

The small Miliary Papular Syphilide commonly appears from two to six months after the occurrence of the chancre. Its eruption is announced by a return of the osteocopic pains which have subsided after the disappearance of the erythema. Suddenly over the entire body, legs, face, and scalp, an eruption of small, pointed elevations, varying in size from a pin's head to a millet-seed, breaks forth. They are closely packed together, and of a deep pinkish-red color. They are especially copious on the forehead, about the nose and chin, on the back of the neck, on the outer surfaces of the extremities, and upon the scapulæ and gluteal regions. In these localities the groups of papules are arranged in circles with a diameter of about half an inch. Where these groups fuse together, the circular form is lost, and the rash is seen in patches with borders composed of segments of the broken rings.

About the scrotum and penis they are likely to be transformed into condylomata.

The eruption generally begins upon the face and neck, and is fully developed at the end of two weeks. As the papule reaches maturity, the cuticle separates in the form of small dry scales, forming a white "collarette" round the shining, red papule. The eruption fades in

from twenty to twenty-five days after its appearance, but if left untreated may be quite persistent. In subsiding, the papules lose their red color and become brown, and finally disappear, leaving a copper-colored stain which may continue for months. This syphilide should be treated energetically, for if allowed to remain long, it becomes extremely obstinate and leaves a permanent alteration of the skin in the shape of scars similar to those which follow small-pox.

The diagnosis will usually be easy if proper attention is paid to the history of the case and search is made for other syphilitic manifestations, such as mucous patches, alopecia and glandular enlargements, which not unfrequently accompany this lesion.

The large Miliary Syphilide rarely occurs alone, nor is it an early lesion, but generally appears at times of relapse, and mingled with some of the other forms of papule. Its eruption is slow, attains the size of a pea, and is elevated to the height of a line above the surface. It rarely occurs in large numbers, is found most profusely on the back and buttocks, and is prone to ulcerate and form pus. In the beginning it is of a bright-red color, which soon fades into the copper-color common to all the syphilides. It is peculiar in not assuming the annular form and in not leaving atrophic scars like the small miliary syphilide.

The small miliary syphilide is prone to relapse.

The Lenticular Papular Syphilide.

The lenticular papular syphilide appears also in two varieties, the small and large. The former frequently occurs in the form of general eruption; the latter is apt to be local and limited in number.

The Small, Flat, Papular Syphilide.

The small, flat papule may precede syphilitic erythema, and thus become the first evidence of constitutional syphilis. This it does in about 12 per cent. of all cases. When so developed, the rash is quite copious, covering the body from head to foot. The invasion is usually slow, requiring from a week to ten days to complete the irruption. The use of alcoholic drinks, hot baths, or over-exertion, may provoke a sudden outbreak.

It appears at first as a rash, composed of minute red papules, which rapidly increase until they measure from one-eighth to one-fourth of an inch in diameter, and are elevated from one-third to one-half a line above the surface. In shape they are round or oval, and distinctly flat; their edges are well marked, but the rash does not give that rough feel to the skin which is noticeable in the miliary form of papule. In early eruptions the rash is copious, and shows no tendency to fuse, but it exhibits a tendency to form groups, and these to take on the

annular form. Relapses frequently take place, and may be expected any time within two years of infection.

Small, flat papules appear first upon the shoulders, back of the neck, and sides of the thorax; they spread from these localities, and become quite copious over the abdomen and on the inner and flexor surfaces of the limbs, but are rarely seen below the knees. They are very common upon the forehead at the margins of the hair, about the corners of the mouth, and at the angles of the nose. Scaling is very likely to occur, and this may cause the disease to be mistaken for psoriasis; but the scales are smaller, less numerous, more adherent, and have not that silvery-white color so characteristic of the non-venereal lesion. It frequently is seen on the palms and soles.

Papules disappear by absorption; they gradually flatten, lose their color, and are followed by a copper-colored stain which is quite persistent. As a rule they do not leave a cicatrix, as do the miliary papules.

Relapses frequently occur, and may be expected any time during the first two years after infection. In relapses the eruption exhibits a tendency to develop about the knees and elbows and take on an annular form. It may or may not be profuse, and, owing to its chronicity, may show every stage of development of the papule in a single case. Owing to this tendency to relapse, the small, flat papule may coexist with any of the manifestations of the secondary stage. Iritis occurs more frequently with this than with any other form of papule.

Diagnosis.—The diagnosis is usually easy, the only diseases resembling it being psoriasis; and from this it is readily separated, both by the history of the case and by peculiarities mentioned above.

The Large, Flat, Papular Syphilide.

The large, flat, papular syphilide belongs usually to the middle and late periods of the secondary stage, being often met with as late as the second or third year after infection. It may, however, occasionally be the first eruption, in which case it resembles the small, flat papule in its mode of appearance, and has no tendency to arrange itself in circles. Again, it may develop during the existence of the erythematous syphilide, and be found scattered through that rash. As a general rule, the earlier it occurs, the more copious it will be. If it follows erythema, it may be profuse, while at a later stage not more than fifty or a hundred papules will be developed, and these will be scattered irregularly over the body.

It appears first as small, red spots, which increase rapidly, and attain a size of from three-eighths to one-half an inch. They are elevated above the surface, the tops flattened, the general outline well marked, and round or oval in shape. The surface of the papules is often slightly scaly. In first outbreaks of this syphilide it occurs on the face, neck,

shoulders, inguinal and gluteal regions, and about joints, and is especially liable to affect the palms of the hands and the soles of the feet. It runs an extremely chronic course, and is never attended with either itching or pain.

Situated upon surfaces which are in coaptation or moist, as between the toes, on the perinæum, or at the navel, they lose their dermal covering and become converted into condylomata.

Under proper treatment the papules are slowly absorbed, leaving behind a deeply pigmented spot, of a copper-brown color, which is quite persistent. They never ulcerate except in depressed conditions of the general health.

This syphilide, like the preceding forms of the papule, is liable to frequently relapse. When so occurring, the eruption is not usually profuse, but always assumes the annular form, and is located upon the palms and soles, the face, the abdomen, and on the limbs in the vicinity of joints. If the relapse takes place as late as the second year, the crop is still more limited, a few papules appearing on the arms or palms, followed by a few on the abdomen, thighs, and forehead. Such late papules attain large size, frequently measuring an inch in diameter.

Prognosis.—The early appearance of this syphilide indicates a severe form of syphilis; hence the prognosis is unfavorable. The eruption will disappear under treatment, but the patient is suffering from an aggravated and persistent form of the disease.

Diagnosis.—The diagnosis is usually easy; the history of the case, the chronic nature of the ailment, the absence of itching and pain, the color of the scales and scars, together with the accompanying diseases, readily separate it from psoriasis, the only dermal lesion which it at all resembles.

This syphilide is accompanied by numerous other syphilitic affections, such as pustular eruptions, iritis, alopecia, onychia, perionychia, condylomata, and often by cachexia.

Treatment.—Mercury, in some of its forms, will be required in the papular syphilides; locally but little treatment will be needed. If large papules develop upon the face, it is desirable to remove them as speedily as possible; this is best accomplished by the use of the Oleate of mercury, in a five per cent. preparation, well rubbed in.

Scaling Papular Syphilide of the Palms and Soles.

The papular syphilides have a special tendency to develop in the palms of the hands and soles of the feet. When so appearing, owing to the thickness of the epidermis in these localities, they lose their distinctive features and are converted into circular or oval scaling patches, to which the name syphilitic psoriasis is sometimes, incorrectly, applied. This form of the syphilides may be an early lesion,

but usually it appears at a late stage of the disease and during the decline of the flat papules.

The scaling syphilide appears first in the form of circular, red papules, which are distinctly circumscribed, and vary in size from a hempseed to that of a twenty-five-cent piece. Sometimes they coalesce into irregular patches and attain a larger size. The epidermis covering the papules finally loosens and peels off, either in large pieces or in small scales. In the furrows of the hand these patches take on an oblong shape, and fissures may form, extending into the papillary body which becomes covered with crusts.

The edges of these lesions, whatever be their shape, show the coppery hue of all the syphilodermata and distinct signs of cell-infiltration, lifting them up like a wall about the scaling patch.

The lesion is exceedingly chronic, often lasting for years; it is never attended with itching, and pain only occurs when fissures are produced.

Beside the scaling and fissures, palmar syphilides produce an uncomfortable stiffness of the hands and a thickening and brittleness of the nails. In some cases the scaling patches involve the entire palms and soles, and even spread beyond them, but never to the backs of either hands or feet. The lesion is usually symmetrical in the early stages of syphilis, but later it loses this character.

Another form of the scaling syphilide is the *syphilide cornée* of the French. Here the lesions appear as small, hard, colorless indurations, which are painless and can be dug out of the palms or soles like "corns," and are composed of masses of epidermal cells.

Diagnosis.—The diagnosis of the scaling-papular syphilide is usually easy. It may be confounded with eczema, with psoriasis, and with callosities on the palms and soles. The history of the case, the absence of itching, and the peculiar copper-colored ring which encircles this syphilide, should aid us to a correct conclusion.

Treatment.—The scaling-papular syphilides of the palms and soles require the ordinary constitutional treatment, but in consequence of the thickness of the integument, special local treatment is needed in many cases. During the early stage, Bumstead and Taylor advise a salve composed of equal parts of a strong mercurial ointment and cosmoline, to be well rubbed in night and morning. The rubbing is to be confined to the diseased spots, and must not be continued too long or too violently. The skin should never be denuded of its covering by the friction, nor should great inflammatory action be excited. At a later stage the mercury should be combined with tar ointment, and the patient should bathe the parts in hot alkaline water, made by adding bicarbonate of soda in the proportion of from one to two ounces to the pint of water. The same author speaks highly of the following ointment.

℞. Hydrarg. oxid. rubri, ... gr. x.
Olei rusci, ... ʒss.
Ung. simplicis, ... ʒj.—M.

India-rubber gloves will soften the skin and may be worn at night.

The Vesicular Syphilide.

Vesicles are rarely encountered in syphilis, though most authors describe a lesion of this kind. They do occasionally occur, but are finally transformed into papules. When this lesion develops, it is found in localities where the skin is thin, as upon the face and genitalia. The vesicles are quite small, and are produced in small, irregular groups; they burst, and their contents dry in the form of a thin crust. This syphilide, if it appears at all, will be seen during the first year. It is not important, and is not often seen.

The Pustular Syphilides.

The pustular syphilides are much less common than either the erythematous or papular varieties. They vary in severity from a mild eruption to one accompanied by symptoms of the gravest character.

The pustules are of all sizes, from that of a pin's head to that of a finger-nail, and may be either flat, globular, or pointed. They are round or oval in shape, and are usually mounted upon a hardened base. The pustules begin as papules, suppuration attacking their apices; they vary greatly in number, in some cases the entire body being covered with them; in other instances only a few are developed. They seem to prefer localities which are profusely studded with sebaceous follicles and hair-bulbs, while certain forms of the eruption are prone to develop in particular regions.

The crusts, which are formed from the puriform contents of the lesions, are especially characteristic, those of small size having a yellow-brown color, the larger being of a greenish-black hue. Beneath recent crusts ulcers will always be found with abrupt, sharply-defined edges, and presenting a "punched-out" appearance.

This syphilide, be it profuse or scanty, will be symmetrically developed.

The early forms being papulo-pustular, and hence not destructive, will rarely cause cicatrices, but leave deeply-pigmented spots at the site of their development. In the later varieties they are followed by cicatrices which, after the pigmentation is absorbed, become shining white.

The pustular syphilide assumes several forms, and has been divided into:

Acne-form; Variola-form; Impetigo-form; Ecthyma-form; Pustular syphilide.

Acne-form Syphilide.

The acne-form syphilide may occur at the beginning of the secondary stage as a general eruption, under which circumstance it will be attended with a very high grade of fever. Usually it appears from the third to the sixth month of the secondary stage, as a rather copious rash of conical or slightly-rounded pustules seated upon a bright-red, hardened base. The eruption begins upon the face, scalp, and back of the neck, and from these points invades the trunk and extremities.

The course of these pustules is usually indolent; each one, after lasting two or three weeks, bursts, and its contents dry into thin, greenish crusts which adhere for a week or two, and then fall, leaving a small brown spot which disappears in a few months.

The prognosis of this syphilide is not so good as in the earlier forms, the eruption being troublesome, and the general health is often greatly impaired.

Variola-form Syphilide.

This is much less common than the acne-form, and, when seen, is rarely developed earlier than the third month of the secondary stage.

It begins upon the face as an eruption of bright red spots, which are rapidly transformed into round, superficial pustules, with deep-red areolæ about their bases. When fully developed, they flatten slightly and, in some instances, become umbilicated. The coverings of the pustules break, and their contents dry and form greenish-brown crusts, which cling closely to the slightly ulcerated tops of the pustules. This syphilide has no tendency to a follicular origin, but seems to prefer those surfaces which, like the face, are covered with soft delicate skin. The crusts fall off, and leave behind pigmented spots.

The variola-form syphilide is sometimes mistaken for small-pox, but the symptoms are so much more acute in that disease that error seems almost impossible.

The Impetigo-form Syphilide.

This form of pustule very rarely, if ever, occurs as an early exanthem; its usual time of appearance is at the middle or latter part of the first year of syphilis. It is uncommon, and is most often seen upon patients who have neglected treatment, or who are debilitated from organic diseases. It appears first in the form of circumscribed red spots, which are rapidly elevated into small oval pustules. Occasionally the pustules attain considerable size, and lose the oval form, those situated upon the face, margins of the scalp, in the scalp itself, about the wings of the nose, the commissures of the lips, and upon the chin, attaining sometimes a diameter of two inches.

They are not usually profuse, but are, in some instances, quite de-

structive. They are surmounted by crusts of dark-brown color, and have a livid red areola about them.

In some untreated, broken-down cases this syphilide takes a serpiginous course, and becomes very destructive. Beneath the greenish-black crusts of such lesions will be found a sharply cut ulcer, with a red, uneven surface. The course of this eruption is usually very chronic, but they finally heal, leaving deep cicatrices and the often-mentioned copper-hued stain of syphilis.

This eruption may be mistaken for impetigo, but the color of the crusts, the slow course of the disease, the absence of pain and itching, together with the history of the case, make the diagnosis clear.

The Ecthyma-form Syphilide.

There are two varieties of this syphilide, superficial and deep. The superficial may occur at any time during the first year of syphilis; its lesions are numerous, and are usually seated upon the back, shoulders, and extremities, though they may develop elsewhere. They begin as slight red elevations of the skin, which soon become small conical pustules, upon which crusts form.

The crusts are of a greenish-yellow color, which, from the admixture of dirt, finally take on a dark olive tint. The pustules increase in size by ulceration, and the crusts become flattened, or even depressed at their centres.

The bright-red color of the base upon which the pustules are seated turns to a dull brown as the disease progresses, and is surrounded by an areola. If the crust is removed, an ulceration will be found, involving the superficial layers of the skin; it is bathed in a thick, yellow pus, and its floor is smooth and of a grayish-red color. They may, or may not, leave cicatrices.

The *deep* variety of this syphilide is usually a late lesion, and begins as an oval papulo-tubercle, the summit of which is soon crowned with a thick, yellow pus, which, becoming thicker, dries into thick crusts of a yellow-brown color, the dark color of the crust being due to the admixture of blood. The syphilide, when mature, attains the size of from one-fourth to one-half an inch, and covered, as the papules are, with crusts, presents quite a characteristic appearance. The eruption is usually quite slow, the pustules appearing in successive crops of from one to a dozen, at intervals of two or three weeks. It is usually attended by evidences of cachexia and a remittent form of syphilitic fever. The ulcers beneath the crust have sharply cut edges, with floors of a grayish-red color, and secrete the thick pus referred to above. The pustules are seated on extensive hardened bases, of a dull-red color, and about them is developed an areola of the same color. This syphilide selects, as its locality, the outer aspect of the front part of the legs and arms. If untreated, the ulcerations become quite destruc-

tive; but under treatment the ulcers become healthy and heal by granulation, leaving a coppery-colored scar, which, after the absorption of its pigment, becomes a white cicatrix, with a copper-hued areola.

Prognosis.—The prognosis in these two syphilides is uncertain, both the deep and the superficial ecthyma being dependent upon a depraved condition of the general health. Usually, however, proper treatment, care, and nourishing diet will restore the patient to health.

Diagnosis. — Ecthyma-form syphilide might be mistaken for simple ecthyma, but the absence of itching, the variable sizes of the lesion, the darker color of the crusts, taken with the history of the case, will save us from such a mistake.

Rupia.

To a late form of ecthyma-form syphilide the term Rupia has been applied. It is very similar to the deep variety described above, its peculiarity consisting in the development of large, dirty, brownish-green or black, stratified crusts, resting upon a flat, ulcerated surface.

The conical shape and laminated structure of this crust are produced in the following way: The scab covering the ulcer, at first, is not larger than a gold dollar, but the ulcerative process is active and confined to the edges of the ulcer; hence it advances slowly beyond the edge of the first crust; the thick pus secreted rapidly drys and forms a second layer of the crust beneath the first one, and also a little larger. Thus several distinct but adherent laminations are formed as the ulcer increases in size, each succeeding one being larger than its predecessor. This may continue until crusts of from half an inch to two inches in diameter are produced. The course, localities involved, number of pustules, and results of ulceration are all very similar to those described under the head of deep ecthymaform syphilide, and need not be repeated.

Rupia is the most dangerous of all the pustular syphilides, and requires careful treatment, or a fatal result may occur. Its diagnosis is easy, as no other lesion of the skin resembles it. Rupia is sometimes classified as a bullous syphilide, but it is really a pustular lesion.

Treatment.—The milder forms of the pustular syphilide will need but little local treatment; in the graver forms, attended by deep ulcerations and crusts, more attention will have to be given to the lesions. If ulcers are formed by the breaking of papules or pustules, they should be carefully cleansed at least twice a day and dusted over with iodoform. In rupia the scabs may require softening before they can be removed; this is accomplished by the use of oil and warm poultices of flaxseed meal; after the crusts are removed, the ulcers should be treated as described above. The constitutional treatment will be given at the end of the chapter.

The Tubercular Syphilides.

In the tubercular syphilitic dermal lesions the entire thickness of the skin is involved; hence they are usually classed as belonging to the tertiary stage of the disease. In the syphilides previously described the pathological process extended to only a portion of the layers. The tubercular forms are late affections, and indicate a well-marked syphilitic dyscrasia; they are rarely seen before the second year, and have occurred as late as the tenth, fifteenth, and in one case, reported by Bassereau, as late as forty years after infection. Two varieties are noted, the ulcerative and non-ulcerative.

Non-ulcerative Tubercular Syphilide.—This variety of the syphilides begins as red spots, which are soon elevated by cellular infiltration into tubercles of from half an inch to an inch in diameter. Sometimes they are as small as split peas, at other times exceed even an inch in diameter. They are round, and are at first of a deep-red or purple-brown color. They first appear on the forehead or back of the neck, and then spread to all portions of the body. They are especially prone to develop upon the forehead and face, and about the alæ of the nose. In the latter locality it sometimes assumes a special aspect. Small tubercles develop along the furrow formed at the junction of the alæ and cheek. After a time they coalesce, and then break down by ulceration; the sore thus produced is covered by a yellow scale or scab. The eruption is seldom widely spread, but confined to one or two groups of tubercles. Its course is extremely slow, and ulceration is a rare occurrence. The first lesions are gradually absorbed, and are followed by crops of new ones, thus keeping up the condition for many months, if not properly treated. Whether removed by absorption or ulceration, this syphilide is always followed by a permanent, white, depressed scar.

Diagnosis.—The diagnosis is easy; the seat, the copper-red hue, the slow course, and the presence or history of other syphilitic affections, readily distinguish its nature.

Ulcerative Tubercular Syphilide.—This is a variety of tubercular syphilide which is always attended with serpiginous ulceration, and is sometimes called syphilitic lupus. It may appear on any part of the body, but is most often seen around the angle of the nose, on the chin, or forehead. The syphilide begins by the development of a series of small tubercles which finally coalesce. When the group attains the area of a quarter of a dollar, degeneration begins in the older tubercles; they quickly ulcerate, and the secretion covers the ulcerated surface with a yellowish or brownish colored scab.

If this crust be removed, a creeping ulcer will be found beneath, healing perhaps at one portion, but spreading at some other part. The ulcer is not deep, nor is its secretion profuse, but it continues to spread,

preceded by groups of tubercles, and is often extremely destructive, involving large areas in its course. The scar left by the ulcer is permanent, of a shining white color, and somewhat depressed below the surface of the healthy skin.

Diagnosis.—From common lupus this syphilide may be diagnosed by its history, but if this fails it may be impossible to distinguish between them. Mr. Hutchinson has called attention to the peculiar semi-transparent infiltrations of the skin contiguous to the ulcerating part, as a valuable aid in distinguishing non-syphilitic from syphilitic lupus.

A vegetating form of the tubercle occurs occasionally, when wart-like excrescences spring up from the surfaces of ulcerating tubercles, accompanied by a yellowish, puriform, badly-smelling secretion. Older writers described this condition in an aggravated form under the name of "framboesia."

Treatment.—The tubercular syphilides of both forms yield usually to treatment, and hence require but little local attention. But if they develop upon the face, the patient is anxious that they shall disappear as rapidly as possible; for such cases inunctions with the oleate of mercury will be of value. In the ulcerative form dustings with iodoform should be practiced.

The Gummous Syphilide.

The gummous syphilide is a late lesion and belongs solely to the tertiary stage; it may occur at any time from the third to the fifteenth year after infection. It consists of a tubercular infiltration, deposited in the subcutaneous connective tissue. From one to six small tumors are usually discovered, deeply seated beneath the skin. They are freely movable, and to the touch seem moderately firm. When first noticed they are about the size of peas; they increase very slowly and frequently attain a diameter of an inch. They cause no pain and are often undetected until by their growth they have invaded the skin, which then takes on a copper-red color and becomes stiffened by hyperæmia and slight cell infiltration.

The skin eventually ulcerates from pressure, and the contents of the tumor escape, as a yellowish, gelatinous-looking fluid, leaving what is then called a gummous ulcer. These tumors are commonly developed on the limbs, perhaps most frequently near the knees and elbows, but they may occur on any part of the body which is well supplied with loose cellular tissue.

The gummous ulcer which remains after the discharge of the contents of the tumor is one of the most dreaded of syphilitic lesions. They are usually round or oval in shape, but their size and depth will depend largely on the size of the tumor preceding them. They present the "punched-out" look which is so characteristic of all the

venereal ulcers; the floor has an unhealthy look, and is coated with a scanty, sanious pus; the edges are thickened, infiltrated, and of a purplish-red color. Gummous tumors are often absorbed under proper treatment, without ulceration.

If ulceration occurs over superficial bones, such as the shin or the frontal bone, superficial necrosis sometimes follows, and it is common to have adhesions take place between such bones and the cicatrix left by such ulcers. The diagnosis of the gumma is not difficult. The history of the case, the freedom from pain, and the absence of inflammatory symptoms, as well as the slow course, will enable us to distinguish this affection from ordinary abscess or furuncle.

The depth of the ulcer, the sharply defined edges, the "punched-out" appearance, the character of the pus, and the color of the base will distinguish this ulceration from the simpler forms of ulcer.

Treatment.—In gummous affections of the skin we must resort to the use of iodide of potassium in five-grain doses three times a day. Locally, mercurial ointment may be applied. If the syphilide breaks down and an ulcer results, Bumstead advises cauterization of the base with a solution of caustic potash (℥j to ℥ij to ℥j of water), as healing will not take place until all the necrotic tissue is removed. After a healthy granulating surface is obtained, powder with iodoform. The greatest care must be taken in using the knife in these cases; incision should be resorted to only as a final resort, for resolution often takes place even after fluctuation can be felt in the gummy mass.

The Pigmentary Syphilide.

Hardy in 1853 described an affection of the skin which he had noted in persons suffering with syphilis, and to which he applied the above name. It consists in an eruption of pale brownish-gray stains or spots of the size of a dime, distributed over a more or less extended surface; sometimes these coalesce and form large, irregular patches. The spots are not elevated above the surface, nor do they desquamate, and they are quite free from itching. They are met with usually upon the neck and breast of women of dark complexion, and are hardly ever seen upon man. The syphilitic nature of this affection is disputed by many, but Fox, Fournier, and Bumstead, and numerous Italian and French observers, unite in ascribing to it a syphilitic origin. Dr. Maireau* has recently written a paper on this subject in which the syphilitic nature of the disease is established. He finds that it appears in many cases shortly after the roseola or at the beginning of the secondary stage, and persists for an indefinite period. It is much more common in women than in men, and in women under twenty-five years of age than in those over that age. He concludes his essay

* Thèse de Paris, 1884.

with the remark, " We are ignorant of any successful treatment of the pigmentary syphilide."

Dr. R. W. Taylor publishes an interesting case of this disease in the " Journal of Cutaneous and Venereal Diseases " for April, 1885, in which he expresses his firm conviction of the syphilitic nature of the affection.

Malignant Precocious Syphilide.

French authors describe under this name violent destructive ulcerations which are developed during the course of the various skin affections of syphilis.

This tendency is accompanied by cachectic symptoms, and may complicate any of the syphilides. It is rarely seen during the outbreak of erythemas or papules, but in the pustular and tubercular forms it occurs. Dr. Ory has noticed that persons who are given to alcoholic excesses are most liable to the complication, though anything which tends to lower the tone of the general health may cause it.

Medical Treatment of the Syphilides.

In the treatment of these affections of the skin one fact is always to be borne in mind, to wit: that these manifestations, however varied, are each and all dependent upon syphilis. How syphilis can cause such different lesions is to be explained by the pathologist; the physician must prescribe with the fact constantly before him that syphilis is the disease with which he is dealing. Mercury and iodine, in some of their many forms and combinations, are the two principal agents in combating these skin manifestations. In the early syphilides, characterized by hyperæmia and superficial lesions, *Mercurius solubilis* or *Mercurius corrosivus* will be found the most useful preparation, but when cell proliferation characterizes the skin affection, and ulcerations result, in a word, when the lesions take on those symptoms which have been described as tertiary, then resort must be had to either the iodide of potassium or else to combinations of iodide and mercury, or to both.

In erythema, the papular and the vesicular syphilides, the use of *Mercurius solubilis* in the first decimal trituration, three grains three times a day, will be followed by the best results. If the case does not improve within ten days, we may change this prescription to the *Mercurius corrosivus* in the second decimal, the dose and repetition as above. In the pustular, tubercular, and gummous syphilides two lines of treatment are open to us. We can rapidly dissipate these lesions by the use of the iodide of potassium in doses of from five to ten grains, dissolved in water, taken three times a day. While this treatment removes the skin manifestation, it has little, if any, effect upon the underlying dyscrasia of which the skin lesion is but the sign. If we would

treat both the constitutional disease and the skin lesion, we must combine mercury with the iodine. Hence, in these late forms of syphilis we derive excellent results from the *iodide* and *biniodide of Mercury* in five-grain doses of the second or third decimal trituration, three times a day.

Dr. Thayer, of Boston, has found that the addition of a few drops of the tincture of iodine to a solution of the iodide secures a more rapid action from that remedy.

In the treatment of the syphilides, Jahr always begins with *Mercurius solubilis* or else with the *red precipitate*, provided the patient has not been treated with Mercury before. These remedies are prescribed by him in all cases, without regard to symptoms or the particular form of the syphilide; he continues their use and does not change the remedy unless, at the expiration of ten days or two weeks, he finds no improvement or the tendency to improvement arrested.

Gold and **Platina** are advised in the treatment of the skin manifestations of syphilis, if Mercury has already been used to excess.

The first-named metal has the indorsement of Hahnemann himself, though its usefulness has been denied over and over again since his day. Clotar Müller has given it his indorsement. Platina has been used by Rosenberg.

Staphisagria "is of value," says Jahr, "when syphilis and mercurial poisoning are combined," and when we have a humid, scalding, fœtid eruption with periosteal pains worse at night.

Nitric acid has coppery, violet-colored spots on the skin, pains drawing and pressing and as from "*splinters*." It has been of value in the treatment of rupia, mucous tubercles, and where ulcers incline to spread in circumference, and bleed easily and profusely.

Cinnabaris is to be used especially if the patient is of scrofulous diathesis.

Kali bichromicum has been used with success in the treatment of the papular and pustular eruptions, with periosteal pains and ulcers which look as though they had been punched out.

Arsenicum has been successfully used by Jahr in tubercular syphilides.

Silicea for ulcerated cutaneous affections where Mercury has been given to excess.

Beside the above remedies the following have been advised:

In erythematous syphilides:

Belladonna, Apis mel., Mercurius solubilis, Nitric acid, Cantharides, Phosphorus, Terebinthina.

In papular syphilides:

Mercurius solubilis, Argentum nitricum, Thuja, Kreasotum, Zincum, Phytolacca.

In pustular syphilides:

Lachesis, Calcarea carbonica, Tartar emetic, Kali bichrom., Hepar.

In tubercular syphilides:

Aurum, Arsenicum, Lycopodium, Graphites, Dulcamara.

In gummous syphilides:

Silicea, Arsenicum.

In rupia:

Asa fœtida, Lachesis, Arsenicum, Clematis, Sulphur, Thuja, Arsenicum iodatum, Silicea, Carbo veg.

Affections of the Hair and Nails.

The appendages of the skin, the hair and nails, also exhibit changes which are due to constitutional syphilis.

Affections of the Hair.

Alopecia or falling of the hair is, relatively, a common occurrence during syphilis. It occurs, usually, during the early months of the secondary stage, and is caused by malnutrition. From the fourth to the sixth month, and up to the end of the second year, this malady may be expected. The hair loses its lustre, feels dry and harsh, and comes out easily upon the brush or comb. The scalp, if examined, will be found to present a perfectly normal appearance, the cause of the disease being located in the hair-bulbs. Total baldness is rare, though in some cases not only is the scalp denuded, but the hairs of the beard, brows, and lashes, and even those covering the pubes, fall out. Generally, the hairs of the head fall out in patches, leaving bare spots (*Alopecia areata*). After a few weeks of baldness a crop of small hairs commences to grow, but they do not reach great length before they also wither and drop out. Ultimately new vigorous hair is produced. This form of alopecia is, therefore, not permanent.

When deep ulcerative lesions develop upon the scalp, they, of necessity, cause the hair to fall, but as these affections involve the tissues and destroy the hair-bulbs, baldness so resulting is permanent, and no treatment can restore the loss.

Treatment.—This does not require any special local treatment; if the patient is restless and wants a wash, the following has been recommended by Berkley Hill.

℞.	Tincture of cantharides,	℥ss.
	Solution of ammonia,	℥ss.
	Spirit of rosemary,	℥j.
	Glycerine,	℥ss.
	Rosewater, to make	℥viii.

This is to be well rubbed into the scalp with a small sponge every night. The general treatment is to be continued, for alopecia is but a symptom of syphilis, and not the disease itself.

Lycopodium has the reputation of being almost a specific in this condition.

Hepar sulph. calc.—Baehr has used this remedy in alopecia occurring in a patient who has been overdosed with Mercury, and reports a most excellent result. *Carbo vegetabilis* is also to be remembered in such cases.

Biniodide of mercury.—Dr. Meyhoffer has used this preparation with good effect in alopecia attended with violent hemicrania.

Alopecia may be due to mal-assimilation; hence in all such cases we must direct our patient to a plain but nourishing diet, such as milk,

eggs, oatmeal, fruits, and fresh meats. A visit to the sea-shore or to the country will be found of service.

Affections of the Nails.

Two varieties of affections occur in the nails of persons suffering from syphilis: onychia and perionychia.

In onychia the disease commences in the nail or matrix; in perionychia it commences in the surrounding tissues, and secondarily involves the nails and matrices.

In onychia the nail will exhibit evidences of impaired nutrition. It loses its lustre and smoothness, and takes on a yellow hue, becomes rough and brittle, and, in some instances, where the matrix is diseased, becomes thickened and traversed by longitudinal or transverse ridges.

In the milder forms of the disease the only inconvenience experienced arises from their friable condition, which causes the nails to break from the least pressure.

In severer forms the nails become loosened from the matrices and fall off, being replaced by rough, imperfectly formed growths of corneous material. Under proper general treatment the nails are reproduced.

So painless is this affection that when the toe-nails are diseased they often drop off without the knowledge of the patient.

Perionychia.—Several forms of this affection are noted, each depending upon the character of the producing disease. When treating of the scaling syphilide of the palms and soles, we referred to a dry, brittle condition of the nails which sometimes accompanies that lesion; this constitutes one form of perionychia. The name, however, is more frequently applied to a condition in which ulceration of the sulcus of the nail occurs, attended with considerable swelling and inflammation of the surrounding tissues. Ulcerative perionychia usually begins by the development of a papule or pustule, during one of these forms of the syphilides, in the sulcus of a nail. This gives rise to irritation and, finally, to ulceration. The nail, acting as a foreign body, aggravates the symptoms; hence we not unfrequently find the whole end of the nail tender, bathed in pus, and swollen until it assumes a club-like appearance.

The nail is generally lost, but if the matrix has not been destroyed, it will be reproduced.

Affections of the nails are frequently symmetrical, and may occur at any time during the secondary period.

Treatment.—The first indication in the treatment of syphilitic diseases of the nails is to keep the parts as clean as possible, and in this way prevent undue inflammation; hence bathing or soaking the diseased fingers in warm water in which borax has been dissolved will be found of service. When open ulcers exist, they should be cleansed

by prolonged soaking and then dusted over with iodoform. The local application of the following prescription gives comfort when cracks and ulcers occur about the nails:

℞.	Perchloride of mercury,	grs. 12.
	Flexile collodion,	½ oz.
	Linseed oil,	12 drops.

This solution is too poisonous to be entrusted to the patient, hence should be applied by the physician only.

Internally, Mercury, in some of its forms, will be required; the following remedies have also been advised:

Arsenicum, *Graphites*, *Hepar*, *Lycopodium*, *Petroleum*.

Affections of the Mucous Membranes.

Mucous Patches.

The mucous membrane, being a continuation of the skin, suffers like it from syphilitic infection. Much confusion has arisen in the literature of these diseases from the use of a variety of names, such as condylomata, mucous tubercles, mucous papules, and mucous pustules. In our own school the confusion has been increased by confounding this sequela of syphilis with the warts which sometimes appear upon the genitals after gonorrhœa. It is hardly necessary for us to say that these affections are entirely distinct.

Davasse and Deville give the following definition of mucous patches, and to them we are also indebted for the name:

The name "mucous patch" is applied to a lesion peculiar to syphilis, consisting of elevations of a more or less decided rose-color, frequently rounded in form, the surface resembling mucous membrane, and situated in the neighborhood of the outlets of mucous canals, especially around the genital organs and anus, upon the mucous membrane of the mouth, and sometimes upon other parts of the body, more particularly at the base of the nails, and wherever the reflection of the integument upon itself forms natural folds.*

Mucous patches constitute one of the most frequent forms of syphilide, and occur early in the secondary stage, usually during the existence of the papular skin affections. They are long-lasting and frequently relapse; hence it is not uncommon to have them well along into the tertiary stage. Their appearance depends very much upon their situation.

Mucous patches of the mouth occur upon the sides of the cheeks and tongue, the gums, and the soft palate. They are irregular in shape, are liable to be fissured, especially when located upon the sides of the cheek at the angles of the mouth. They exhibit a peculiar sil-

* Quoted by Bumstead

very-white color, not at all unlike the appearance caused by touching mucous surfaces with nitrate of silver. The irritation caused by broken teeth is a common cause of this trouble, and the use of tobacco, both by chewing and smoking, causes its development and hinders its cure. It is owing to the presence of these patches upon the lips and within the mouth, that syphilis is sometimes conveyed in the act of kissing, or by using table utensils in common, for the secretions of mucous patches, as of all secondary lesions, are contagious.

Mucous patches located about the anus and genitals are very different in appearance from those just described, the peculiarity arising from the location of the lesion in this instance upon the integument. This form begins as a red papule, slightly elevated above the surface, and varying in size from a fifth to half an inch; where a number are seated closely together they coalesce and form a rose-red patch with an irregular outline.

A slight effusion, sufficient to loosen the epidermis, takes place, and friction, to which these parts are especially liable, removes it and leaves a raw surface which is covered by a grayish pellicle secreting a viscid, badly smelling secretion which is extremely contagious. These patches become elevated, by hyperæmia, into broad flat growths to which the name condylomata has been applied. The grayish pellicle may be wiped off, and exhibits beneath a rose-colored, superficially ulcerated surface so frequently seen about the anus and vulva of syphilitic women.

They occur, also, but less frequently, between the toes, in the folds of the groin and breast, and at the navel, and present symptoms very much like the preceding.

The initial lesion sometimes undergoes a peculiar transformation when developed upon a moist surface, as for instance the preputial cavity, and takes on the appearance of a mucous patch.

Mucous patches are liable to cause irritation, and hence are not uncommonly accompanied by itching. The secretion from them is very contagious, and is the usual cause of extra-genital chancres.

Treatment.—Besides the general treatment for syphilis, which must not be interrupted, the lesions just described call for special measures.

Mucous patches seated about the anus or genitals require to be kept scrupulously clean; hence, they should be washed twice daily with warm water and castile soap, after which they should be swabbed over with Labarraque's solution, in the proportion of one part of the solution to eight parts of water; they should then be wiped dry and dusted with a powder composed of equal parts of calomel and oxide of zinc. Contiguous parts should be kept separated by pieces of lint or old linen placed between them.

Mucous patches of the buccal cavity require the removal of all sources of irritation, such as broken teeth, and the use of tobacco, either by

chewing or smoking, must be given up. The mouth should be well washed several times a day with warm water, and afterwards rinsed with a little dilute tincture of myrrh. The teeth should be carefully cleansed with a soft brush. Brushing over the patches with a piece of the solid nitrate of silver every second or third day, is advised in very obstinate cases. Hoyne uses as a local wash the third attenuation of the remedy which he is using internally.

The internal treatment will consist of remedies addressed to the constitutional condition of the patient.

In the secondary stage, the time when these patches are usually developed, the remedy will usually consist of some form of mercury. If the patches become so important as to require special internal treatment, we are to remember the efficacy of *Tartar emet.*, *Nitric acid*, *Lycopod.*, *Sulphur*, *Calcarea carb.*, *Thuja*, *Sabina*, *Causticum*, and *Phosphoric acid.*

Yeldham uses Mercurius sol. 2^x, and finds it often sufficient; if it fails, he resorts to Nitric acid. Locally, he covers the parts with a warm linseed-meal poultice; this is continued until the parts are thoroughly clean; he then dresses with lint moistened with the *Lotio nigra* made by the following formula:

℞. Calomel, ... gr. xv.
Lime-water, ... ℥v.—M.

He also speaks highly of applications of a lotion of calendula made in the proportion of one part of the tincture to eight parts of water.

Sycosis.

Hahnemann classed all condylomata of venereal origin under the one general name of sycosis, and considered them as the external manifestation of a peculiar poison which, although partaking of the nature of venereal disease, was entirely distinct and different. Hughes* and many other distinguished writers of our school adhere to this classification of Hahnemann, but we are led to believe that the theory of a sycotic poison as the cause of all forms of venereal warts is erroneous. We have, as we have seen above, a condyloma which is due to a mucous patch situated upon the skin in a moist situation and irritated by friction. Another form sometimes occurs in persons suffering from gonorrhœa, but these consist simply of hypertrophied papillæ with increase of connective tissue and bloodvessels. They are identical with simple warts of the hands and other parts of the body, and do not owe their origin to any specific virus. They occur in gonorrhœal cases, owing to the irritating discharge of that disease, and not to any virus which the discharge contains. Hahnemann recommended *Thuja* as the peculiar remedy for sycosis, hence homœo-

* Pharmacodynamics, second edition, article on Thuja.

pathic physicians have continued to use the remedy in all forms of venereal diseases attended by condylomata.

Thuja is undoubtedly a remedy of the greatest value in venereal warts due to irritation, but in true syphilitic condylomata, due to mucous patches situated upon the skin, we have not been able to derive that benefit from the remedy which others of our school claim.

Syphilitic Diseases of the Digestive Organs.

We have described the various lesions which syphilis is capable of producing; have traced the course of this all-pervading poison from its commencement in the syphilitic chancre, through the lymphatic system and blood, and have studied its effects as revealed in the various syphilides. The most casual reader must have noted that the disease has step by step advanced from trivial lesions to profound and serious disorders. Pathology has shown that the same onward march has been taking place in the tissues; the earlier lesions were found to be the results of hyperæmia, and involved the more superficial layers of the skin; the later manifestations are found to be dependent upon hyperplasia, and to involve not only the entire thickness of the skin, but to have pushed still deeper and involved the muscles, and caused destructive ulcerations in their course.

We now propose to study the effects of syphilis as exhibited in the various organs and tissues of the body, commencing with the digestive organs.

The Tongue.—We may have chancre developed upon the tongue. In such a case we will find a single sore situated usually on the tip of the tongue, and an enlargement of the lymphatic glands under the angle of the jaw.

Mucous patches occurring upon the tongue have already been described, but beside these we may have certain white patches which seem due to hypertrophy of the epithelium of the tongue, producing small dead-white patches, destitute of pain or soreness. It is an inveterate complaint, and from its frequency in smokers has been supposed to be caused by the irritation of the pipe or of the smoke. The foregoing complaints are peculiar to the early years of syphilis, prior to the third year after infection.

Tertiary affections of the tongue are of two kinds, sclerosis and gumma. Sclerosis is due to the production of hyperplastic material which develops into fibrous tissue. Gumma consists in the development of isolated gummy nodules in the substance of the tongue, in every respect similar to gummata in other organs.

Sclerosis.—This consists in the development of two or three plates of cellular material in the mucous or submucous tissue of the organ. They are usually situated at the anterior or middle portion of the dor-

sum. The mucous membrane covering the site is of a darker color and smoother than in health. After a time this infiltrated material is converted into hard contractile fibrous tissue which interferes with the free use of the organ, but rarely ulcerates. A deep variety of sclerosis sometimes occurs, and is distinguished by the infiltration involving the muscular structure, its most characteristic sign being an irregular lobulated appearance of the dorsal surface. Sclerosis of the tongue is most frequent about the fifth year of syphilis.

Gummata of the Tongue.—Gummy tumors may develop either in the mucous membrane of the tongue or in its muscular substance. Like the preceding affection, it is usually a late manifestation of syphilis. The dorsum and sides of the tongue are the portions which are most liable to become affected. Gummata commence as hard tumors buried in the substance of the tongue and, when first noticed, are about the size of a pea or cherry. They are more easily felt than seen in the early stage, but as they increase in size they approach the surface and become quite evident. They are usually multiple and quite firm, but eventually they soften, and by pressure causing absorption of the tongue-substance, they ulcerate and discharge. The ulcer remaining increases rapidly and presents the usual perpendicular edges and foul base. Gummous ulcers of the tongue, though frequently large and deep, heal readily under proper treatment and cicatrize without deformity to the organ or disadvantage in its use.

Diagnosis.—Sclerosis and gumma of the tongue in their appearance are very similar to cancerous affections of that organ, but may be distinguished from it by the history of the case, by the absence of lancinating pains shooting toward the ear, so common in cancer of the tongue, by the age of the patient, and by the number of ulcers, cancer usually being single, and gumma multiple.

Treatment.—In sclerosis of the tongue, and also in cases of gummy tumors of that organ, the Iodide of potassium should be administered in five-grain doses three times a day. This will rapidly remove the hardened plates, and prevent the formation of gummatous ulcers. If ulcers have already formed, they should be washed several times a day with a weak solution of the Permanganate of potash.

Beside the Iodide of potassium, some preparation of Mercury should also be administered. The *Mercurius iodatus ruber* has been found of the greatest value in these affections; also Nitric acid. Our great dependence, however, is on the Iodide of potassium.

Kali bichrom. enjoys quite a reputation for deep, punched-out looking ulcers of the tongue.

Mouth and Pharynx.—Beside the mucous patches, which are of such frequent occurrence in the mouth during an attack of syphilis, we may have the chancre itself appearing upon the gums, buccal surfaces, and pharynx. Several interesting cases, communicated by the Eusta-

chian catheter, have been reported. The clinical thermometer might very easily carry the contagion from one mouth to the other when used under the tongue. The symptoms of chancre in these localities are very similar to those which attend the lesion when seated upon the tongue.

Small, shallow ulcers are often noticed upon the mucous membrane of the buccal cavity and pharynx during the early stages of syphilis. They have sharply-cut, uneven borders, and are *not* surrounded by a thickened base; the bottom of the sore is covered with a gray exudation. They are usually seen about the angles of the lips, the inside of the cheeks, and upon the pillars of the fauces.

The tonsils are sometimes the seat of a deep, sharply-cut ulcer, with a dark areola. It is extremely liable to slough, and may cause considerable destruction of tissue.

The fauces form one of the principal seats of syphilitic manifestations. During the erythematous syphilide we usually have an erythema of the soft palate and pillars of the fauces; this, however, is not a serious lesion, and usually subsides with the other accompaniments of the rash. During the later eruptions we may have more serious affections, attended with ulceration and loss of tissue. The tertiary diseases of the mouth are usually confined to the hard palate and the velum. As in the tongue, the affection is of two forms, a diffused infiltration and circumscribed gummata.

Diffused infiltration, if superficially deposited, causes a thickening of the mucous membrane, usually of the velum; this breaks down into a group of shallow ulcers with sharply-defined edges, which creep over the surface of the velum, the anterior pillars of the fauces, or extend outward and involve the mucous lining of the buccal cavity. This form of ulceration gives but little inconvenience, except soreness during the act of eating and swallowing, and heals, leaving a widespread, branching scar.

The results of deep infiltration and the ulceration occasioned by circumscribed gummata of the soft palate are so similar that we shall describe them together. This is one of the dreaded results of syphilis. It is insidious in its approach and destructive in its tendency. The attention of the physician is not usually called to the disease until it is far advanced upon its rapid course and irreparable mischief accomplished.

If, during the treatment of a syphilitic, he should complain of dryness and discomfort in the pharynx, frequent hawking of viscid mucus from the throat, pain in swallowing, humming in the ears, and obstinate coryza, we should carefully examine the throat with a rhinoscopic mirror, for should the gumma develop upon the posterior surface of the velum it would only occasion redness and swelling of the anterior surface. If a gumma has developed, we will notice a hard circum-

scribed mass, rarely larger than a cherry, and generally much smaller, situated upon the velum or the neighboring parts. The infiltration which accompanies the disease causes an immobility of the soft palate, which is quite noticeable when the patient is asked to utter some sound which requires the use of the soft palate. Cornil considers this symptom of value in early diagnosticating gumma of the soft palate.

If the disease is untreated, the tumor softens and breaks down into an ulcer, which rapidly perforates the velum, destroys both it and the arches, converting the mouth and pharynx into one great cavity. This is followed by a train of evils such as difficult respiration, return of both liquid and solid food through the nose when swallowed, and a nasal twang to the voice. The bones may become damaged by the onward spread of the ulcerative process, resulting in necrosis of the sphenoid, the palatine, the turbinated, the basilar portion of the occipital, and even the vertebræ themselves. The result of such extensive ulceration is frequently terrible, and loss of life is not an uncommon sequel. If recognized early, and properly treated, this frightful destruction can be avoided.

Pharynx.—Beside the early manifestations of syphilis already noted, the pharynx may be invaded by gummata. These tumors very frequently select this site during the tertiary stage, but are rarely seen until after ulceration has supervened, the pain caused in the act of swallowing calling the patient's attention to some trouble in the throat. The ulcer here caused by gumma is similar to that described above, having sharply-defined edges, yellow or gray suppurating base, with a deep-red border. The destruction occasioned is extensive, and the resulting scars often give rise to serious deformity and inconvenience. Baumler has called attention to the fact, "that gummata which thrust forward the posterior wall of the pharynx may originate in the periosteum of the vertebræ, and, therefore, when tumors of the posterior pharyngeal wall occur in adults, we should always think of syphilis; while in children, retropharyngeal abscesses are more apt to be due to tubercular diseases of the spine."

Treatment.—The treatment of mucous patches of the mouth has been given in another place. The small ulcers, which occur in early syphilis, must be carefully cleansed with the following solution of permanganate of potash:

℞. Solution of permanganate of potash, ... 2–4 drachms.
Distilled water, ... 10 ounces.

Kali bichrom. should be given internally.

The various affections of the mouth and throat require prompt treatment; the more superficial lesions will be benefited by one of the

mercurials, but the deep ulcerations of the tertiary stage require the Iodide of potassium in appreciable doses.

Jahr uses the *Mercurius solubilis* in ulcerations of the throat where there is no tendency to spread, and the *Mercurius corrosivus* if phagedenic ulceration is present. He also speaks highly of *Nitric acid.* Yeldham also uses *Nitric acid* in ulcerations of the mouth and throat; he gives ten drops of the first or second decimal solution three times a day, and uses at the same time a gargle composed of a solution of half a drachm of the pure acid in eight ounces of water. In simple inflammation of the throat, before ulceration takes place, he advises *Aconite*, *Belladonna*, *Apis*, and *Mercurius corrosivus.* *After Aconite has been exhibited, to reduce the general febrile excitement which attends the early stage of syphilitic sore throat, Apis in five-drop doses of first decimal dilution is very efficacious. If it fail, *Belladonna*, *Lachesis*, and *Mercurius corrosivus*, especially the latter, should be tried.

Beside the remedies mentioned above, Helmuth has had good results from *Aurum* when the ulceration of the throat was due to the excessive use of Mercury, and this he thinks is its most frequent cause. *Lycopodium* and *Carbo veg.* he advises when *Aurum* fails.

†When the patient complains of dryness and scraping in the throat, with swelling and inflammation of the tonsils, *Hepar* is an excellent remedy. When superficial ulcers of a grayish color are situated in the buccal cavity, *Nitric acid* may be employed. After the exhibition of these remedies, when the more violent inflammatory symptoms are mitigated, *Silicea* or *Sulphur* will often complete the cure. If Mercury has not been used to excess during the first stage of the disease, it alone will relieve the condition of the throat. *Kali hydriod.* and *Mercurius iodatus* are also useful; so are *Arsenicum iodatum*, *Aurum*, *Belladonna*, and *Staphisagria.*

Jahr gives the following list of remedies in affections of the mouth, throat, and fauces.

For herpetic eruptions in mouth and throat: *Lycopodium*, *Nitric acid*, *Phosphoric acid*, *Zincum.*

For excoriations and erosions: *Mercurius solubilis*, *Nitric acid*, *Phosphoric acid*, *Lachesis.*

For ulcers on the tongue: *Mercurius præcipitatus*, *Nitric acid.*

For ulcers of the throat: *Mercurius solubilis*, *Mercurius præcipitat. ruber*, *Mercurius sublimat. corr.*, *Lachesis*, *Aurum*, *Lycopodium*, *Iodum*, *Kali iodatum.*

For angina syphilitica: *Lycopodium*, *Lachesis*, *Aurum*, *Nitric acid*, *Mercurius sol.*, *Argentum*, *Mezereum.*

In extensive ulcerations of the throat it should be swabbed or sprayed with a solution of the nitrate of silver twice a day:

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* Yeldham, page 112.

† Helmuth's Surgery, page 180.

℞. Arg. nit., ... gr. v–x.
Aquæ, ... ℥j.

The patient must give up the use of tobacco, as both smoking and chewing aggravate the affections and prevent early recovery.

Among our indigenous plants *Phytolacca* has some reputation in secondary lesions of the nose, throat, and mucous surfaces generally. Dr. A. E. Small has reported several cases of syphilitic ulceration of the throat and fauces cured with this remedy.

Corydalis is advised by Hale in syphilitic ulcerations of the mouth and fauces, with profuse secretion of mucus and fetid breath.

Œsophagus, Stomach, and Intestines.—The œsophagus may rarely be the seat of ulceration following gummous deposits, in which case troublesome strictures result, but it is more apt to be injured in consequence of pharyngeal disease. Functional derangements of the stomach are of frequent occurrence during the early stages of syphilis, such as loss of appetite, nausea, and in some cases inordinate desire for great quantities of food, and an almost insatiable thirst. Of the organic changes caused in the alimentary canal by syphilis we are comparatively ignorant. From the examinations made by Cornil, Klebs, Laurenzi, Oser, Cullerier, and Leudet, it seems evident that both the stomach and the small and large intestines may suffer from gumma and the ulceration which follows it. In some instances such lesions have caused an obstinate diarrhœa, with bloody stools, and eructations and vomiting of food a few hours after its ingestion. Gummy tumors are also, occasionally, developed in the rectum, and if ulceration takes place, they are followed by troublesome strictures. The great majority of strictures of the rectum, however, are dependent upon another cause, *i. e.*, cicatricial tissue following the destructive processes of chancroid. The anus may be the seat of the chancre, and, as we have already seen, is frequently affected by mucous patches. The late affections are rare, and generally assume the form of moderately deep ulcers, which are extremely painful and intractable. Gumma of the anus is excessively rare.

Treatment.—The treatment in these affections will consist of Mercury and the Iodide of potassium, with such local measures as the lesions may suggest.

The Liver.—Jaundice is a very common symptom in early syphilis, frequently attending the first outbreak of skin manifestations; it is transitory, and seems to be unaccompanied by organic disease of the organ, though Murchison thinks it due to a catarrh of the gall-ducts; it is especially apt to be followed by acute atrophy.* Delavarenne†

* Clinical Lectures on Diseases of Liver, page 153.

† Quoted in Archives of Dermatology, October, 1881.

says, "that even in early syphilis traces of repeated congestion of the liver are found."

The later diseases of the liver are quite frequent; Chvostek* says that, in his experience, they are the commonest of visceral affections, and depend upon two pathological conditions, to wit, interstitial hyperplasia and circumscribed gumma.

Interstitial Hepatitis.—Syphilitic interstitial hepatitis is caused by an abnormal increase of the cellular tissue elements of the capsule of Glisson, and may be either general or partial, usually the latter. At first the bulk of the organ is increased, but when the disease is fully developed the newly formed fibrous tissue shrinks, thus contracting and hardening the liver, and giving it a puckered appearance. It can be distinguished from simple cirrhosis only by the history of the case and the presence of other syphilitic symptoms.

Pain in the hepatic region is one of the most constant symptoms. It may be localized at one point or may be diffused, and is sometimes dull and heavy, at others sharp and intense. It is made worse by pressure, and does not radiate to the shoulder, as in other hepatic troubles. Ascites is observed only in those cases in which the liver has shrunken. Absence of gastric troubles, constant enlargement of the spleen, and comparative rapidity of course, serve to distinguish syphilitic from simple or alcoholic hepatitis.

The prognosis in interstitial hepatitis is not favorable, though recovery may take place.

Gummata of the Liver.—This condition of the liver is usually accompanied by a mild form of interstitial hyperplasia, but not sufficient to cause contraction or hardness of the organ. In this newly formed fibrous tissue gummatous tumors are found varying in size from a pin's head to a walnut, and often much larger. They are not numerous and on section are found to consist of a fibrous envelope, embedded in connective tissue, and containing a central mass homogeneous or composed of granular matter interspersed with small round cells, and traversed with a delicate network of connective tissue and small nutrient vessels. Such tumors are at first quite firm, and eventually terminate by becoming soft and being absorbed; or by becoming calcified, the remaining mass being embedded in fibrous tissue; or the tumor contracts and is converted into a fibrous tissue, leaving furrows or pits on the surface of the liver. The latter is the usual termination, the others result but rarely.

The symptoms of gummata of the liver have not been carefully studied, but as this condition is always associated with interstitial hyperplasia, the early symptoms of the two diseases are necessarily similar. We have to depend largely upon the history of the case and

* Vierteljahrschr. f. Derm. u. Syph., 1881, page 325.

other evidences of constitutional disease. The organ may be increased in volume, and nodules may be detected upon its surface. Unless the tumors are numerous, there is no interference with the functions of the organ. We may have anasarca, clay-colored or bloody stools, albuminous urine, epistaxis, and icterus, but they are not constant.

The prognosis is more favorable in gumma than in interstitial hepatitis, and if death occurs, it results usually from some intercurrent disease.

Lardaceous Disease of the Liver.—"In a large number of cases of waxy disease," says Murchison,* "the patients have been the subjects of constitutional syphilis, which appears to act as a predisposing cause independently of its inducing disease of the bones or protracted discharges, and independently of any abuse of mercury, to which waxy liver was attributed by Graves and G. Budd." When the liver is affected in this way, it is enlarged, often to twice its normal size, the surface is smooth, and the texture firm. The diseased lobules will be found, on section, to have a pale, translucent, waxy appearance. The change of color to a violet, on the application of Iodine and Sulphuric acid, is characteristic.

The symptoms of waxy or lardaceous disease of the liver are very similar to those of cirrhosis in its earlier stages before contraction has taken place. Palpation will reveal the enlargement, which is found uniform, and having no tendency to obstruct the portal circulation, both jaundice and ascites are rare complications.

Lardaceous disease of the spleen will generally be found when the liver is waxy. Recovery is very rare.

Acute atrophy of the liver is an occasional complication of syphilis, but how far it is dependent on the syphilitic virus is still unsettled. Murchison thinks it more likely to occur in those patients who have developed jaundice early in the course of the disease, resulting from catarrh of the gall-ducts.

The various diseases of the liver are generally found associated with other manifestations of syphilis, such as ulcerations of the palate, caries of the bones of the skull, and ulcerative diseases of the skin; their treatment is conducted on general principles.

The Spleen.—The spleen is frequently enlarged during the early part of the secondary stage of syphilis. It takes place from the fifty-fifth to the eighty-fifth day after infection, and lasts from one to two months; it is due, probably, to hyperæmia. Later we may have developed interstitial hyperplasia, circumscribed gumma, and even lardaceous disease; the two latter, however, are extremely rare. Hyperplasia of the spleen has been carefully studied by Bloch, of Copenhagen, who has found it in 61.4 per cent. of the cases of adults suffering with acquired syphilis.

* Dis. of Liver, page 35.

The symptoms of syphilitic affections of the spleen are not characteristic, and here, as in so many other instances, we must depend upon the history of the patient and careful examination to detect other syphilitic manifestations.

The thyroid body,* the supra-renal bodies,† the pancreas,‡ and the salivary glands,§ may each suffer from the syphilitic virus, the pathological conditions developed being similar to those already studied in other organs, *i.e.*, hyperæmia, interstitial hyperplasia, and the development of circumscribed gummy tumors. The symptoms of these diseases are not clear, nor do they very frequently occur.

Treatment.—The internal treatment of syphilitic diseases of the digestive organs consists in the administration of those remedies which have been found most efficacious in tertiary affections. The Iodide of mercury, either the proto-iodide or the bin-iodide, will be of service, and the Iodide of potassium is as powerful here as in so many other syphilitic conditions. The dose required will be large, and must be repeated at frequent intervals.

Beside internal medication, patients suffering with these forms of syphilis require careful nursing and generous diet. It is essential that a vigorous condition of health should be obtained at as early a date as possible. The use of cod-liver oil is followed by pleasing results, and, if coupled with a well-selected diet, will restore the patient's strength and furnish the physician a good foundation upon which to work in his battle with the deeply-seated lesions of the internal viscera.

Syphilitic Diseases of the Respiratory Organs.

The Nose.—Several cases of syphilitic chancre occurring upon the nose have been reported, but are noticeable only from their rarity, and not from any peculiarity derived from their situation.

During syphilitic erythema the mucous lining of the nose becomes acutely inflamed, and is at first dry, but afterward bathed with copious mucous secretion.

The papular syphilides are likely to develop within the nasal passages, especially involving the hair-follicles at their entrances. The papules become converted into pustules; their secretions dry into crusts beneath which persistent and painful ulcers are found.

Fissures about the alæ, and mucous patches within the nostrils, are also numbered among the early lesions affecting the nose. In this situation they are both painful and obstinate, and, if neglected, may give rise to serious trouble by the irritation causing inflammation of the periosteum and perichondrium, and finally limited necrosis.

Necrosis of the Bones of the nose may occur in the later stages of

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* Lancereaux. † Von Barensprung. ‡ Verneuil. § Fournier.

syphilis, during the development of gummous tumors in the skin and viscera.

Gummy deposits made in the mucous membrane or periosteum of the nose slowly ulcerate, destroying the coverings of the bones and cartilages, and necrosis results. The appearance of these destructive processes is usually marked by a profuse, foul-smelling, often bloody secretion from the nose. The smell is disgusting, and makes the patient obnoxious both to himself and to others. This is the so-called ozæna syphilitica. It is one of the most dreaded complications of late syphilis, and is exceedingly insidious in its approach. Berkeley Hill says we should carefully examine into the previous history of obstinate nasal catarrhs in which the patient complains of a sense of stiffness about one or both nostrils; especially so if accompanied by abnormal sensibility or tenderness on pressure, and a dull pain about the root of the nose or forehead.

Necrosis, should it occur, will be followed by frightful deformity. The septum may be perforated and the nasal bones destroyed, leaving a hollow where the bridge of the nose existed. The necrosis may extend downward along the vomer to the hard palate, or upward along the ethmoid and spongy bones to the base of the skull. In the end the nose, mouth, and pharynx may be converted into one great cavity, the sense of smell be obliterated, swallowing made difficult, and, by involving the Eustachian tubes, deafness may also result. The voice, of course, is altered by the destruction of the natural boundaries of these cavities.

Treatment.—*Aurum* is one of our most important remedies in necrosis of the bones of the nose; it has been used for many years, and our literature is filled with cases of syphilitic ozæna which have been benefited by its use. It should be given in the third decimal trituration, a half-grain three times a day. *Mercurius solubilis* has also been advised in this affection, but we prefer the bin-iodide of Mercury, and think its use will be followed by better results. The Iodide of potassium is also frequently required in this condition. *Nitric acid*, *Lachesis*, *Silicea*, *Hepar*, and *Sulphur* have been used with success in syphilis of the nose.

This affection is one which will try the patience of both the sufferer and his physician, and yet, though discouraging, the treatment should not be relaxed for a single day. Recovery without deformity is possible, but only on the condition of constant care and watchfulness. The cavity of the nose should be washed out daily with a solution of salt and water, at a temperature of about blood heat, one ounce of salt being dissolved in a pint of water. A solution of chlorinated soda is also useful as an injection.

℞. Solution of chlorinated soda, ... ℥ij.
Distilled water, ... ℥x.

If the bones become necrosed, they must be removed, as the fœtid discharge will continue as long as they remain. The general health of the patient must be watched, the long-continued discharge having a tendency to undermine it; hence, a nourishing diet must be ordered and cod-liver oil administered twice a day. A weak solution of the tincture of iodine makes an excellent wash, and should be used with a syringe. Bumstead advises the inhalation of the fumes of burning calomel, and says it is followed by good results.

The larynx is frequently attacked by syphilis, during both the early and late stages. Gerhardt and Roth think that those parts of the vocal organism in contact during the act of phonation most frequently suffer from these lesions. The invasion of the larynx is usually very insidious, and the course of the diseases there developed is chronic and devoid of pain.

Julian has called attention to pain in the ear as a symptom indicative of laryngeal affections. Cough is not usually present, except during later stages, when it is accompanied by expectoration. The voice is hoarse and rough, and may be entirely lost, and dyspnœa is distressing in some cases, while in others we hear no complaint.

Lesions of the larynx of the secondary stage are erythema, superficial ulcerations, and mucous patches; of the tertiary stage, deep ulcerations, gummy tumors, and necrosis of the cartilages.

Erythema of the larynx usually develops during the existence of one of the early syphilides. It consists of a rosy reddening of the mucous lining, either general or in patches, and is accompanied with slight huskiness of the voice, sense of dryness and, occasionally, slight pain. The condition is usually transient, but may relapse and become troublesome.

Superficial ulcerations may accompany erythema, the ulcers being shallow, only involving the mucous membrane. They are persistent, sluggish, and cause some hoarseness.

Mucous patches also develop in the larynx, usually in conjunction with their appearance in other localities, though they may develop here independently. They occur most frequently upon the epiglottis, at the entrance to the larynx, the false vocal cords, and the arytenoid cartilages. They appear as smooth yellow projections, round or oval in shape, and attended with hoarseness. Under appropriate treatment they rapidly disappear.

The later lesions of the larynx are much more serious than the preceding, and are due to cell infiltration and gummy growths. The first mentioned, cellular infiltration, gives rise to a destructive form of ulceration. It begins as a gradual thickening of the mucous tissues, which afterwards breaks down into ulcers which destroy the mucous membrane and often the deeper tissues. The favorite seats of this lesion are on the epiglottis, one of the false cords, in the posterior

commissure of the vocal cords, or even on the cords themselves. They are usually attended with extensive swelling of the mucous membrane, and may cause suffocation. The parts involved may be entirely destroyed, and not unfrequently necrosis of the cartilages of the larynx results.

Gummy Tumors.—Two forms of gummatous deposits have been noticed in the larynx, circumscribed tumors and diffuse infiltration of the parts with gummy material. Both this and the preceding are late results of syphilis, rarely appearing before the fifth year after infection, and often much later. In the larynx gummata are usually single and may attain great size, eventually breaking down and causing a deep and destructive form of ulceration which may not only destroy the vocal organs, but may even cause the death of the patient from stenosis.

Perichondritis, vegetations, and caries of the cartilages are not uncommon results of the serious forms of ulceration just described. Stenosis of the larynx, either partial or complete, may also follow; when complete, the voice is lost, and respiration is carried on through an artificial opening; when partial, the breathing is embarrassed, and the patient, upon the slightest provocation, is threatened with suffocation.

Diagnosis.—The symptoms attending these various lesions of the larynx are not peculiar; hoarseness, in a greater or less degree, is usually present, but pain is not complained of except in the late ulcerative forms. The laryngoscope reveals the true condition of the parts, and the history of the case will aid in forming a correct conclusion as to the nature of the disease.

Prognosis.—The prognosis in the early forms is good, but in the later affections there is danger both of death and destruction of function. The more remote the lesion is from the entrance to the larynx, the more serious will be its consequences.

Treatment.—Professor Helmuth says that he has failed with such remedies as Phosphorus, Hepar, and Sulphur in the treatment of this affection, though they are usually recommended in our text-books. "The medicines which have produced decidedly beneficial action are the *Bichromate of potash*, in the second trituration, given twice or thrice a day, and continued for a length of time; also the *Kali hydriodicum* in substance, given thrice a day. If indications for Mercury are present, the *Bichloride* will act better than any other preparation. *Arsenic*, *Iodine*, *Macrotys*, *Podophyllum* have been given from time to time with benefit." Helmuth has also used, with good effect, a weak solution of Iodine. Ten drops of the first decimal solution are added to a gill of water and sprayed into the throat twice a week. In advanced cases surgical interference is often required.

THE TRACHEA AND BRONCHI.—The trachea and bronchi may be

invaded by lesions similar to those described as affecting the larynx, though much less frequently. It has been thought that persons working in dust or other irritating substances are more liable to develop these forms of syphilis than others. Early affections are rare, and consist of erythemas and shallow ulcers; the latter, by contraction of their cicatrices, sometimes occasion stenosis.

Tertiary affections are also rare, and occur from the fourth to the eighth year after infection, and in some cases at a much later period. They consist either of diffusè infiltration into the submucous tissue or of circumscribed gummata. In the bronchial tubes the lesions are apt to be found near the bifurcation. The symptoms which attend syphilitic diseases of the trachea and bronchi are not characteristic. In the beginning these troubles are insidious, and usually gain considerable development before they attract the patient's attention. Cough, slight dyspnœa, and a tickling sensation behind the sternum are among the early symptoms. Later on, inspiration becomes difficult, and is sometimes accompanied by a whistling sound; there may be oppression on going upstairs, or a sense of suffocation at night, with a dry cough. When ulceration has become extensive, we may have a muco-purulent expectoration streaked with blood. The voice is preserved throughout, unless the larynx should also be diseased. When the bronchi are involved, the symptoms are very similar to those recorded above. In both the trachea and bronchi the great danger arises from contraction of the cicatrices left after the ulcers have healed, producing stenosis of the tubes. The ulcerations, being submucous, tend to involve the cartilaginous rings, causing perichondritis and caries.

The prognosis is usually unfavorable, for, should stenosis occur, both tracheotomy and medicinal treatment often fail to give relief.

For syphilitic diseases of the *lungs* the reader is referred to the article on that subject in the first volume of this work.

Treatment.—In the treatment of syphilitic diseases of the trachea and bronchi we depend upon Mercury and the Iodide of potassium, aided by the use of a nourishing diet and careful hygienic surroundings.

Syphilitic Diseases of the Organs of Circulation.

The Heart.—The heart suffers only during the tertiary stage of syphilis and from affections resulting from either diffuse infiltration of its muscular walls or from the development of gummy tumors. Lancereaux has reported two cases of waxy degeneration due to syphilis, but the observation has not been confirmed. The symptoms accompanying such lesions are similar to those which attend non-specific diseases of the heart muscle, hence their nature is often unsuspected until after death.

Grenouiller, in an effort to determine the period when heart affections are liable to appear, collected a series of twenty-four cases, and found that in eighteen of them the disease was manifested ten years after infection, though both he and Hutchinson have reported cases appearing at a much earlier date, and Tessier has recently treated a case occurring as early as the third year after infection. The last mentioned case presented the following post-mortem appearances: The anterior walls of the right ventricle in their upper halves were extensively involved, the muscular tissue of which seemed entirely transformed. The thickness of the cardiac wall appeared about normal, but it seemed of a peculiar gray color, and its consistence firmer. Section showed numerous milk-white, lentil-sized nodules, both in the cardiac walls and elsewhere. These presented a caseous appearance, but were in reality of quite firm consistence, showing no trace of softening even in the centre. The lentil-shaped nodules in this case were gummy tumors developed in the heart substance. "The changes which the heart undergoes in syphilis are principally: enlargement from dilatation of its cavities, and more or less extensive fatty degeneration."*

The Pericardium.—Syphilis may affect the pericardium, but such lesions are rare. Baumler speaks of *miliary granules* studding its surface, which Wagner and he consider syphilitic. Virchow has described membranous adhesions between the serous surfaces, and Lancereaux has recorded a case where a gumma as large as a cherry formed in the pericardium.

The Bloodvessels.—Syphilitic diseases of the veins are rare, and the capillaries are not usually affected except those of the brain which, when gumma occurs, are thickened and sometimes obliterated by a proliferation of the endothelial cells composing their walls. The smaller arteries quite frequently suffer from diseases of their walls, which develop either secondarily, during lesions in neighboring tissues, or primarily, the latter class of disorders being confined almost exclusively to the small arteries of the brain.

"The morbid change consists of a circumscribed thickening of the wall of the vessel by an infiltration of small cells, especially in the tunica intima. The lesion is limited internally by the endothelium, and externally by the membrana fenestrata. The cells are round and spindle-shaped, and seem to become developed into an imperfectly fibrillated tissue."† The tunica adventitia is also involved, and from this the cell infiltration spreads to the muscular coat.

The structural change consists in a narrowing of the calibre of the vessel, first from the presence of new growths which appear as rounded projections upon the inner surface of the artery, and secondly from contraction of the fibrous tissue into which the growths are often

* Baumler. † Bumstead and Taylor.

transformed. Fatty degeneration is another termination which may occur in such affections. Obliteration of the diseased vessels may follow. The relation existing between syphilis and atheroma of the arteries is an interesting question in its bearing upon the production of aneurism. Certainly, syphilitics are especially prone to these accidents, and the visible results of the disease are very similar in appearance to that which we call atheroma.

The symptoms caused by such affections will depend upon the vessels involved, and the prognosis upon the seat and extent of the morbid process. The diagnosis can be made only by a careful study of the patient's history and symptoms. From simple arteritis it differs in being limited to the smaller vessels, in its rapid development, and by involving all the coats of the artery.

The Lymphatic Vessels.

The lymphatic system plays an important part in syphilis, and while the morbid material finds its way to the various tissues of the body through these vessels it does not fail to leave on them its impress. We may have in the early stage of syphilis a hardening of the lymph-vessels in the vicinity of the initial lesion; the induration is similar in character to that of the indurated glands, and consists of masses of small cells infiltrating the walls and often obstructing their lumen. Sallé* has recently studied the condition of the lymphatics in syphilis, and finds that beside the lymphatic involvement mentioned above, we may have secondary lymphopathy which is evolved under the sole influence of the diathesis, without being due to local manifestation. In the tertiary stage, certain lymphatics, principally those of the dorsum of the penis, may become sclerosed and give rise to a special lymphopathy. In both acquired and hereditary syphilis alterations of the visceral lymphatics take place, but they occasion no characteristic symptom by which we may diagnosticate the condition.

Syphilitic affections of the lymph-vessels cause them to assume the appearance of hard, mobile, indolent, aphlegmatic cords; they are usually painless, and require but little treatment.

In tertiary syphilis it is possible that the lymphatic circulation is greatly retarded by syphilitic processes blocking up the lymph-vessels. Otis considers many of the tertiary lesions due to such obstruction, the nutrient material, being poured out in excess, becomes converted into gummy tumors because the obstructed lymph-vessels cannot carry it away.

Lymphatic Glands.—We have already seen how the lymphatic glands in the immediate vicinity of the initial lesion become hardened, and how at a later date this glandular enlargement and hardening becomes

* Journal of Cutan. and Venereal Dis., July, 1885.

general. In the tertiary stage the glands may become enlarged from deposits of gummy material; Lancereaux has noticed that the deeper glands are more liable to this accident than the superficial, and that in syphilitic diseases of the liver gummy disease of the lumbar, iliac, and deep inguinal groups occur.

Of the superficial glands those of the groins are most frequently affected by tertiary syphilis.

Syphilitic Diseases of the Nervous System.

The brain, spinal cord, and nerves are each liable to be affected by the morbid processes of syphilis. Ballonius, as early as the beginning of the seventeenth century, described syphilitic growths of the brain, and numerous early writers relate cases of epilepsy, paralysis, and neuralgia which they ascribe to syphilis. Hunter rejected the idea, and the medical world, bound by his dictum, refused to believe that syphilis caused diseases of the nervous system. The discovery of syphilitic diseases of the liver by Dittrich, in 1849, marked the beginning of a new era in pathology, for it inaugurated the study of visceral syphilis. Lallemand, in 1834, and Budd, in 1842, had each reported a series of cases of nervous diseases which they attributed to this disease, but after Dittrich's discovery the attention of syphilographers was attracted to the study of its internal evidences.

Ricord, in 1851, Schützenberger, in 1850, Virchow, in 1858, were among the first to carefully study the subject. Gros and Lancereaux, in 1861, Zambaco, in 1862, and Wiks and Wagner, in 1863, followed; and these were again followed by a host of students, among whom we may mention, as particularly fruitful in discoveries, the names of Reynolds, Hughlings Jackson, Clifford Allbut, Fournier, Buzzard, and Heubner.

The morbid processes consist of: (1) syphilitic growths and diseases of the arteries, similar to those which occur in other situations; (2) certain subacute and chronic inflammations of the meninges, and sometimes of the interstitial tissue of the nerves and nerve centres, often attended by the formation of new tissue; (3) certain chronic degenerations which sometimes follow syphilis in a manner suggesting a syphilitic origin.

General Ætiology.—Nervous disorders dependent upon syphilitic dyscrasia belong, usually, to a late period of the disease, most cases occurring between the third and tenth year. Cases have been reported as early as the third month, and as late as the twenty-fifth year, but it is rare for the nervous system to suffer during the first year.

Diseases of the meninges are developed earliest; arterial lesions and gummata are unknown until after the first year, while the degenerative

diseases occur only in persons who have long suffered with syphilis. Nervous affections develop with equal frequency in patients of all ages and in both sexes, nor do the conditions of life or daily surroundings exert any influence to either retard or hasten the symptoms. Special causes which act directly upon the nervous system seem to aid in the development of these disorders. Among these may be mentioned the following:

Hereditary tendencies to nervous affections. Paracelsus called attention to this cause, and the investigations of Lagneau, Englestedt and Griesinger have proved that such tendencies play an important part in the development of syphilis in these tissues.

Traumatic influences, such as blows, falls, or other injuries, may favor or even induce outbreaks of nervous disorders in syphilis.

Psychical causes also play an important part in precipitating these diseases. Numerous cases have been reported which have followed so closely upon mental overwork, sexual excesses, anxiety, fright, and similar conditions, that we are compelled to attribute the onset of the nervous disorder to the mental disturbance thus occasioned.

Diseases of the Brain.—The diseases of the brain due to syphilis consist of morbid growths, diseases of the arteries, and meningitis.

Syphilitic Growths.—These may appear as nodes on the inner surfaces of the cranial bones, and damage the brain by pressure; or they may develop as gummatous tumors on the meninges and affect the brain directly by causing inflammation.

Syphilomata or gummata, developed in the cranial cavity, present the same general appearances which have been described when occurring in other organs. They damage the tissue of the brain not only by pressure, but by inaugurating a tendency to degeneration leading to a softening of its substance.

It is doubtful whether these tumors are ever developed primarily in the brain tissue; they usually commence in the coverings, and by extension involve the cerebral substance.

Growths in the dura mater arise between its layers, and are more firm than those of the pia mater, owing to the greater abundance of fibrous material. The pia mater is more frequently the seat of these tumors than the dura mater; they spring from every part of it, and from its intimate relation with the brain are prone to involve its substance.

Gummata of the brain occur most frequently between the fifth and twelfth years, though instances have been reported as early as twelve months after infection, and as late as fifteen years.

Diseases of the Arteries of the Brain.—The arteries of the brain undergo the same pathological changes when affected by syphilis as do the other vessels of the body, and as these have been already described, it will not be necessary to repeat the description.

The disease affects most commonly the carotids and their branches, the vertebrals, the basilar, and the posterior cerebrals. A diminution of the size of the calibre of the vessel is, by the development of nodules, produced within the lumen. This interference with the circulation of the blood causes local anæmia of the brain, or, if the vessel becomes entirely occluded, the vascular supply of a portion of the brain is cut off, and necrotic softening results. The walls of the vessels, weakened by the morbid process, develop aneurisms; cerebral hæmorrhages, followed by hemiplegia, are not uncommon.

Arterial disease is generally met with from two to twelve years after infection, though cases are reported as early as the sixth month and as late as the twentieth year.

Diseases of the Meninges.—A simple form of acute meningitis may occur early in the history of syphilis by extension of inflammation from a bone which has become carious; but acute meningitis without such an exciting cause is extremely rare.

Subacute and chronic forms of the disease, either general or involving small areas, are not at all uncommon. In the neighborhoods of syphilomata the meninges are often thickened and matted together, and in localities where growths do not exist the same changes are developed. In the dura mater we may have pachymeningitis resulting in adhesions to both the pia mater and the cranial bones, and sometimes, in consequence, thrombosis of the cerebral sinuses and softening of the brain. Meningitis occurs usually during the later stages of syphilis, though occasionally developed in the early part of the secondary period.

A few cases of sclerosis of the brain in persons suffering with syphilis have been reported by Eccheverria, Charcot, and Gumbault.

The cranial nerves are often damaged by the changes produced by cerebral syphilis, suffering from the pressure of intercranial growths, or from changes produced in their sheaths by extension of inflammation from the diseased meninges. Beside, small gummatous tumors may form in the sheaths and, by pressure, damage them. Such lesions are often symmetrical.

Symptoms of Syphilitic Diseases of the Brain.—Diseases of the brain, due to syphilis, are often preceded by certain premonitory symptoms by which we are enabled to recognize the threatened onset long before its occurrence.

The most marked of these is *headache.* It is rarely absent, and precedes the more distinctive symptoms by weeks and even months. It varies in severity, and often becomes almost insupportable; it occurs in paroxysms which, like the bone pains in the extremities, become worse at night, often at about the same hour, remitting as morning approaches. Heubner has called attention to the fact, which he thinks highly important but not always noticed, that this headache, when it

can be localized, is generally made distinctly worse by pressure upon certain points.

Transient attacks of giddiness, dulness of the mind and delirium, and permanent or often recurring sleeplessness are symptoms frequently found in patients who are about to develop cerebral syphilis. Transient paresis of the limbs or cranial nerves is another of these prodromata.

The developed symptoms vary according to the part of the brain affected and the character of the producing lesion. The most important are paralysis, convulsions, and disturbances of the mind.

Paralysis is one of the most frequent results of cerebral syphilis. It is usually hemiplegic, though both sides of the body may be simultaneously attacked, especially when the morbid process attacks the pons or is developed in both hemispheres of the brain. Its distribution depends on the seat of the disease, and its mode of onset on the nature of the lesion. As a rule, *actual growths and chronic meningitis* cause a paralysis which is gradual in its development, while *diseases of the vessels* cause suddenly developed paralysis. The two first-mentioned causes produce their effect by pressure; the latter, by causing thrombosis, cuts off the blood-supply, and thus arrests the function of the brain. The degree of paralysis produced by syphilis is variable; in some cases it is as profound as that which follows apoplexy; in others it appears as a unilateral weakness, recognized by a sluggish action of the limbs.

In the latter class of cases we may have a slight drooping of the shoulder, a dragging of the foot, a diminished energy of particular movements, without the power of walking, the use of the arms for purposes of writing, etc., being completely lost. The power of speech is especially liable to be affected, not causing absolute aphasia, but a peculiar hindrance of the speech, as though the patient's control over the organs were imperfect, producing slowness, stammering, and other evidences of impaired utterance. Heubner has seen cases in which the aphasia was complete and combined with agraphia.

Diagnosis.—Syphilitic paralysis usually occurs at a much earlier age than the simple variety, and the fact that such attacks are not accompanied, at the time of onset, by loss of consciousness, is considered of value by Bumstead. The history of the patient and the existence of the prodroma before mentioned, will be of value in determining the nature of the complaint.

Convulsions.—Convulsions constitute an important symptom of cerebral syphilis, and are commonly due to either meningitis or syphilomata, not often resulting from diseases of the vessels. These causes affect, particularly, the surfaces of the brain, and as here the cortical motor centres are situated, the irritation produced is exhibited in the form of convulsions. They do not differ in character from those result-

ing from other local causes, and will be considered more fully in another part of this chapter.

Mental disturbances are also occasionally met with in syphilitic diseases of the brain. Active delirium is rare, but hebetude, and a low half-demented condition, with occasional paroxysms of obvious derangement, is more common.

Optic neuritis is exceedingly common, and is dependent upon the disturbances caused by chronic meningitis and syphilitic tumors. Developed in the course of cerebral syphilis, it presents no peculiarities by which it may be distinguished from the same condition when resulting from other intercranial diseases.

Symptoms of Special Lesions.

Symptoms of Meningitis.—The most frequent symptoms of syphilitic disease of the meninges are persistent headaches, marked by nightly exacerbations, sleeplessness, changes in the mental state, convulsions, peripheral pains, hyperæsthesia, and paralysis of regions supplied by the cranial nerves, and, finally, coma. Optic neuritis is developed when the meningis of the base of the brain is involved. Mental disturbances indicate that large areas of the membranes are involved. The temperature is only slightly increased, and the pulse not greatly accelerated. The coma increases if proper treatment is not afforded, and may pass into utter unconsciousness.

Symptoms of Arterial Disease.—Syphilitic affections of the arteries of the brain are preceded, for a greater or less length of time, by certain prodromal symptoms which should be remembered. Of these, headache is the most frequent, accompanied by sleeplessness, giddiness, transient attacks of unconsciousness, and alterations in the mental state of the patient. Hemiplegia is the most characteristic symptom of arterial disease of the brain; its onset is usually sudden, following the premonitory symptoms mentioned above. It may occur as early as the sixth month, or as late as twenty years after infection. Its onset, when sudden, is often attended with loss of consciousness, as in ordinary hemiplegia, and the interference with motion may be serious, though disturbances of sensation are usually limited.

When hemiplegia comes on by gradual invasion, total paralysis seldom occurs, the patient suffering from an impairment of motion rather than from its loss. Hemiplegia is more frequent on the right side than on the left, and, when so located, may often be accompanied by aphasia. The observation of Tanowsky that aphasia is very frequently associated with syphilitic hemiplegia of the left side is important. He found in fifty-three cases of aphasia, in syphilitics, that the hemiplegia was on the right side in eighteen, and on the left side in fourteen cases, the others not being hemiplegic.

Mauriac has shown by dissection that this concurrence of left-sided

hemiplegia and aphasia is dependent in part upon the great frequency of multiple brain-lesions in syphilis, and in part upon the habitual involvement of large territories of the gray matter secondarily to disease of the membranes. H. C. Wood thinks that the conjoint existence of left hemiplegia and aphasia is almost diagnostic of cerebral syphilis.

When the hemiplegia is dependent upon the occlusion of a small or unimportant vessel, it may pass away in a few hours or days, but if the vessel is large, it may continue for a long time, or even become permanent.

The prognosis, however, in all syphilitic hemiplegias is much better than in the simple form of the disease.

Diagnosis.—Its gradual development, when dependent upon syphilomata, and its occurrence in persons under forty years of age, mark this form of hemiplegia, and distinguish it from the idiopathic variety.

Symptoms of Syphilitic Intercranial Growths.—The symptoms caused by the development of syphilomata within the cranial cavity are exactly similar to those resulting from the presence of tumors which are non-specific in their nature. Headache is noticed here as in all other forms of cerebral syphilis, and is attended with the peculiar nightly exacerbation. The attending paralysis is gradual in its onset, and has a peculiar tendency to be temporary, transient, fugitive, and varying in its character. To-day one arm may be almost useless, to-morrow its vigor has returned, and on the third day it may hang helplessly at the side. This peculiarity is due to the fact that the palsy results not from the pressure of a clot, but from a congestion of the brain tissue in the region of the growing tumor. Of course, the paralysis becomes complete when the tumor has grown sufficiently to make pressure.

The fact that gummata are especially liable to occur about the base of the brain, and are, hence, liable to involve the nerves issuing therefrom, gives us another series of phenomena the occurrence of which indicates to us the existence of syphilitic intercranial growths. Hence, a rapidly, but not abruptly, appearing strabismus, ptosis, dilated pupil, or any paralytic eye symptoms in the adult, will point us to the brain, and the presence of syphilitic growths as the cause. Optic neuritis forms one of the most constant symptoms of syphilitic tumors of the brain.

Syphilitic Epilepsy.—Epileptic convulsions frequently occur during attacks of cerebral syphilis, and are due to irritation of the gray matter of the brain resulting from the presence of gummy tumors, meningeal thickenings, or adhesions. When due to affections of the meninges, it may develop quite early, though generally classed as one of the late manifestations of syphilis.

Eccheverria has reported many cases occurring as early as the first

year after infection, and he says that perhaps half the cases of this disease occur before the expiration of the second year. Broadbent, Hughlings Jackson, and other observers, have reported cases in which the disease was not developed until eight, ten, and fifteen years after infection. This possible delay in the manifestation of the disease should not be forgotten, for it may prove of great value in the diagnosis of what at first sight might appear to be simple epilepsy.

Heubner has called attention to the fact that a severe localized headache always precedes the development of syphilitic epilepsy. It may exist for months, or even years, before the convulsive attacks begin, and is described as almost insupportable, occurring in paroxysms, and, like the osteocopic pains of the extremities, becoming worse at night. It is an important fact that this headache, when it can be localized, is made distinctly worse by pressure upon certain points. Charcot says that this headache is confined to a limited spot on the side of the head.

Two forms of the disease are recognized, the *grand mal* and the *petit mal.*

The symptoms of the severe form of syphilitic epilepsy differ from those exhibited by the simple disease in being more deliberate in their onset, in the consciousness being lost later, and in the absence of the peculiar aura and cry which are so characteristic. The consciousness, though lost later than in the simple form, often returns much less slowly, patients remaining for hours, or even days, in a state of stupidity. Instead of the cyanotic condition and the foaming at the mouth which is so commonly seen in the simple form, we have a deathly pallor and a profuse flow of saliva in the syphilitic disease.

The convulsions occur at short intervals, and often with distinct regularity; if neglected, they become more and more severe, and are followed by serious mental disturbances. The mental symptoms consist at first of irritability of temper, melancholy, fickleness of disposition; at a later period marked weakness of the intellect is exhibited, loss of memory, imperfect speech, and finally a state of hebetude or even dementia may result.

To the milder form of the disease Charcot has applied the name of partial syphilitic epilepsy. It may exist alone, or combined with the form described above. It differs from the *grand mal* in the attacks being much less severe, of shorter duration, and in the fact that general convulsive movements may be absent. The seizure may be limited to a single limb or to one side of the body, and in some cases amounts to nothing more than a slight rigidity of the affected member. The patient may be seized while talking or performing some act, and, becoming unconscious, is noticed to stand staring for a few seconds, and then resume the conversation or action as though nothing had happened. In other cases twitching of the muscles of the side of the

face, turning the tongue to one side, general trembling, and a tendency to whirl around as though giddy, may be noticed. These manifestations are attended with partial loss of consciousness, and, in some instances, with tonic spasms.

Hughlings Jackson has described a form of partial epilepsy occurring in syphilis, which begins unilaterally as a twitching, rigidity or violent spasm of the muscles of the thumb and forefinger. This spasm may not extend beyond the arm, though in some cases it becomes general. Cornil has noticed that in such cases the face is always attacked before the limbs are involved.

Diagnosis.—Gowers says that syphilitic epilepsy, though closely resembling idiopathic epilepsy, can be diagnosticated from it by the following considerations:

1st. The history of the patient; whether he has ever had syphilis or previous attacks of epilepsy.

2d. The persistent headaches which precede the occurrence of the convulsions and exist during the whole of the intervals between, and not merely after the attacks.

3d. The frequent coexistence of optic neuritis.

4th. The coincidence of paralytic symptoms, such as hemiplegia, aphasia, and paralysis of various muscles.

5th. The association of early and often progressive mental disturbance.

6th. The age of the patient. Simple epilepsy usually develops before puberty, the syphilitic variety between the twentieth and thirtieth year.

Dr. H. C. Wood has noticed diplopia, due to a weakness of some of the ocular muscles, preceding the development of syphilitic epilepsy when due to chronic meningeal syphilis.

Prognosis.—The prognosis is usually favorable, the condition yielding readily to specific treatment. Bumstead has noticed that convulsions, preceded by a long prodromal stage in which the headache and symptoms of mental disturbance have been especially severe, have been difficult of cure; but when the headache has been slight and the prodromes of but short duration, treatment has been rewarded by rapid recovery.

Insanity.—The question whether, or not, syphilis can cause insanity without meningeal disease is an important one. Many alienists give a negative answer, but a paper on "the Clinical Aspects of Cerebral Syphilis," by Dr. H. C. Wood, of Philadelphia, would indicate that syphilis is capable of producing all the various forms of insanity. He tabulates twenty-three cases of syphilitic disease of the brain in which insanity was developed, and shows that mania, melancholia, erotic mania, delirium of grandeur, and all other varieties, were produced without obvious meningeal disease, and he attributes the aber-

ration of mind to a syphilitic disease of the gray matter, without the existence of tumors or meningeal disease. He further states that the symptoms of the mania, however various they may appear at first, end almost always in dementia, unless relieved.

Many cases of dementia paralytica occurring in syphilitics have been reported; in these cases the syphilitic disease has been widespread and has involved the whole cortex, thus causing progressive mental disorder, accompanied by gradual loss of power in all parts of the body. In many of these cases the delirium of grandeur has been noticed just as in dementia paralytica when arising from non-specific diseases of the cortex. It differs from the latter disease in the important fact that under specific treatment restoration of health and function is possible. Fournier has noticed that delusion in paralytic dementia of syphilis takes on the character of a vague, general satisfaction rather than of that greatness and grandeur which is so peculiar to the general paralysis of the insane. Obersteiner, who has carefully studied the relation of syphilis to dementia paralytica, has concluded "it must be included among the symptoms of tertiary syphilis." He thinks it difficult to distinguish between the two forms of the disease, and relies upon the following points:

1. The early appearance of the paralysis, when due to syphilis, between the twenty-fifth and thirtieth year. When not related to syphilis it rarely appears before the thirtieth or thirty-fifth year.

2. Unnaturally dilated pupils result from syphilis, while contracted pupils occur in those cases where there is no suspicion of venereal taint.

3. The results of treatment, many cases of dementia syphilitica having been cured by the Iodide of potassium. This rule is not absolute, for if the disease has long continued and the nerve substance been too seriously affected, restoration becomes impossible even when syphilis has been the producing cause.

Disease of the Spinal Cord.—The spinal cord and its meninges are liable to be visited by the direful effects of syphilis, but escape much more frequently than the brain. Two forms of the disease have been noticed, meningitis and syphilitic growths. Circumscribed gummata do not occur so frequently as the diffused infiltrating form, in which case the membranes and lymphatic spaces are crowded with gelatinous masses which provoke a state of chronic inflammation. The cord may become affected secondarily by the syphilitic disease first involving the vertebræ and thence extending to the membranes which line the spinal canal.

Syphilitic Growths of the Spinal Cord.—Gummata of the spinal cord, as in the brain, spring from the meninges. They are usually small, more or less rounded masses, reddish-gray in color when recent, and have a strong tendency to take on cheesy degeneration. They may

occur at any point, and damage the nervous mass either by compression or invasion. The nerve-roots may also be injured by the pressure exerted upon them.

The meninges of the cord become affected as the result of irritation caused by the presence of syphilitic growths. When these spring from the dura mater, we may have a pachymeningitis develop which, extending around the cord, may by pressure interfere with its functions, and may involve the nerve-roots which pass through the thickened membrane. The pia mater and the arachnoid may each suffer independently, but in the majority of cases the three membranes are affected simultaneously and become adherent. Heubner says, "In this case the cord itself is involved in the process, and examination reveals, over an area corresponding to the adhesions, a proliferation of the neuroglia with destruction of the medullary sheaths of the white fibres, changes which may extend to a considerable depth."

Syphilitic affections of the cord, as stated above, are rare, and, when occurring, they are not developed until in the later stages of the disease, several, and often many, years after infection.

Symptoms.—The symptoms developed by syphilitic diseases of the cord are very similar, whether they arise from tumors or from inflammations of the meninges. Patients usually complain of general languor and an indefinite feeling of sickness which they cannot localize for a long time before the more pronounced evidences of their affection declare themselves. When the membranes of the cord are attacked, certain well-marked symptoms of irritation are developed, such as pain referred to the spinal column or to the localities to which the nerves of the diseased portion of the cord are distributed. They are decidedly neuralgic in character and are subject to great variations, both in intensity and duration. Abnormal sensations are also complained of, such as numbness, tingling, zones of hyperæsthesia and spots of anæsthesia, with feelings of stiffness and even rigidity in certain muscles or groups of muscles. These symptoms are subject to great fluctuations; at one time they render the patient almost helpless, at another they disappear, and his health seems unimpaired. After a time a new feature is developed; to the symptoms of irritation are added well-marked evidences of paralysis. At first the patient notices a weakness in one of his limbs or it may be in half of his body; he finds it difficult for him to rise, or to move the affected member. Heubner says, "It is characteristic of this affection that, after the symptoms of paralysis have once made their appearance, they attain a high grade in a remarkably short time. The extent of the paralysis will depend upon the seat of the lesion. When located in the lumbar region, both lower extremities will be paralyzed; when in the dorsal, the sphincters will also be involved. After a little time the other side of the body becomes affected, and in a short time the paraplegia be-

comes complete. After the disease has attained a certain height, it remains stationary for a considerable time, and the patient is confined to his bed for weeks and even months."

This stationary stage may terminate in one of two ways: under proper treatment recovery may to a degree take place, or the patient may succumb to the disease and the confinement occasioned by it.

Disturbances of sensibility do not, usually, increase in a corresponding ratio with the motor paralysis, as they do in other instances of tumors of the cord or in myelitis.

Prognosis.—The prognosis in syphilitic diseases of the cord is most favorable when the lesion is situated in the lowest portion of the cord; and the outlook becomes much less favorable when the sphincters of the bladder and rectum are involved. The case becomes critical, and may speedily terminate in death, if the lesion is localized in the upper part of the cervical portion, for then the muscles of the trunk, including those of respiration, are paralyzed, and death closes the scene. But even in this most dangerous development of the disease proper treatment may arrest the degeneration, and life be saved and the functions of the parts restored in a greater or less degree. Absolute recovery is out of the question; the pressure exerted upon the sensitive cord, by the tumor or infiltrated membrane, has so altered its condition that under the most favorable condition traces of the paralysis will remain.

Acute ascending spinal paralysis is sometimes developed as early as the first year after infection. This, beside being the earliest of the spinal manifestations of the disease, is also the most serious and runs the most rapid course. For a few hours before its advent the patient may notice flying pains of a neuralgic character in the extremities; these are soon followed by a sense of weakness, and then by general loss of motion of the lower extremities. Sensation is not destroyed, and this but adds to the suffering of the patient, for the paralysis is often accompanied by formication, tingling, and numbness in the stricken members. The progress of the disease is rapid; in from twenty-four to thirty-six hours the entire muscular system of the limbs and trunk may be involved, the muscles of respiration escaping. The patient is confined to bed, his health gives way, and death takes place as early as the third or fourth week after the seizure. Medicine seems powerless in this affection, and post-mortem examinations fail to reveal any alteration of the cord.

Syphilis and Locomotor Ataxy.—Duchenne, early in his investigations of sclerosis of the posterior columns of the cord, noticed the frequency of an association of syphilis with the disease, but concluded that no evidence existed that it was the sole cause of any of the cases coming under his notice. In 1876, Fournier called attention again to the sub-

ject, and insisted that syphilis is very frequently the cause of locomotor ataxy. He, at that time, reported thirty cases, twenty-four of which had undoubted syphilitic histories. Vulpian, in 1879, said that he had seen but few cases of ataxy which had not had syphilis. "I do not think," he adds, "that it is an exaggeration to say that, of twenty persons attacked with locomotor ataxy, there are at least fifteen who are old syphilitic subjects." Erb, in 1879, reported that he found a syphilitic history in 61 per cent. of his cases, and in an article, published in 1881, states that the ratio had risen to 88 per cent. of the 115 cases treated by him. The following table of percentages of syphilitic histories in Tabes may be of interest:

Pusinelli	found in	51	cases,	16	per cent.	syphilitic.
Westphal	"	75	"	14	"	"
Remak	"	52	"	25	"	"
Bernhardt	"	37	"	25	"	"
Rosenthal	"	105	"	18	"	"
"	"	170	"*	12	"	"
Gowers	"	33	"	70	"	"
Althaus	"	32	"	90.6	"	"
Voight	"	43	"	67	"	"
Erb	"	115	"	88	"	"
Fournier	"	30	"			
Féreol	"	11	"			
Siredey	"	10	"			

The above statistics are certainly suggestive, and would at first sight lead one to think that syphilis bears an important causal relation to locomotor ataxy.

For several years after Fournier's publication, and its warm advocacy by Erb in Germany and by Gowers in England, this theory became quite popular, but recently it has been held with less tenacity, and the present state of opinion upon the subject is well expressed by Buzzard in the *Lancet* under date of June 10th, 1882, in the words: "While the remarkable frequency of association between syphilis and tabes dorsalis is unaccountable, I do not think, all things considered, that the time has yet arrived for us to draw safe inferences as to the precise nature of the relations."

This hesitancy to pronounce syphilis as the cause of many cases of locomotor ataxy arises from several considerations. Though the statistics given above seem to point strongly in that direction, they are not yet conclusive. It has been found that specific treatment of ataxy is not crowned with that success which attends it in all other manifestations of syphilis. Again, women suffer in about the same ratio as

* This 170 includes the 105 cases reported in line above. He first reported 65 cases and, two years after, reported 105 other cases.

men from all other nervous affections of syphilis, but in tabes they furnish only about 10 per cent. of the cases. Finally, the great difficulty which attends the discovery of the early symptoms of tabes makes it possible that in many of the cases reported as syphilitic these may have existed before infection, and the development of the disease has occurred after, and not in consequence of, that accident.

Locomotor ataxy, occurring with syphilitic history, does not differ from the simple form. If it is dependent upon syphilis, it must be classed as a very late manifestation. The earliest case in Gowers' collection occurred seven years after infection, and he thinks it rare to have it develop earlier than the tenth year, and reports cases as late as the twenty-fifth and thirtieth year.

The Nerves.—The various nerves of the body, and especially those which issue from the cranium, are liable to become the seats of syphilitic manifestations. They usually suffer through compression of their trunks, caused by the development of syphilitic growths in their connective-tissue sheaths, and the resulting symptoms are simply those which any injury of that kind would produce, such as neuralgic pains, paralysis of single muscles or groups of muscles, and loss of function, as in the nerves of special sense.

Treatment.—There is nothing peculiar in the treatment of the nervous diseases of syphilis. Though their manifestations are so varied, they are the offspring of syphilis, and the remedies which we have found of value in other lesions caused by this protean evil will act with equal promptitude and certainty in diseases of the brain and nervous tissues. The administration of the remedies must be prompt, and the dose must be increased until favorable results are seen, for the organs threatened are vital, and, if aid is afforded quickly, absolute restoration is possible; if delayed, paralysis, epilepsy, or even death, may result.

Bumstead advises the use of the Iodide of potassium in massive doses. He begins with fifteen grains after each meal, and if the patient bears it well he rapidly increases the amount. If the patient is known to bear the Iodide, he commences with half-drachm doses, or if the case is urgent, doses of a drachm are ordered, three times a day. Every other day the quantity of each dose is increased by the addition of five grains of the salt, until the symptoms improve or until doses of two drachms each are reached. Mercury, in some of its forms, will also be required, and the general condition of the patient must be watched, a nourishing diet provided, and every cause of anxiety and care removed. Pure country air, or the bracing atmosphere of the seaside, exert a wonderful influence for good in such cases, while cheerful company and pleasant surroundings each aid in overcoming the tendencies of the disease.

Syphilitic Diseases of the Eye.

The eye, in common with all other portions of the economy, is a field for the development of the various manifestations of the syphilitic poison. This organ may be affected either directly or indirectly; directly, when the structures proper of the ball become diseased, and indirectly by diseases occurring in the walls or in the cellular tissue of the orbit. The movements and functions of the eye may be interfered with, in consequence of remote results of syphilis, as when strabismus results from gummata developed within the cranial cavity.

Diseases of the Orbit.—The bones of the orbit, and the periosteum covering them, may suffer from syphilis, and, as a consequence, periosteal swellings, caries and necrosis may result. If such swellings attain considerable size, and are situated deep in the orbit, protrusion of the ball and loss of function may result.

Necrosis and caries may give rise to inflammation of the cellular tissue of the orbit, and deeply seated abscesses, with fistulous openings, may result, followed, should recovery took place, with distortion of the ball from cicatricial contraction of tissues. These deep affections of the orbit are attended with excruciating suffering and great constitutional disturbance, loss of flesh, of appetite, and strength.

In the early stages, if discovered, the Iodide of potassium, in doses of two or three grains, three times a day, will be of value; but when the disease has advanced, and danger of suppuration exists, Bumstead advises large doses of the Iodide, as much as a drachm two or three times a day.

The condition is desperate, the function of the organ is in danger, hence certain methods must be followed. The following remedies have been advised by Norton: Aurum, Kali iod., Mercurius, Asa fœtida, Hecla lava, Fluoric acid, Silicea, Ruta, Petroleum, Lycopodium, Carbo animalis, Natrum muriaticum.

Lachrymal Apparatus.—The lachrymal duct, in some instances, is narrowed, in consequence of an inflammatory affection of its mucous lining, induced by the syphilitic dyscrasia. This inflammation may be primary or secondary, resulting from an extension of a diseased process existing within the nasal cavity. Stenosis of the duct is a consequence to be anticipated and guarded against.

Gummata sometimes develop in the caruncles, and are usually followed by atrophy and permanent epiphora.

The lachrymal gland, in a few instances, has been found enlarged during syphilis, and the enlargement has been dissipated by specific treatment.

Eyelids.—The eyelids may be the seat of the initial lesion, and, when so situated, it will usually be found on the delicate skin at the margins of the lids. The induration in such cases is wide-spread, and the

resulting inflammation and congestion of both the lids and the conjunctiva is excessive. The preauricular and submaxillary glands may be enlarged, and are of importance in reaching a diagnosis. The lids may be the seat of various syphilides, especially those of the pustular variety and also ulcerating rupia. When so situated, they display no peculiarities, and are only noted because of the inconvenience resulting from their existence. The cilia and also the eyebrows often fall during the general alopecia which occurs early in the secondary stage.

Ptosis results from syphilitic disease of the third pair of cranial nerves; both it and strabismus are found in many cases of brain syphilis, and are due to pressure from meningeal thickening or from syphilomata.

Gummata of the lids often occur during the tertiary stage, and may cause destructive ulceration and deformity. Their most common seat is the free borders of the lids. The tarsal cartilages are, in rare instances, attacked by syphilis, and gummy tumors are developed; the skin remains sound and freely movable over the enlarged cartilages. Such tumors belong to the late manifestations of the disease (fourth to eighth year), and are usually unsymmetrical.

Conjunctiva.—Syphilitic diseases of the conjunctiva are rare, and when occurring are usually traceable to an extension of the disease from one of the contiguous parts of the visual organ. Not that this membrane possesses any peculiar immunity from the ravages of syphilis; its exemption is due rather to its situation and to the protection thereby secured. The initial lesion, in rare instances, has been developed upon the conjunctiva, the virus having been carried in one case by a kiss from a mucous patch of the mouth, in another by a surgeon's finger who had been handling a syphilitic; in both instances well-marked lesions appeared after the usual period of incubation. When situated upon the conjunctiva, the usual symptoms of hardness and glandular enlargements will be found.

Secondary manifestations of syphilis upon the conjunctiva are more frequent, and it is not rare, though by no means common, to have ulcerations, papules and mucous patches develop upon this membrane during the course of the disease. Noyes has noticed that they are usually found upon the conjunctiva near the margin of the cornea; this observation may be of value, though for diagnostic purposes we generally depend upon the history of the case and the discovery of other syphilitic lesions.

Gummy tumors have in few instances been noted, but they are extremely rare and, of course, belong to the tertiary stage of the disease.

Cornea.—The following observation from Bumstead is of importance. "While ulceration of the cornea with loss of tissue is in non-specific cases the commonest form of disease to which this membrane is liable,

in syphilis, ulceration rarely, according to some never, occurs as the direct result of the constitutional taint."

Interstitial keratitis is the most common affection of the cornea due to syphilis. It is quite frequently developed during the course of hereditary syphilis; indeed, some writers have confined its occurrence to this form of the disease, but careful observation has shown that it occurs during the acquired as well as in the hereditary form.

Nettleship gives the following description of the symptoms and appearances developed in interstitial keratitis.

"It usually begins in one eye. When the case is first seen, one or more considerable patches of haze in the substance of the cornea are generally present, together with considerable ciliary congestion and more or less intolerance of light. The haze may begin at any part, but most frequently near the margin. Before long the whole cornea becomes involved; and in a few weeks the various clouds of opacity have so thickened and extended that the whole cornea is opaque, though the greater density of certain parts is still quite perceptible. From the beginning the hazy parts lose their polish through some change in the anterior epithelium, and this, together with the opacity, gives to the cornea very much the appearance of a piece of ground-glass. There is no ulceration. In a few cases, although the cornea is severely affected, there is total absence of congestion and photophobia; but in the great majority, a zone of sclerotic congestion is present in the ciliary region, and some intolerance of light with circumorbital pain. Sometimes the appearance of corneal opacity is preceded for a few days by ciliary congestion. In the variety known as keratitis punctata the opacities are small and sharply defined, but even in these cases the intervening tissue is seldom quite clear."

"In another group of cases the haze of the cornea is accompanied from the first by the formation of vessels in its substance. In extreme cases the vessels invade every part of the cornea except a little island in the middle, and give to the tissue a dull red color which has been described as a salmon-pink or a dull brick-red. As recovery takes place, a few straggling vessels are often left, and the corneal surface may show numerous little irregularities."

Iritis and cyclitis or anterior choroiditis not unfrequently complicate the affection and increase the discomfort of the patient.

Diagnosis.—The history of the case, as well as the peculiar appearance of the cornea, will aid us in a correct conclusion as to the nature of the disease. In the hereditary form the teeth, the countenance, and the history of the patient and of his family, will be reliable guides.

Prognosis.—In mild cases the prognosis is favorable. If such cases are seen early, and are put at once under proper treatment, a good result can often be obtained; but we should in all cases be ex-

tremely guarded in the promises we make to the patient, for dire results not unfrequently follow the keratitis of syphilis.

Treatment.—The treatment of keratitis must be conducted upon principles which recognize its specific nature and tendencies. The diet and hygienic surroundings of the patient must receive the greatest care. Food of the most digestible form and nourishing character will be required. Frequent baths in tepid water, either salt or fresh, followed by thorough rubbings of the skin, will be of service, and residence in the open country or at the seaside will give a tone to the system which cannot be acquired in any other way. Cod-liver oil should not be forgotten, as it affords nourishment, and the iodine contained in it seems to beneficially affect the general condition.

Van Buren and Keyes advise fomentations of the diseased eye by means of compresses wrung out of hot water and applied for a period of one or two hours at a time, three times daily. The compresses must be changed as fast as they become cool, and the water must be kept as hot as the hand can bear. If iritis threatens, or if the circumorbital pain is excessive, instillations of the following solution of the Sulphate of atropia will be of service:

℞. Sulphate of Atropia, ... gr. j–ij.
Distilled water, ... ℥ j.

A drop into the diseased eye from three to six times daily.

Colored glasses or a shade protect the eye and afford great comfort to the patient when in the light.

The homœopathic remedies are *Mercurius cor.*, *Merc. protiodide*, *Aurum muriaticum*, *Hepar*, *Arsenicum*, *Sulphur*, *Belladonna.* Norton has given the following indications for the mercurials:

Mercurius corrosivus.—Indicated in the erethistic forms of the disease with great photophobia, acrid lachrymation, pains worse at night and in damp, cold weather.

Mercurius protoiodatus.—In serpiginous ulceration of the cornea commencing at the margin; it extends over the whole cornea, especially the upper part; ulceration involves only the superficial layers of the cornea; vascularity of the cornea; thick, yellow coat on the base of the tongue.

Iris.—The iris is very frequently attacked by syphilis, giving rise to a very dangerous form of iritis. Von Graefe has estimated that about 60 per cent. of all cases of iritis are due to syphilis. Syphilitic iritis may occur at almost any time during the course of the disease, but is especially liable to develop during the exanthematous period of the disorder; hence it is often seen as early as the second month after the appearance of the initial lesion, and may occur as late as the gummy period of the tertiary stage.

Several forms of the disease have been described, such as the simple

or plastic iritis, serous iritis, and parenchymatous or suppurative iritis.

In the simple or plastic form the symptoms are mild, and the exudation, which takes place on the papillary border of the membrane, is plastic and very liable to cause adhesions between the iris and the anterior capsule of the lens.

In the serous form of iritis the exudation is serous instead of plastic, and Bumstead says it is due to a hypersecretion of a slightly turbid aqueous humor. This increase of the contents of the anterior chamber deepens it, increases the intraocular tension, and causes the pupil to dilate rather than contract, which is the ordinary condition in iritis. Owing to this state of dilatation there is but little danger of synechia.

In the parenchymatous or suppurative form the condition is much more serious than in either of the preceding. Here the inflammation attacks the stroma of the iris, causing swellings of the membrane and an increase of its connective-tissue elements. We have developed in this form of iritis peculiar brownish or yellowish elevations upon the surface of the iris at the margin of the pupil; these tubercles or tumors have been shown by Virchow to be veritable gummata, and to be entirely similar to the same class of tumors occurring in other localities. Extensive adhesions of the iris take place during attacks of parenchymatous iritis, and so firm are they that recovery is rare. Deposits of pus in the anterior chamber are also of frequent occurrence.

Symptoms.—The subjective symptoms of syphilitic iritis are usually milder than those which accompany the rheumatic and simple forms of the disease, but the pathological changes are profound and serious.

It usually begins in one eye, but both suffer sooner or later in about two-thirds of all cases. It is preceded, for a day or two, by the well-known zone of pink congestion of the sub-conjunctival vessels in the ciliary region; in violent cases the vessels of the conjunctiva may also be involved. The iris, which at first has only a dull look, gradually assumes a dirty, grayish, dark color, totally obliterating the beautiful arrangement of its fibres. This muddy appearance is due to congestion, and also to exudation into the substance of the membrane. The aqueous humor becomes turbid, and, in consequence, the vision may be impaired. In all cases there is a tendency on the part of the iris to adhere to the capsule of the lens; if the adhesions are extensive, the movements of the membrane are lost; if adhesions take place at only a few points, the circular form of the pupil is destroyed and an irregular form substituted.

In the later forms of iritis, as we have already seen, we may have gummy tumors developed. Here* the iris swells at one or more

* Nettleship.

points, and small nodules appear, projecting from the anterior surface; these are at first very vascular, reddish, and not larger than a pin's head; afterwards they become larger and assume a yellowish color. They are generally situated close to the pupillary border of the iris; occasionally they enlarge so much as to fill the anterior chamber. If they become very large, atrophy of the corresponding part of the iris may occur. In this form of the disease the adhesions of the iris are often extensive and permanent, and if proper treatment is not resorted to early, great damage to the organ is certain to result. Punctated keratitis often accompanies syphilitic iritis.

The subjective symptoms, as already noted, are not usually so severe as in other forms of iritis. The pain is often slight, and but little intolerance of light is manifested, though both symptoms may be very severe. Vision is often disturbed; this may be due either to adhesions of the iris or to opacities in the aqueous humor. A feeling of general uneasiness and slight febrile condition accompanies these symptoms.

Diagnosis.—Syphilitic iritis can only be distinguished from other forms by attention to the history of the patient and an examination with a view of detecting evidences of syphilitic infection. The following table, by Desmarres, presents at a glance the differential indications between syphilitic and rheumatic iritis.

Syphilitic Iritis.	Rheumatic Iritis.
No acute symptoms.	Always acute symptoms.
Slow development of disease.	Rapid development.
Yellowish-green discoloration of the iris, dimness of the cornea and aqueous humor.	No discoloration of iris; cornea and aqueous humor retain their transparency.
Perikeratic circle indistinct.	Circle very distinct.
Synechiæ and pupillary exudations.	Synechiæ rare.
Punctated keratitis in last period.	Punctated keratitis never occurs.
Condylomata of the iris.	No condylomata.
Very little photophobia.	Intense photophobia.
No watering of eyes.	Abundant watering of eyes.
General dulness of eyes.	Eyes unusually bright.

Prognosis.—We must always remember that we have two forms, at least, of syphilitic iritis: an early and a late variety. In the former the condition is merely that of inflammation, hence its results are not so serious; but in the other we have gummata developed in the membrane, and in consequence firm adhesions of the iris, deformities of the pupil, persistent dimness of sight, and many other grave complications; hence the prognosis will depend very much on the age of the syphilis causing the iritis. If occurring early in the history of the disease, proper treatment may remove every trace of the affection; but the

late variety frequently defies our best directed efforts, and results in deformity and, often, loss of vision.

Treatment.—The great danger in iritis is that adhesions may form between the inflamed iris and the capsule of the lens or the posterior surface of the cornea. Our treatment must be addressed primarily to a prevention of this occurrence. A strong solution of Atropine must be used to rapidly dilate the pupil and get it out of the way. Afterward a milder solution may be employed to keep up the dilatation:

Strong Solution of Atropine.

℞. Sulphate of Atropia, ... gr. iv.
Distilled water, ... ʒj.

This may be dropped into the eye every two hours until the pupil is fully dilated; then use the following to keep up the effect:

Weak Solution of Atropine.

℞. Sulphate of Atropia, ... gr. ij.
Distilled water, ... ʒj.

Of this, a drop or two is to be instilled two or three times a day.

If adhesions have already formed when the surgeon is called, an effort must be made to break them up by the persistent use of the strong solution of Atropine and compresses wet with a Belladonna fomentation:

℞. Extract of Belladonna, ... ʒj to ʒij.
Hot water, ... Oj.

to be applied hot.

If we can succeed in dilating the pupil, the pain will cease and the congestion will rapidly decrease. The remedy is Mercury; it must be given in half-grain doses of the first decimal trituration, and repeated two or three times a day. It will relieve the condition of the iris and, what is more important, hold in check the syphilitic taint from which the patient suffers.

In the late form of iritis, with gummy tumors, the Iodide of potassium, in five-grain doses three times a day, may be of service.

The diet will depend largely on the condition of the patient; if robust and strong, it should be sparing; if cachectic, the most nourishing food should be used. In cold weather it is advisable to remain in doors, but if the weather is pleasant, the eye should be protected by a shade, and the air and sunlight enjoyed. It is rarely necessary to confine the patient to a dark room, save in cases of extreme photophobia, and even then he should be urged to leave it as soon as possible, as

the darkness but aggravates the symptoms. It would be out of place here to speak of the surgical treatment which is so often required in this affection. Every other day the quantity is increased by the addition of five grains of the salt until the symptoms improve or until doses of two drachms each are reached.

Among the homœopathic remedies for syphilitic iritis—

Rhus toxicodendron * has proved itself of value, especially in the primary stage, with profuse lachrymation.

Petroleum, when there is heat in the eyes, with pain, heat, and throbbing in the occiput.

Cinnabar, when pain affects the supra-orbital region. Helmuth considers this the best mercurial for this form of disease.

For abscess of the iris: *Hepar*, *Silicea*, *Mercurius*, and *Sulphur*.

For ulceration of the cornea: *Mercurius*, *Arsenicum*, and *Calcarea*.

Iritis in cases where Mercury has been abused: *Nitric acid*, Mezereum, Hepar, Dulcamara, Sulphur, *Asa fœtida*, *Aurum*.

Colchicum will be of service when there is an exudation of lymph, or the inflammation is of a very chronic character.

Thuja, after iritis, tubercles, and warty excrescences appear upon the iris. Severe, sharp, sticking pains, worse at night and better from warmth.

Asa fœtida, especially after the abuse of Mercury. Pain throbbing, pulsating, very severe, in the eye, above the eye, and in the temple. Liebold thinks it acts best in women.

Aurum.—After abuse of Mercury or of Iodide of potassium. Tearing, pressing pains deep in the bones of the orbit and extending down into the eyeballs. Pressing pain from above downward and from within outwards. Aggravated by touching. Great mental depression, with suicidal mania.

Mercurius.—Norton considers this remedy our sheet anchor in syphilitic iritis. The *sublimate* he finds most useful, it being indicated in cases where the symptoms are violent; next comes the *Mercurius sol.*, which is to be used when the inflammation is of a lower grade than that indicating the *Merc. cor.* The *Protoiodide of mercury* he gives when there are glandular enlargement, superficial ulcers of the cornea, and a thick, yellow coating on the base of the tongue.

Nitric acid.—The pains are pressing and stinging, aggravated by every change of temperature, worse at night and on touching the parts.

Choroid.—Syphilitic disease of the choroid does not occur so frequently as iritis; still, it is by no means a rare manifestation. It is likely to develop later than diseases of the iris, the majority of cases occurring during the first year after infection, although it has been seen as late as the tenth, and even the fifteenth, year. The late form, as in late iritis, is dependent upon the development of gummy products, and hence is more serious in its consequences. Clinically we cannot separate the varieties of choroiditis, but dissection shows us that three forms of the disease occur, viz., a plastic inflammation, a serous inflammation, and a parenchymatous or suppurative form. In a large majority of cases both eyes are diseased, and while absolute blindness rarely occurs, great impairment of vision is a constant result. The

* Helmuth's Surgery, page 182.

disease affects the inner layer of the choroid, and causes a collection of small round cells, either in patches upon its surface or else an infiltration of the membrane. This infiltration may involve large tracts of the choroid and affect the overlying pigment epithelium of the retina, and in this way cause adhesions between the retina and the choroid, and also thickenings of the retina. If the disease is not checked, atrophy of the choroid and retina may result.

The symptoms of choroiditis are usually those of failure of sight. A slight dimness of vision, a kind of lassitude of the eye, a sensation of painful tension, are the first symptoms to attract the attention of the patient. The loss of sight increases gradually, objects appear as in a mist, or moving black spots interfere with the vision. Pain is sometimes complained of, especially if there should be much congestion. The ophthalmoscope is of great value in determining the exact condition of the eye, and should be used in all suspected cases. The changes exhibited by this instrument cannot be stated here, and the reader is referred to works on ophthalmology, in which these changes will be found fully illustrated. The course of the disease is usually slow; it sometimes lasts for months, and during its course may present successive ameliorations and aggravations, with a constant tendency to grow worse. Recovery, however, often takes place; but in the late form of the disease, although blindness rarely occurs, it is often followed by permanent injury of vision.

Diagnosis.—Like many other manifestations, syphilitic choroiditis has no absolute diagnostic marks to distinguish it from non-specific inflammation. In diagnosis we are dependent upon the history of the patient and upon other evidences of a syphilitic taint.

Treatment.—Similar to the treatment advised under syphilitic iritis. *Mercurius solubilis*, *Kali iod.*, and *Aurum* have been especially recommended in this affection.

Retina.—*"Syphilitic retinitis is generally associated with, and is secondary to, choroiditis, but in some cases no change can be demonstrated in the choroid, and the retinitis, though quite the same, is assumed to be primary. The vitreous in this disease is often hazy, and the opacities are often seated very deeply, just in front of the retina." The ophthalmoscopic changes are very similar to those existing in idiopathic retinitis. Syphilitic retinitis is by no means of frequent occurrence in secondary syphilis, and is rarely developed earlier than the sixth, or later than the eighteenth, month after infection. It generally attacks both eyes, but not simultaneously. "Its onset is often rapid, as judged by its chief symptom, failure of sight; as a rule, the amblyopia is much greater than would be expected from the slight changes exhibited. It is essentially a protracted disease,

* Nettleship.

always lasting for months, and showing a remarkable tendency to repeated and rapid exacerbations after temporary recoveries, but with a constant tendency to get worse. Its onset is sometimes attended with pain, and one of the early symptoms is a 'flickering' before the sight. The presence of marked night-blindness in the later stages of the disease is of diagnostic value." Mercury is to be given, and the eye should be protected from the glare of the sun by colored glasses. The prognosis is generally favorable if seen early and appropriate treatment employed.

In rare instances syphilis may affect the sclera and also the ciliary body, giving rise to symptoms which in no way differ from idiopathic diseases of the parts. The optic nerve may also suffer from the venereal taint, and, as we have already seen, both the aqueous and the vitreous humors are subject to changes which impair their usefulness.

Syphilitic Diseases of the Ear.

The ear is occasionally invaded by the lesions of syphilis, and cases have been reported in which the external, middle, and internal portions have been affected. The diseases are not well understood, and the treatment of those affecting the deeper portions are not attended with that success which usually follows our efforts in the management of syphilis.

External Ear.—In several instances the initial lesion has been found situated upon the external ear. When so located, it may readily escape the attention of the attendant, as it is not accompanied by any symptoms which help us to distinguish it. The lymphatic glands of the locality are enlarged, and are painless and freely movable under the skin, as in other cases of chancre. The external ear is sometimes the seat of the skin-manifestations of syphilis. Papules are frequently seen about the outlet of the external meatus and in the concha. Dr. Sexton has recently* reported three cases of tubercular syphilide of the ear in which a cure was made by using very small doses of the Biniodide of mercury and Iodide of potassium—about one-fortieth of a grain of the former, and two and a half grains of the latter—given three or four times a day.

The Middle Ear.—The middle ear may be affected independently, but in the majority of cases its acute syphilitic affections are derived from similar conditions of the throat by extension, in which case but one ear will be affected, and upon that side an ulceration of the throat will be seen. The affection may occur at any time during the first or second year of syphilis, and is accompanied by jerking, tearing pains in the ear. The hearing is impaired, and examination shows the

* Journal of Cutan. and Venereal Diseases, June, 1883.

membrana tympani drawn in and the mucous membrane of the drum reddened. As a rule, such cases recover without suppuration, but this may occur and the membrana tympani be perforated.

A chronic affection of the ear coming on insidiously, and attacking first one ear and then the other, and causing rapid impairment of hearing, has been described. It begins usually about three months after the general skin manifestations are developed. The membrana tympani shows a grayish-white appearance, and is devoid of lustre. The mucous membrane of the pharynx is congested in most cases, and shallow ulcers of the tonsil and velum are usually present. Pain is felt in the ear, but more often in the temple and forehead, and exhibits the nightly aggravation so common in syphilis.

Schwartze holds that the bilateral character of this trouble, the nocturnal frontal pains, the rapidly increasing deafness, and the early impairment of the conductive power of the cranial bones, are symptoms which may be considered characteristic of the affection. The termination is usually great, and often total, deafness, the treatment being very unsatisfactory. Impairment of hearing sometimes results from occlusion of the Eustachian tube, the occlusion resulting from cicatricial contraction following ulcerations of the pharynx.

Internal Ear.—The affections of the internal ear caused by syphilis are not well understood, and though certain writers have classified them, the classification is based more upon theory than upon absolute knowledge. A very peculiar deafness occurs sometimes during the late period of the secondary stage; both ears are affected simultaneously, and while the patient can hear his own voice, or a tuning-fork applied to the vertex, to all extraneous sounds he is oblivious. This form of deafness is preceded by a hyperæmia of the drum, and is often attended by abnormal sounds and a feeling of fulness in the ears. Vertigo, especially on rising or stooping, and staggering gait often attend the disease.

Dr. Sexton has called attention to a peculiar symptom which accompanies sudden deafness, patients complaining that all sound as heard by them is raised in pitch; for instance, the rumbling of a railroad train produces a painfully high-pitched sound like a whistle. The results of treatment are not at all satisfactory.

Syphilitic Diseases of the Genito-Urinary System.

Urethra.—We have already called attention to the fact that the urethra is a favorite seat for the development of the initial lesion of syphilis. In the chapter devoted to the syphilitic chancre we have presented a diagnostic table which will be found of great service in distinguishing the symptoms arising from the presence of a chancre deep in the urethra and gonorrhœa.

A muco-purulent discharge from the urethra is sometimes found in syphilis. The disease is rare, and presents nothing of interest save the fact that its occasional occurrence has given rise to the theory, in our school of medicine, that there are two forms of gonorrhœa, a simple and a syphilitic form. In the chapter devoted to the history of gonorrhœa we have carefully examined this theory, and have tried to show how erroneous the belief is, and how greatly it has confused and retarded the study and treatment of these affections by homœopathists. The urethritis dependent upon syphilis occurs during the outbreak of the secondary symptoms, and is due to the irritation set up in the mucous lining of the urethra by the development of erythema, mucous patches, and superficial ulcerations upon its surface. The discharge is very similar to that of gonorrhœa, but differs from it in the following important particulars. It ceases in a few days or weeks after its appearance, even without treatment. It is not attended by irritation or scalding. It is accompanied always by other secondary manifestations of syphilis, and, if brought in contact with a healthy person, it produces the initial lesion of syphilis, and not urethritis. The disease is very rare, and is so different from ordinary gonorrhœa that it need cause no confusion in practice.

Bladder.—Syphilitic affections of the bladder, if they exist, are as yet but little known. Lancereaux quotes from Follin and from Virchow cases in which tumors of the bladder were developed in syphilitics, and were thought to be due to the disease. The connection is not clearly made out; hence the observation is to be taken, not as establishing the existence of syphilitic disease of the bladder, but as indicating that such a condition may exist. The same uncertainty exists concerning syphilitic lesions of the ureters and the pelvis of the kidneys.

Kidneys.—Rayer* was the first to discover that the kidneys suffer from syphilis, though, prior to him, attention had been called to the occurrence of kidney disease in syphilitics; but it was believed to be due to the abuse of Mercury rather than to any change superinduced by the venereal trouble. The kidneys suffer much less often than do some of the other viscera, and yet with sufficient frequency to demand our attention. Wagner,† in 9000 autopsies, found 63 cases of kidney disease traceable to syphilis. Speiss,‡ in 220 autopsies of syphilitics, found pathological changes in the kidneys in 147 cases, and gummatous formations in 7 of them. Engel§ calculates that, out of 16 cases of Bright's disease, there is inveterate syphilis in 6, but this estimate is

* Rayer. Traité des maladies des reins. Paris. 1840.

† E. Wagner. Archives of Dermatology. April, 1882.

‡ Speiss. Archives of Dermatology. April, 1882.

§ Quoted by Lancereaux. Sydenham Society's Edition. 1868.

entirely too high, as has been shown by Bamberger,* who found only 49 cases due to syphilis in 2340 autopsies of acute and chronic Bright's disease.

We find the same anatomical changes to occur in the kidneys of syphilitics which we have noted in the other viscera, to wit, interstitial hyperplasia and isolated gumma.

Beer† describes very fully these anatomical changes. He has noted:

1. Small, circumscribed, nodular formations (gummatous tumors) in otherwise normal or differently diseased kidneys.

2. Simple interstitial hyperplasia, mostly irregular, with the formation of cicatrices.

3. Diffuse cellular hyperplasia of the interstitial tissues, mostly with lardaceous degeneration of the vessels and manifold atrophies of the new formation, as well as peculiar parenchymatous changes. These were particularly small fatty deposits, but they rarely existed without lardaceous degeneration of some part of the organ.

4. Purely parenchymatous affections.

Without other aids to diagnosis, only the first and third of these forms can be regarded as characteristically syphilitic.

Wagner, in a careful study of these affections, has described several forms which correspond to the idiopathic diseases of the kidney.

Acute Bright's Disease.—Under the head of Acute Bright's Disease, he gives the histories of three cases, where this affection was observed in patients under the full influence of the early stages of syphilis, or where the symptoms of the disease disappeared under the use of anti-syphilitic remedies, and follows these with five more cases where post-mortem examination of patients who had showed symptoms of syphilis during life revealed parenchymatous nephritis with hæmorrhage.

Subacute or *Chronic Bright's Disease.*—Under the head of Subacute or Chronic Bright's Disease he describes four cases similar to those in the first division, but the autopsy showed, in each instance, that the Bright's disease had advanced to the second stage. In all of these cases, both the acute and chronic, the urine was highly albuminous and contained casts. The face and limbs were œdematous, and those which recovered grew rapidly better under the Iodide of potassium.

Lardaceous Disease of the Kidneys.—This is perhaps the most frequent disease of the kidneys due to syphilis; it often occurs in consequence of the prolonged suppuration which attends many of the tertiary affections, notably those of the bones and joints; but it has been proved beyond a doubt that syphilis can cause lardaceous disease without any obvious suppurative affections. Virchow believes that it is caused by the cachexia of syphilis. Moxon says that "the syphilitic lardaceous

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* Quoted by Wagner in Archives of Dermatology.

† Archives of Dermatology. April, 1882.

kidney presents very much the appearance of the large, white kidney of Bright, and that we are not to expect the "bacony" appearance seen in other forms of the disease. "The essential change," say Hill and Cooper, "consists in an infiltration of a nitrogenous material, beginning with the small arteries, and afterwards involving other tissues. The Malpighian tufts appear large, white and opaque, and become still more evident if a solution of Iodine be poured over the kidney, when they assume a hue much browner than the other parts of the section." Wagner has observed a number of cases of amyloid degeneration dependent upon syphilis; in many of them lardaceous disease of the liver and spleen existed at the same time.

Gummata of the Kidney.—This is not a frequent disease of the kidney; but, though rare, sufficient evidence exists to prove that it does occur. When these tumors are developed in the kidney, they are situated in the cortex, near its surface, and present the appearance usually exhibited by these growths. In all the instances hitherto recorded, similar nodules were also present in the liver. Wagner has noted several cases, one of which had apparently been cured by treatment.

Interstitial Hyperplasia of the Kidney.—*"When the kidney is attacked by interstitial hyperplasia, the change begins in one or two, sometimes in several, points at once. The stroma thickens and contracts to some extent. The glandular structure also suffers by compression from the thickening and contraction of the interstitial tissue; the cells of the tubules waste, the Malpighian bodies shrink, and their envelopes thicken. This process of cirrhosis is usually limited in extent, and only exceptionally pervades the kidney generally. Such a kidney has its surface unevenly marked by deep seams. The capsule is tough and adherent. White bands of cicatricial tissue traverse the organ, and gummy nodules are sometimes connected with the bands. The cirrhosis, produced by syphilis, is not different in appearance from cirrhosis produced by other causes, and a kidney is only pathognomonically syphilitic when it contains gummata, either with or without cirrhosis."

Wagner has noted in his cases a unilateral atrophy of the kidney, due to the contraction following interstitial hyperplasia. The atrophy was marked, and a compensatory hypertrophy of the other kidney was found. Weigert and Heubner have also observed this condition, and have found arteritis obliterans accompanying it.

Symptoms.—The symptoms of renal disease, dependent upon syphilis, do not differ from those which arise in the course of kidney affections dependent upon other causes. *Albuminuria* is a very frequent symptom in syphilitic, as in idiopathic, forms of kidney disease. During the early secondary manifestations we may have an acute tem-

* Hill and Cooper.

porary attack; its duration is short, and its cause unknown. Cornil states that when it occurs in tertiary syphilis, it rapidly causes an incurable cachexia. It is a constant attendant upon the various conditions described above, and is often attended by dropsies. *"When it is persistent, it indicates a serious lesion of the kidneys, and may entail all the phenomena known under the head of uræmic; thus, we sometimes see vomiting and diarrhœa, sometimes cerebral derangements and coma which often proves fatal."

The course of syphilitic affections is slow and continuous, their duration generally long, and their termination most frequently fatal. I am speaking here of renal affections of the tertiary period; the albuminuria which often occurs in the early stages is much more amenable to treatment.

Diagnosis.—The antecedents of the patient, the concomitant syphilitic manifestations, and a state of peculiar cachexia, are symptoms of such import that their existence will certainly put us on the track of the diagnosis. The observation of Lancereaux, that syphilitic diseases of the kidney and liver frequently coexist, should not be overlooked, for enlargement or atrophy of the latter organ, attended with albumin in the urine, constitutes a strong presumption, if not a certainty, in favor of visceral syphilis.

Prognosis.—The prognosis of syphilitic lesions of the kidney, without albuminuria, is usually favorable; this cannot be said when it is present. Rayer says: "I know few diseases which offer so few chances of cure as these complicated cases; these complicated cases of inveterate syphilis with changes in the liver and kidneys are almost always incurable."

Treatment.—The treatment for the various diseases of the kidneys due to syphilis should be selected with regard to the stage of the producing cause, hence, as the great majority of these disorders are developed during the tertiary stage, the Iodide of potassium will be found the most useful. Should it fail, we must then resort to *Mercurius corrosivus*, which has done excellent work in these affections. Homœopathic literature contains but little concerning the treatment of these disorders by our system. It would be well for members of the profession to publish their experience, seeing how utterly futile in the graver forms of these affections are the iodide and mercurials of our rivals. The following from Hughes may be of service: *In Bright's Disease, Terebinthina* may be of service in nephritis with albuminous and bloody urine, scanty urinary secretion.

Cantharides in cases of nephritis where desquamation is considerable, and uræmia threatens.

Arsenicum in subacute nephritis with œdema and serous inflammations.

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* Lancereaux.

In amyloid or lardaceous degeneration of the kidneys, Hughes recommends *Phosphoric acid*, especially when due to suppuration; it may be of value in syphilitic diseases. *Nitric acid* is also to be remembered.

The Male Genital Organs.

The Penis.—The penis, as we have already pointed out, is very often the seat of the initial lesion of syphilis; this is owing to the intimate connection of this organ with the female vagina during the act of copulation. It also suffers during the early stages of the disease from papules and mucous patches, and during the tertiary stage is not unfrequently attacked by gummy tumors. When gummata, situated upon the penis, break down, a ragged ulcerating sore is left which is liable to be mistaken for chancroid; but the presence of syphilitic disease elsewhere, and the history of the case, will usually render distinction easy. Gummata developed between the layers of the prepuce have been mistaken for cystic tumors. Gummata sometimes occur in the erectile tissue of one of the corpora cavernosa, and then give rise to a peculiar form of chordee. As long as the penis is flaccid there is no inconvenience, for the nodules are never attended with pain; but when erection takes place, the gummy tumor blocking up the cavernous body, prevents the inflow of blood, and hence that side of the penis remains flaccid, while the opposite body becomes turgid and erect, and causes the penis to curve toward the sound side. These gummy nodules are usually easily dissipated by appropriate treatment; if neglected, they may break down and give rise to deep and troublesome ulcers.

Affections of the Vasa Deferentia, the Vesiculæ Seminales, and the Prostate.—The *vas deferens* very rarely becomes the seat of syphilitic disease, remaining intact in the great majority of cases, even when the testicle is involved. It is sometimes injured by extension of the disease from the testicle, Verneuil having seen a case in which a gummy tumor, twice the size of a fist, had developed in the cord, and extended as far as the iliac fossa. A similar product occupied the anterior wall of the right auricle.

The *vesiculæ seminales* do not appear to be subject to the influence of syphilis; at least no well-authenticated case of disease of these reservoirs has been reported.

The *prostate gland* seems to enjoy a similar immunity, though Lancereaux rather inclines to the view that it may suffer from the development of gummy tumors within its substance.

The Testicles and Epididymes.—In syphilitic diseases of the testicles we have the same pathological conditions so often noticed in other organs, *i.e.*, interstitial hyperplasia and gummy tumors. In the former the disease is disseminated, in the latter it is circumscribed.

Epididymitis.—Drou, in 1863, described an indolent, painless enlargement of the globus major, due to syphilis, which has received the name of syphilitic epididymitis. It occurs usually about three months and a half after the appearance of the initial lesion, though in some cases it has appeared as late as one year. The patient complains of a lump behind the testicle, hard, painless, and varying in size from a pea to an olive, or even a walnut. It always involves the head of the epididymis, and in this it differs from gonorrhœal epididymitis, where the tail is the seat of lesion. Very frequently the epididymis of both sides is involved. The swelling is indolent, but subsides in a few weeks under mercurial treatment. From the fact that patients suffering from this affection are able to discharge spermatic fluid as rich in spermatozoa as though no disease existed, it has been supposed that the pathological change takes place in the periphery of the globe. The hardness is probably due to gummous infiltration, though there has been no histological examination of these tumors so far as we know.

In late syphilis the epididymis is sometimes attacked by an extension of the disease from the testicle; in this form the disease is apt to be unilateral.

Diagnosis.—This form of epididymitis can be readily distinguished from that of gonorrhœa by its indolence, by the seat of enlargement, and by its rapid subsidence under mercurial treatment.

Treatment.—The Biniodide of mercury is a remedy of great value in this affection; *Clematis*, Pulsatilla, Nitric acid, and Staphisagria have been advised. If the affection accompanies late syphilis, the Iodide of potassium may be required.

Syhilitic Orchitis.—Astruc had noticed that the testicle often became enlarged from syphilis, but it was not until Sir Astley Cooper had thoroughly studied the disease that its existence separate from gonorrhœal orchitis was recognized. Ricord, at a later date, carefully investigated the affection both at the bedside and post-mortem, and to his careful studies we are indebted to-day for our full information concerning this disease.

Syphilitic sarcocele, Syphilitic orchitis, Syphilitic albuginitis are synonymous terms for one and the same affection, which occurs usually at the transition period of syphilis, when the secondary manifestations are becoming so profound and grave as to cause us to hesitate in classifying them. In very rapid cases of syphilis orchitis may occur as early as the fourth or fifth month, but generally several years elapse between the appearance of the primary lesion and the involvement of the testicle. It is usually accompanied by other severe manifestations of the disease, such as ulcerations of the fauces and affections of the periosteum and bones, though it sometimes is seen as the only sign of syphilis, and coming, as it often does, years after the primary

sore has passed away, it may be difficult to at once trace the true nature of the affection, but the symptoms are so peculiar that with ordinary care the real character of the lesion will be discovered.

Symptoms.—The patient often fails to discover the diseased condition of the testicle until it has attained considerable size, for syphilitic orchitis is always painless. Not only is the trouble painless, but during its course it seems to destroy the normal sensibility of the organ, until finally it can be pressed and squeezed without any inconvenience whatever. The disease affects the body of the testicle alone, rarely involving the cord, and is attended by some increase in size, though this is not marked, as the testicle in the severest cases does not reach a size greater than double its normal bulk. The testes are usually both involved, sometimes simultaneously, at other times consecutively. In exceptional cases the patient complains of dull, aching pains in the loins and back, though usually the discomfort only amounts to a sensation of weight, and this is felt at night after he has spent the day at business, and is due to the increased weight of the organ. The painless character of the disease, and the loss of sensibility of the organ in advanced cases, are important symptoms in distinguishing between this and other enlargements of the parts. An examination of the body of the testicle early in the course of the disease will detect one or more distinct projections, varying in size from that of a pea to an almond. These are gummy nodules, and are located upon the tunica albuginea; as the disease progresses, they coalesce and form a hard tumor, which retains the general shape of the testicle.

Syphilitic orchitis is always attended with slight hydrocele, which may interfere with a thorough examination of the organ. Usually the sexual desire remains unimpaired, but if the testes both become involved, the function of generation is gradually lost, and impotence and sterility result. The course of the disease is always slow; it may last for several years, and terminate in a variety of ways. Ricord taught that suppuration never occurs, but the observations of numerous more recent authorities prove that this law is not always true, and that suppuration may follow here, as in any other syphilitic affection. If the disease is left to itself, obliteration of the seminiferous tubules results, and atrophy of the organ follows. The parenchyma of the organ may degenerate into fibrous, cartilaginous, or osseous tissue, with consequent destruction of function. Gummy tumors generally end in resolution, leaving behind them a more or less radical change in the testicle, or they may soften, and thus give rise to suppuration and ulceration of the neighboring parts, causing the so-called syphilitic fungus of the testes.

Diagnosis.—Syphilitic orchitis may be confounded with a variety

of troubles, such as gonorrhœal orchitis, traumatic orchitis, non-specific tubercular disease, and with cancer of the testicle.

Gonorrhœal orchitis can be distinguished by the history of the case, the preceding urethral inflammation and discharge, by the painful character of the disease, the redness, heat, and tension of the scrotum, and by the fact that the globus minor is the part attacked.

Traumatic orchitis is recognized by the history of a recent injury and by the violence of the attending symptoms, differing markedly from the painless, non-inflammatory character of the syphilitic disease.

*" Tubercular disease of the testicle occurs about the age of puberty rather than in adult life, and in persons presenting evidences of a strumous diathesis. The adventitious deposit first takes place in the epididymis, or in the centre, and not in the external portions, of the testes, as in syphilitic orchitis; as the disease progresses, slight protuberances may be formed upon the surface, as in the last mentioned disease, but they soon contract adhesions with the tunica vaginalis and scrotum, suppurate and ulcerate. Moreover, evidences of tubercular deposit may often be detected in the vesiculæ seminales by examination with the finger *per anum*, or in the cord and inguinal ganglia. *In cancer of the testicle*, which is generally of the encephaloid variety, the pain is slight at the commencement, but increases with the progress of the disease, and becomes very severe and lancinating; the tumor is very irregular, grows with great rapidity, and often attains an immense size; the cord and neighboring ganglia are frequently involved."

Treatment.—The first indication in the treatment of syphilitic orchitis is to properly support the enlarged testicle in a well-fitting suspensory bandage. This is about all the local attention the case will require. Internally the patient must have the Biniodide of mercury in the second decimal trituration, twice a day, in doses of one grain each.

Aurum, Conium, Pulsatilla, Nitric acid, and Lycopodium have each been recommended in this affection.

Syphilitic Diseases of the Female Genital Organs.

The genital organs of women do not suffer from the effects of syphilis so frequently nor so severely as would be expected.

The *Vulva* is sometimes the seat of the initial lesion, as we have seen, and during the secondary stage may suffer from erosions and papules. Papules thus located are similar to papules in other situations, but owing to the friction of the parts as well as the moist condition, they may ulcerate and become converted into mucous patches and condylomata. During the secondary period, in weak cachectic women, we

* Bumstead and Taylor.

may have troublesome and destructive ulcers of the labia, and at a later period gummy deposits may take place, and result in deep, ragged sores.

The Vagina.—It is a rare thing to find the initial lesion situated in the vagina, and equally as rare to find either secondary or tertiary manifestations. It may be the seat of gummy tumors and of ulcerations, more or less deep, giving rise to troublesome contractions of the canal.

Uterus.—The cervix uteri, in rare instances, has had the initial lesion located upon it, and quite as rarely has exhibited secondary or tertiary lesions. Deep ulcers of the cervix may occur from gummata breaking down, and are followed by contractions which in some instances have occluded the os, and have in this way contributed to the production of sterility. The symptoms of syphilitic disease of the uterus do not differ from those which attend similar affections of a non-venereal character, hence it is extremely difficult to decide as to their nature. We can only do so by inquiring into the history of the case and examining the patient closely for other evidences of syphilis. *The ovaries* and *Fallopian tubes* may, in all probability, be affected by constitutional syphilis, but our knowledge of such manifestations is so limited and uncertain that it is best to leave the question open.

The menses, in severe cases of syphilis, are sometimes arrested or become irregular; this is owing more to the weak, anæmic condition of the patient than to any change in the organs, but in the great majority of cases this function is not interfered with.

The Breasts.—The mammary glands suffer from the effects of constitutional syphilis, and, as in other organs of the body, we may have two pathological conditions resulting: a diffused cellular infiltration and circumscribed gumma. These affections are both rare, especially the first named; cases of gummata of the breast are more frequent, and have, in some instances, been mistaken for malignant or benign growths. Gumma of the breast presents a well-defined swelling, unattended by pain, and attracts attention only after it has acquired considerable size. The skin over it is at first free, but when large and neglected, the tumor becomes adherent to the skin, softens, its contents are discharged, and a deep, slowly-healing ulcer remains.

Diagnosis.—From cancer, gumma may be distinguished by the absence of pain, the non-implication of the integument and other structures, the absence of glandular enlargement, and by the nipple presenting a natural appearance. From adenoma the diagnosis is more difficult, and we must rely upon the history of the case, the presence of other syphilitic affections, or their traces, and the effect of treatment.

Prognosis.—The prognosis in syphilitic diseases of the breast is good, recovery speedily taking place under proper treatment.

Syphilitic Diseases of the Bones, Cartilages, and Joints.

Nocturnal bone pains constitute one of the dreaded symptoms of syphilis. While they always accompany the syphilitic lesions of the osseous system which occur during the tertiary stage, they are also found during the early part of the secondary stage. They are felt only at night, and usually after the patient has retired, and are described as excruciating. In the early stages of the disease they are located in the long bones, particularly those of the leg, but in the tertiary stage are found in any of the bones of the skeleton which have become the seat of syphilitic lesions.

Early Periostitis.—The periosteum may suffer very early in the course of an attack of syphilis. Mauriac has reported cases occurring even before the appearance of syphilitic roseola, and Bassereau a case as early as the third month after infection. The disease consists of a hyperæmia of the periosteum and the formation of new fibrous tissue, causing painful swellings upon the surfaces of the superficial bones. These nodes vary in size from a half-inch to an inch and a half, and are often elevated as much as an inch above the surface. They are smooth and round, and are sometimes single, at other times multiple. The nodes grow rapidly and are the seat of constant pain, which is aggravated by the slightest pressure and, as in all syphilitic bone affections, is distinctly worse at night. The parietal and frontal bones are most often attacked; the headache which attends this form is described as almost unbearable. The sternal end of the clavicle, the upper third of the sternum, and the subcutaneous portion of the tibia are each favorite seats of the disease. These tumors usually terminate by resolution, and rarely cause exostosis or even thickening of the periosteum.

Late Lesions.—It is during the tertiary stage of syphilis that the bones suffer most; the lesions developed then are more profound and destructive, and give rise to long-continued and wasting disorders, often resulting in frightful deformity, and not unfrequently in death. These tertiary bone affections are not to be looked for in every case of syphilis, even when left without treatment, for in many cases the disease seems to exhaust itself long before these deeper tissues feel its malign influence. But unfortunately we cannot determine where this gracious termination will occur; hence we must treat every case with the fear that tertiary bone affections may occur. The abuse of Mercury has without doubt played a by no means unimportant part in the production of destructive bone-diseases in syphilitics. We believe that in our school of medicine there is a tendency to over-estimate this disease-producing agency of Mercury, and in the old school a tendency, just as marked, to deny to the drug any such power. Here, as in so many other places, an intermediate position is safest. Mercury, if abused, will precipitate bone troubles; but in a case of syphilis not

one dose of the mineral may have been administered, and yet the most terrible bone affections may develop.

Lancereaux has divided late syphilitic lesions of bone into the following classes: Inflammatory disease of the bone and periosteum, gummy tumors, dry caries, exostosis, caries, and necrosis.

Inflammatory Form—Osteo-periostitis.—This lesion of syphilis affects both the periosteum and the underlying plate of bone, and commences by an increased vascularity of the two surfaces, followed by an effusion of a fluid or a substance of greater consistence. When this effusion takes place into the periosteum, a tumor is developed which has an oval surface and which fades away into the surrounding tissue. If the lesion occurs in the thickness of the bone, we will find dilated canals which are filled with a substance resembling bone plasma or callus. These lesions produce small tumors upon the surface of the bones which are quite tender upon pressure and are the seats of excruciating nocturnal pains. In the majority of cases the skin over them is not involved, nor is it changed in texture or in hue. The tibia, clavicle, ulna, sternum, and cranium are most liable to be thus attacked, but all the bones of the skeleton may suffer, though the superficial ones are most liable to be involved. This inflammation most frequently terminates in resolution, but if neglected may give rise to troublesome ulcers which have for their base a plate of carious bone. They heal slowly, and the cicatrices are attached to the uneven bony surface. Another termination consists in the deposit of calcareous material in the node, thus giving rise to bony exostosis or periostosis.

Syphilitic Exostoses.—These terminal lesions of osteo-periostitis vary in size from that of a pea to that of a walnut, and have a hard, bony consistence. They are divided into epiphyseal and parenchymatous exostoses.

Parenchymatous exostosis follows deep-seated ostitis, and is an hypertrophy of the normal bone-tissue. The new ossification may take on the character of either cancellated or compact bone-tissue. When it consists of layers with areolæ between them, the name of laminated tissue is sometimes applied; when formed of compact tissue, it is said to be eburnated, and then it produces with the increased volume an increased weight and density of bone-tissue.

Epiphyseal exostosis is the result of periosteal inflammation. The bony tumor in this lesion is at first movable upon the bone beneath, hence the idea of comparing it to a kind of epiphysis; in the end it becomes adherent. The bony plates are often multiple and assume various shapes, flat, conical, elongated, and hemispherical.

Exostoses of either variety are not usually attended with marked symptoms other than the night pains, unless they should be located in such a manner as to impinge upon a nerve, in which case a trouble-

some neuralgia would result. When situated within the cavity of the skull, not an uncommon location, they cause very serious symptoms, such as hemiplegia, epilepsy, and other grave affections.

Gummy Form—Osteomyelitis.—Gummata of the bones is not a rare disease; when occurring, they occupy either the periosteum or the bone itself, in which case the medullary substance is the usual starting place.

When the tumor is developed in the periosteum, it has a fixed base, more or less circumscribed in form, soft and fluctuating, and consists of the ordinary gummy material. The tumor increases in size, becomes inflamed, and involves, by pressure, the overlying skin, which it finally perforates, and leaves an ulcer which has, for its base, a carious bone, to which the cicatrix, when healing takes place, becomes firmly fixed.

When the gummy neoplasm is situated in a long bone, it has for its usual seat the medullary canal, and consists of a substance of the color and consistence of a lardaceous product. The disease is accompanied by nocturnal osteocopic pains which make the nights of the sufferer almost unbearable. There is hypertrophy of the diseased bone, with the formation of cancellated tissue; the medulla is hardened, and, according to Ricord, resembles rancid bacon in appearance and consistence.

Gummy tumors also affect the flat bones, and in them work their greatest mischief. Any of the flat bones of the skeleton may be attacked, but in practice we will find the bones of the head, nose, hard palate, and the alveolar process of the upper jaw the favorite seats of this affection. The destruction which attends gummata thus located, constitutes one of the most serious results of syphilis. When located in the bones of the cranium, such growths are likely to develop in the diploë; as they increase in size, they push apart the laminæ of compact tissue, and finally cause necrosis, and even caries. Perforation sometimes takes place, and the dura mater is laid bare, or may protrude through the opening.

Gummata of the bones may terminate either by the absorption of the new growth, by the suppuration of the bone, or caries and necrosis may result.

Virchow has called attention to the fact that the sequestrum in syphilitic necrosis is pierced with holes and orifices which communicate in its interior, and in this differs from the sequestrum of ordinary necrosis, which presents a smooth, polished, compact, even surface. "It may be added," says Lancereaux, "that the surrounding tissue, whether necrosed or not, is often eburnated and heavy." He also calls attention to the peculiar half-circle form which is seen in cases of necrosis of the cranium, and which calls to mind the annular or semi-annular arrangement which we have noted in certain of the syphilides.

Dry Caries.—Virchow has described a disease of the bones, occurring

in late syphilis, which is peculiar in that it progresses without suppuration. The bones of the cranium are the usual seat of this affection, though a case in which the sternum was involved has been reported. It often coexists with gummy affections of the periosteum; indeed, Lancereaux thinks it is in some unknown way traceable to gummy infiltration.

It is slow and insidious in its approach, hence often escapes observation until it is fully established. Lancereaux thus describes the condition:

"It shows itself at one or more points in the form of foci, characterized at the centre by a process of thinning (regressive action), and at the circumference by a process of proliferation or hypertrophy (progressive action). The thinning commences constantly by the dilatation of the medullary or vascular canals of the bones. Gaping orifices are observed, pores which are the extremities of the straight canals of the cortical substance, and at the same time furrows, converging toward the affected point, which are formed by canals parallel to the surface of the bone. At first the cortical substance of the bone becomes hollow over a small surface; this depression assumes a stellated appearance. This depression increases in circumference and depth; the medullary canals at the circumference become enlarged; the centre is depressed and assumes the form of a funnel, and the edges become perpendicular, brittle, and wrinkled. This continues until the bottom of the funnel reaches the spongy portion of the diploë, and may result in perforation.

"While the bone is thus wasting, an osseous substance of new formation is deposited at the periphery of these funnel-shaped depressions. This osseous material rapidly hardens, becomes eburnated and sclerosed, and forms around the depression an irregular mammillated rim. Osseous substance is also deposited at the bottom of the depression, new portions of bone are formed, which cause in the end sclerosis of the whole diseased part." This affection is attended with the nightly pains common to all the bone-diseases of syphilis; the other symptoms are the depressions resulting from local atrophy and disturbances which may result to other organs from compression or secondary changes. The marked symptom in dry caries is the destruction of bone without suppuration.

Course and Duration.—The general course of syphilitic affections of the osseous system is slow and progressive. Their duration is long, like that of most of the other manifestations of the same nature. The prognosis is not serious, unless they come to interfere with the functions of important organs, such as the brain and spinal cord. The suppuration, which sometimes attends the separation of sequestra, is not without danger, but the greatest danger arises from the fact that

these tertiary affections of bone are often attended by dangerous diseases of the viscera.

Treatment.—Bone-affections of syphilis belong almost entirely to the third stage, hence the general treatment of that stage will usually be required in these diseases. The Iodide of potassium will be found of the greatest service in dissipating nodes and allaying the nocturnal pains of these affections; indeed, in every form of bone disease, and almost in every stage, it will act with wonderful certainty and quickness. If the case has been neglected, and the bone-affection is extensive, and the general condition of the patient bad, it may be well to remember Bumstead's advice to use the Iodide in large doses of forty, sixty, or even a hundred grains per diem.

We should be careful about lancing syphilitic nodes, for resolution often takes place even after fluctuation is evident; and to open the tumor only exposes the bone, and will certainly result in caries and necrosis. The treatment of caries and necrosis, and the disposition to be made of sequestra, belongs to the domain of surgery; hence it will not be touched upon here.

The homœopathic remedies which have been found most useful in bone-affections are arranged in the following table, taken from Jahr's work on *Venereal Diseases.*

For bone pains, ostitis, and periostitis: Mezereum, Phosphorus, Staphisagria, Phosphoric acid, Nitric acid, Aurum, Guaiacum.

For swelling of bones, periostoses, and exostoses: Aurum, Fluoric acid, Phosphorus, Staphisagria, Phosphoric acid, Mezereum, Silicea, and Sulphur.

For caries and necrosis: Aurum, Nitric acid, Fluoric acid, Silicea.

Beside the above-mentioned remedies, *Asa fœtida* has been highly recommended in venereal nodes and affections of long bones.

Aurum has been especially advised when the bones of the face, nose, or skull are affected. Jahr gives the remedy in half-grain doses of the third trituration, every four days, and says that it has proved the most efficient of all remedies in these affections.

Mercurius solubilis is used by Yeldham in doses of from five to ten grains of the second decimal trituration, given three times a day; he says that in cases of inflammation of the periosteum which follows soon after the primary sore, this remedy is usually all that will be required. In later affections he uses the Iodide of potassium.

Nitric acid is used by him after the Iodide has been employed for some time, and the improvement seems to be arrested. It is given in doses of from one to two drops of the strong acid, properly diluted, three or four times a day. Yeldham also recommends this acid as a local application in necrosis, applying it upon cotton-wool after it has been diluted.

Corydalis.—Syphilitic nodes of the skull; also in nodes of the tibia.

Hale reports two cases which had been treated for a year with the Iodide, cured with Corydalis in ten-drop doses of the tincture, given four times a day.

Stillingia sylvatica seems especially suited to diseases of the periosteum. Hale says it has cured exostosis of the bones of the face. He thinks it of value in mild cases of syphilis, but says "it will not cure alone."

The diet and surroundings of patients suffering from bone-affections must receive careful attention. Nourishing food and regular hours and habits must be insisted upon. Cod-liver oil should be administered daily, and a visit to the seashore is to be advised where a tendency to exhaustion is developed.

Dactylitis Syphilitica.

This affection of the fingers and toes occurs in both acquired and hereditary syphilis, but is much more rare in the former than in the latter. Our remarks will be confined to the acquired form.

Bumstead and Taylor, who have carefully studied this affection, recognize two varieties: the first, where the pathological changes begin in the subcutaneous tissue and fibrous structure of the joints; the second, where the morbid process begins in the bones and periosteum.

In the first form the disease comes on slowly, and first attracts attention by enlargement of one or more fingers or toes. When the toes are affected, their whole length is included, but in the fingers the enlargement is quite sharply limited to the proximal phalanx; it may not extend further, or it may involve the whole finger, but this is rare. The skin over the diseased phalanx is of a bluish-red color, and the swelling is tense and firmly attached to the skin, and is usually greatest on the dorsal surface. The disease develops slowly and often without pain, though sometimes attended with dull aching. There is more or less periosteal thickening, but the bone in this form usually escapes without serious damage. In a few weeks after the development of the affection the joint becomes stiffened, and if left untreated, in the course of one or two months this stiffness subsides and the joints become unnaturally mobile. There may be slight effusion into the synovial cavity, and crepitation from erosion of articular cartilages. It is a late manifestation, and runs a chronic course. In its early stage it is amenable to treatment; the prognosis is, therefore, good, for the disease rarely involves the surface in ulceration, and the joint may be restored to its natural condition; but if neglected, the result may be an unnatural mobility.

Second Variety.—The second variety may begin either as a periostitis or as an ostitis. Its progress is variable, sometimes rapid, at others slow; the earlier it appears in a case, the more acute is its course. It

belongs to a very late stage of syphilis; often five, ten, or even fifteen years elapse between the initial lesion and its development. The shape of the enlargement depends upon the phalanx involved, it assuming the form of an acorn or balloon when the first phalanx is affected, and fusiform or cylindrical when the second or third suffers. The fingers are attacked more frequently than the toes, but both toes and fingers may suffer simultaneously. The proximal phalanx of the finger is the one most liable to be affected, and the distal phalanx least frequently. The size of the enlargement seems to be influenced by the number of joints attacked, it being larger when only one suffers than when many are diseased, for any number of joints may be affected at the same time, the enlargements being distributed sometimes unilaterally, at others symmetrically. The metacarpal bones are, in some instances, enlarged, those of the thumb and index-finger being most liable to be involved. The skin over the diseased bone is often unchanged, unless the increase in size has been very rapid, when inflammation and redness may be exhibited. If ulceration occurs, the opening will be on the side of the finger, and the discharge will consist of cheesy material and pus. Limited necrosis may occur, but usually the bone escapes serious damage. The structures about the joints may be thickened, the articular cartilages eroded, and hydrarthrosis may occur, impairing motion; at a later date, after absorption, the joint may become mobile. This affection pursues its course almost without pain, or, if present, it is so slight as to almost go unnoticed.

The affection may terminate in a variety of ways; after continuing a long time the gummy deposit may be absorbed, or it may soften and be discharged through a sinus. The enlarged shaft of bone may return to its original size, every evidence of disease disappearing; or it may become thinner at the point of lesion, causing an ugly deformity; at other times the shaft is shortened and the finger maimed for life; in a few cases it has been elongated, and finally the shaft may be thickened and eburnated. The deformity following dactylitis is not usually marked, but if neglected, the malformation following may be quite unpleasant, and the uses of the member greatly interfered with.

Diagnosis.—It is important to recognize these affections early, and as there are several conditions for which they may be mistaken, we must be on our guard to distinguish between them and paronychia, gout, rheumatoid arthritis, enchondroma, and exostosis.

In paronychia the local inflammatory symptoms and pain will distinguish it from dactylitis.

Dactylitis of the great toe might be mistaken for gout, but here the absence of pain and undue heat would reveal the true character of the enlargement. The same difference would exist between dactylitis and

rheumatism of the small joints, from enchondroma and exostosis by the swelling in these affections being more localized.

Treatment.—The treatment is that required for late syphilis. When the disease had developed rapidly, it will promptly disappear under proper remedies, but if it came slowly or has continued for a long time, the prognosis is not so good.

Syphilitic Diseases of the Cartilages.—The cartilages suffer from the effects of syphilis as well as the bones, and, as in the latter, the disease seems to attack by preference certain of them, while others escape its ravages. Those cartilages which have a covering somewhat analogous to the periosteum, the perichondrium, are especially liable to become the seats of disease. The cartilages of the larynx, being of this form, are often attacked, and necrosis and destruction result. The costal cartilages appear to be susceptible to the same condition. The articular cartilages are not affected, unless it be secondarily, as when the bones or synovial membranes of a joint are diseased.

Syphilitic Affections of Joints.—The joints may be affected during the early stages of syphilis, before the secondary eruptions appear; during the secondary stage, at from six months to a year after infection; and again, at a very late date, several years after the initial lesion.

Early Disease of the Joints.—Early in the course of syphilis the larger joints may be the seat of rheumatoid pains which are very distressing to the patient; they may precede the first exanthem, and depart when it is fully developed, or persist for many months. The pain is dull and aching in character during the day, or it may be so slight as to be unnoticed while the patient is taking exercise, but at night it becomes excruciating, and drives him almost mad. The affected joint is not tender on pressure, it is not reddened, the temperature is not increased, nor is there enlargement. Any of the joints may be affected, but the larger ones, such as the shoulders, knees, elbows, wrists, and ankles, most frequently suffer. The knees are especially liable to the disease. One or more joints are usually involved, sometimes symmetrically, at other times this peculiarity is not exhibited. The lesion is probably due to a low grade of hyperæmia of the synovial membrane and fibrous tissues of the joint.

Rhus toxicodendron will be found of service in this affection, but *Mercurius solubilis*, or some other preparation of the metal, will certainly be required before the suffering can be finally relieved.

Secondary Affections of Joints.—Diseases of the joints during the secondary stage of syphilis are more rare than the affection just described, but still they undoubtedly occur. Brodie has remarked that chronic inflammation of the synovial membrane of one or more joints is not uncommon in connection with the papular eruptions of early syphilis. In one form of secondary disease the joint is slightly swollen, and is especially painful at night or when the joint is at rest; movement

increases the pain. Redness and heat are sometimes seen, but not commonly. The affection has been seen in the knee, wrist, and ankle.

Another form of secondary disease consists of a simple hydrarthrosis, the knee-joint being almost its exclusive seat. The pain in this variety is less than in the one just described, but the swelling is more pronounced; in some cases the effusion is quite copious. A peculiarity of this effusion is the intermittent character which it sometimes assumes, at one time increasing rapidly, and at another time almost disappearing, but reappearing after a little time, and regaining its former quantity.

Neither form persists long, though relapses are so common as to be considered characteristic.

Tertiary Affections of Joints.—We may have simple synovitis of a joint as late as five years after the initial lesion, but in the great majority of cases, when occurring at so late a date, it will be found associated with gummy tumors. "Richet, who was the first to describe this form of synovial inflammation, named it 'syphilitic white swelling,' and it was said by him to be due to gummy infiltration into the subsynovial connective tissue and into the reflections of the membrane which lined the joints." Lancereaux has confirmed this view by dissection; he says, "the subsynovial cellular tissue and the fibrous tissue were here the seat of the neoplasm, which did not differ either in color, consistence, or histological composition from the syphilitic products of the subcutaneous cellular tissue." Slight pains, with nocturnal exacerbations, attend this lesion; the joint swells slowly, with effusion, which is often intermittent, and upon either side of the ligament of the patella a soft elastic mass may be felt.

There is no increase of temperature, and the motions of the limb are preserved. The knee-joint is the favorite seat of the trouble. Sometimes one knee only is affected, sometimes both knees are attacked at the same time. Other joints may be invaded by the disease, but in almost every instance the large joints are preferred.

The prognosis in this affection is not quite so good as in the varieties already considered, though, if recognized early and properly treated, recovery is the general result. Anchylosis of the joint, not complete, sometimes occurs when the knee is neglected.

Treatment.—The treatment consists in the use of the Iodide of potassium and one of the forms of Mercury.

Syphilitic Affections of Muscles, Aponeuroses, and Tendons.

Syphilitic affections of the muscles early attracted the attention of syphilographers, but it has only been during the present century that our knowledge of these diseases has become at all satisfactory. The

credit of this advance is due to Ricord, Notta, Virchow, Bouisson, of Montpelier, and Mauriac.

Muscular Pains.—During the first few months of syphilis, prior to the appearance of the skin manifestations, it is not uncommon to have patients complain of dull, aching pains in the muscles of the loins, calves, and thighs. The pain is often worse at night and on getting awake in the morning, but it is not so severe as to greatly inconvenience the patient, it causing stiffness and lameness rather than suffering.

A few doses of *Rhus tox.*, Baptisia, *Bryonia*, *Arnica*, or *Mercurius sol.* will relieve the condition.

Muscular Contraction.—This is a rare affection, belonging to the early stage of syphilis, and is entirely distinct from the more permanent contractions which occur at a later stage, caused by interstitial myositis. Notta first called attention to this peculiar condition, and his observations have been confirmed by Fournier, Mauriac, and Van Harlingen.

As stated above, it belongs to the early stage of syphilis, the majority of cases occurring during the first year after infection. It has been noted as early as two months after the initial lesion, and as late as fifteen months, but the greatest number of cases have appeared about ten months after syphilis has been acquired. It is sometimes accompanied by severe skin affections, but usually they are mild and of the character we would expect to find during the early secondary stage. Mauriac has observed that rheumatism plays no part in its production, and has never seen a case in a person so suffering. Neither age, sex, nor condition seems to exert any predisposing influence.

It seems especially prone to affect the flexor muscles of the upper extremity, and more frequently occurs in the biceps of the left arm, though that of the right arm also suffers, as do the supinator longus and the flexors of the fingers, particularly of the ring and little finger.

Symptoms.—The disease is insidious in its approach, hence the contractions may be quite well developed before the patient observes them, he first noting an inability to extend his arm. If we examine the arm, we will find the tendon of the biceps tense and clearly defined as a hard, even cord; the muscle presents no appearance of change, either in size or texture, but seems too short or as in a state of partial contraction. In some cases the belly of the muscle is tender when pressed upon or kneaded, but often this symptom is absent. Extension of the arm is always painful, the pain being felt at the elbow and in the muscle; in some cases a neuralgia of the biceps is developed, which is distinctly worse at night and seems to be independent of motion.

The contraction usually increases rapidly up to a certain point, and

then becomes stationary, the arm assuming an angle of from 160° to 90°. The fingers in some instances are completely flexed upon the palm. The affection may continue for months or even years if left to itself, but under appropriate treatment it gradually grows better; but the cure is not rapid. Mauriac considers the affection to be myoneuropathic in its nature, the syphilitic condition affecting the nerves and muscles directly, and not through the brain or spinal cord; he classifies the disease as a subacute myositis.

Treatment.—Mercury in the form of the Mercurius solubilis, with occasional doses of the Iodide of potassium, will be found of service in this affection. Brisk rubbings of the parts affected will also be of value, and a daily use of the faradic current should be tried.

The disease is liable to relapse; hence the treatment must be continued until every vestige of the syphilis is eradicated.

Pathological Anatomy.—The late lesions of syphilis, as exhibited in the muscular system, are analogous to those which we have found in so many other tissues and organs, a diffused form—interstitial hyperplasia,—and a circumscribed form—gummy tumors.

Diffused Form—Interstitial Myositis.—Ricord regards hypertrophy and tumefaction of the muscle as the first stage of this affection. By degrees an exudation of plastic lymph takes place, or rather an appearance of nuclei and cells; then new fibres of connective tissue are developed in the inter-fibrillary spaces of the muscles; later on these contract, and shortening and atrophy of the muscle result; finally they degenerate into fibrous, cartilaginous, or even osseous tissue, and the function of the diseased muscle is destroyed.

Circumscribed Form—Gummy Myositis.—The pathological condition here differs from the preceding only in the arrangement of the new formation. Instead of the neoplasm infiltrating a great amount of the muscular tissue, it here is circumscribed and presents itself in the form of a distinct tumor of the connective tissue of the muscle. Gummy tumors thus developed do not differ from similar growths in other subcutaneous cellular tissues. At first they appear of a grayish color, which soon changes to a yellowish hue; they may attain the size of a filbert or even that of an orange. They have, at first, a soft, gummy consistence, which they sometimes retain throughout their existence; others become semi-organized and, hence, firmer, while at a later stage they may become encysted, the fibrous covering becoming incrusted with the salts of lime, and an ossiform state resulting.

Bouisson, of Montpelier, has taught that gummy tumors of muscles may suppurate, but this view has been shown to be erroneous.

Symptoms of Interstitial Myositis.—The symptoms of interstitial myositis are very similar to those which attend muscular contractions occurring in the early stage of syphilis, muscular retraction being the most constant as well as the most prominent manifestation. The dis-

eased muscle is slightly swollen and tender when pressed upon, but there is no feeling of doughiness, nor are there adhesions between the swollen muscle and the skin, which remains intact and retains its natural color. Pain is a constant symptom, and is dull and aching in its character; it is located almost exclusively in the neighborhood of the tendinous attachments, and may be excited by palpation of the diseased or contracted muscle. No muscle is exempt from the disease, but it shows itself by preference in the muscles of the upper extremity, and especially in the flexors of the fore-arm. The course of the disease is generally slow and insidious; recovery is the rule, but it must be borne in mind that, if neglected, atrophy and loss of motion may result. The new connective-tissue elements developed during the disease between the fibres of the muscle become fibrous and contract into permanent cicatricial tissue, thus effectually binding down the muscle, and preventing its contraction. The fibrillæ themselves may also degenerate, losing their striation; they become infiltrated with oil-globules, and at last undergo calcareous degeneration. If seen early and treated carefully, the disease is curable.

Treatment.—Similar to that given under "Muscular Contraction."

Circumscribed Gummata of Muscles, or Gummy Myositis.—This is a rare form of late syphilis, belonging to the tertiary stage, and consists of a circumscribed deposit in muscular tissue of the same material as is found in gummata of subcutaneous cellular tissue and in syphilitic diseases of the viscera. They occur most frequently in the gluteus maximus, the trapezius, the sterno-cleido-mastoideus, vastus externus, and the pectoralis major. Certain organs of an essentially muscular structure, such as the lips, the tongue, the velum palati, the muscles of the larynx, and the heart, sometimes exhibit this change.

Gummy tumors of the muscular tissue grow slowly, and are not attended with inflammatory symptoms; they sometimes attain the size of an orange, though that of a filbert is more common.

The shape assumed depends very greatly upon the surrounding structures; some are globular, others fusiform, and still others irregular in outline; they are most easily detected when the muscle is at rest. In gummy myositis the muscle affected is sometimes contracted, but this does not always occur. The pain attending the disease is neither marked nor constant; it is felt most at the moment of contraction or immediately afterward. Bouisson has noticed that variations of temperature and the hygrometric condition of the air affect the sensibility of the diseased muscle, and that this sensibility is increased at night. The skin over gummy tumors remains unchanged, but when they are situated near the surface, the aponeurosis becomes inflamed and hypertrophied. If these tumors attain large size, they may cause inconvenience by retarding the action of the muscle. The course of the disease is usually slow, and, if neglected, it may terminate in the produc-

tion of deep, sanious ulcers which cicatrize very slowly. If seen early and properly treated, the prognosis is good.

Treatment.—The treatment consists in the use of the Iodide of potassium and Mercury.

Affections of Aponeuroses, Tendons, and Bursæ.—Though the aponeuroses and tendons possess but little vascularity, they do not escape the manifestation of constitutional syphilis. Indeed, the fibrous tissue, of which they are so largely composed, seems especially liable to visitations of this evil. The lesions observed in them do not differ from those just described as affecting the muscles. Verneuil and Fournier have made careful studies of these disorders, and to them we are indebted for the knowledge we have concerning these affections.

Aponeuroses.—Syphilis, in some instances, causes a plastic exudation to take place in the substance of the aponeuroses of muscles; they may also be the seat of gummy tumors, but not so frequently as the tendons. These affections cause a thickening of the fibrous material of which the fascia is composed, and may cause inconvenience by interfering with the free use of the limb. The parts most liable to attack are the aponeuroses of the vasti and the fascia lata of the thigh. The course of such affections is slow, and suppuration rarely, if ever, occurs.

Tendons.—Verneuil has described an affection of the tendons of the hand to which he has given the name of dorsal hygroma. It affects the tendons of the back of the hand, and consists in a swelling which never extends beyond the dorsal ligament, and is due to effusion. The swellings assume a triangular shape, with the base toward the fingers. They cause no pain, unless very large. The lesion belongs to early syphilis.

Fournier has described a syphilitic lesion of the tendons of the wrist, ankle and foot, but may involve any tendon, consisting of hyperæmia of their sheaths, with serous effusion. The swelling, in shape, conforms to the surrounding parts, and is firm and elastic. It forms rapidly, and is often attended with pain.

Beside the affections above described, tendons may have gummy tumors develop in their substance. The larger, thicker ones, and those which are most constantly used, are more liable to this accident. Such tumors are clearly felt under the skin; they are not usually attended with pain, unless they become very large and run an exceedingly chronic course. They terminate either in absorption, or soften and discharge their contents through the skin, leaving a deep, ragged ulcer which heals with difficulty.

Bursæ.—The bursæ are liable to suffer from constitutional syphilis in the early stage; an effusion may take place as a result of inflammation. Verneuil and Fournier have recorded such cases, in which

distension of the bursæ of the patella and olecranon occurred. In late syphilis, gummy tumors may be developed; especially is this lesion liable to occur in the bursæ of the patella; it seems, also, to occur more frequently in women than in men.

The Prognosis in Syphilis.

The prognosis in syphilis is generally good, for the natural tendency of the disease is to recovery. Diday treated ninety-three cases by the expectant method, with the following result: In seven, no symptoms of the disease were seen after the erythematous eruption had subsided; in fifty-three, repeated relapses were noted in the manifestations upon the skin and mucous membrane, but these ceased at the expiration of eleven months from the time of infection; in twenty-nine cases, periostitis and iritis occurred, and the disease continued for twenty months; in four cases, such grave lesions rapidly developed, as rapid, tubercular syphilides and other deep affections, that the expectant method was given up and Mercury administered. From the above we see how varied are the tendencies of the disease when untreated; but the cheering fact that recovery is possible stands out prominently.

Very many cases of syphilis, under proper treatment, cease after the early secondary symptoms; but I think it must be a rare occurrence for the disease to be cured without secondary eruptions occurring at all. I have never been so fortunate as to see such a case, and am led to think that in those cases where secondary symptoms have been prevented either chancroid has been mistaken for chancre, or else the primary sore has been treated by massive doses of Mercury and the patient lost sight of afterward. Mercury, it is well known, will delay the appearance of secondary lesions, but eventually they will appear if the medicine is suspended.

When we consider how various are the terminations of syphilis, we are not surprised that efforts have been made to detect in the early symptoms some sign by which the character of the succeeding symptoms may be determined. Diday taught that, *if the period of incubation is long*, the case will be mild; if short, the constitutional manifestations will be severe; but, unfortunately, the rule does not hold good in practice.

Extensive Ulcerations of the initial lesion (phagedæna) are supposed to indicate the approach of a long-lasting syphilis. Not that the phagedæna causes any change in the virus of the disease, but the occurrence of this accident indicates a depraved condition of the general health, and *the gravity of the disease is determined by the condition of the patient.* Some teach that if the initial lesion is surrounded by *a large area of hardness*, the resulting constitutional symptoms will be severe; others deny this, and point to many cases of severe disease in which hardness of the chancre was trivial. "The amount of induration," says

Cock, "is dependent upon the amount of cellular tissue involved, and has no relation to the character of the virus or of the constitutional involvement."

*"*Copious multiple enlargement of the lymphatic glands* in connection with the initial lesion is often an indication of a severe course, though exceptions to this are not rare. Early enlargement of the lymphatic glands of the body generally is much more certainly prognostic of a severe affection."

Van Buren and Keyes consider *the early eruption the best guide* by which to determine the nature of the succeeding symptoms; if this is scanty and purely erythematous, a mild case may be inferred; but if it is profuse, and takes on a vesicular or, still worse, a pustular form, or if it is complicated by iritis, a grave form of the disease may be expected and an unfavorable prognosis formed. Lancereaux and many other eminent syphilographers deny that much dependence can be placed even on these signs, and point to numerous cases of severe and long-lasting disease which have been preceded by early manifestations so mild in character as to escape the observation of the patient.

From the above considerations it will be evident that in practice we must be guarded in our prognosis, for the mildest primary lesion may be succeeded by the severest constitutional affections, or it may be followed by the faintest rash and a few secondary affections.

The constitution of the patient must also be taken into consideration in each case, for experience has proved that syphilis in tuberculous and scrofulous subjects takes on a severe and obstinate form, with tendencies to ulcerations and affections of the viscera.

Again, certain diseases complicate the course of syphilis, and cause fatal terminations which otherwise might not occur. Erysipelas, occurring in a cachectic patient with a rapidly spreading affection, may cause death.

The same disease occurring in a mild case of syphilis, especially during the papular or tubercular syphilides, the skin symptoms will rapidly disappear, but return after erysipelas is cured. When persons with Bright's disease contract syphilis, the disorder takes on a malignant form, other visceral lesions follow, and death is not an uncommon result.

Serious complications are to be expected when the disease occurs in persons addicted to alcoholism; with such, the tertiary symptoms occur early, and the viscera are very liable to be attacked.

The hygienic surroundings of the patient must also be considered in forming a prognosis in syphilis. If these are unfavorable, they prolong the disease and develop the more dreaded tendencies of the affection. Stubborn cases are to be expected in patients who, beside dwelling in unhealthy localities, are neglectful of their own personal cleanliness. Even when the surroundings are all that could be asked,

* Hill and Cooper, page 377.

if the patient is careless about using the bath, disobeys the rules prescribed for his government, and is negligent about his habits, our prognosis should be unfavorable.

The great fact which experience has placed beyond a doubt *is, that uncomplicated syphilis is a curable disease*, and that, with proper care and treatment, to every victim of this disorder *an absolute recovery of health can be promised.* This may be long delayed, but its consummation will be certain if patience, care, and skill go hand in hand in its treatment.

Death is a very rare termination of uncomplicated syphilis; when it occurs we will find either that the case has been neglected or improperly treated, or else the disease has attacked some of the internal viscera. The great majority of the deaths set down as having resulted from this disease have occurred in tuberculous or scrofulous persons, in persons long addicted to alcoholic drinks, or in those who have already some affection upon which the syphilis has been grafted, and death has resulted from the complication.

We must not forget the great length of time which may intervene between the various stages and developments of syphilis. Cases have been reported where for ten years, twenty years, and even longer, the disease has remained dormant, and then, without appreciable cause, has shown itself in one of its may forms. Our prognosis should recognize this possibility, but still, in cases carefully treated for a sufficient length of time, there is but little danger of these late affections. And the patient who has submitted himself to a prolonged course of medicine can be assured that his chances of escape from these late lesions are excellent. He should, however, be cautioned to always inform his medical attendant, in any future illness, of his syphilitic history, for this knowledge is of the greatest importance to the physician, and if promptly given may protect the patient from serious mistakes, and save him from terrible consequences.

The Treatment of Syphilis.

The treatment of syphilis may be divided into local, hygienic, and general. In this chapter we propose to discuss the hygienic and general treatment, as the local and special treatment of the various lesions have been considered at the conclusion of the several chapters.

Before taking up these subjects, a little time may be profitably devoted to a few general considerations concerning the duties which the syphilitic patient and the physician owe to each other and to society at large. Primarily it is the duty of the physician to treat a patient suffering from syphilis with the utmost candor. He should tell the whole truth concerning the nature and course of the disease; the variety of lesions which follow in the train of the primary sore; the length of time treatment will be required; and finally, the *uncertainty* of cure unless care and attention are given, and the *certainty of*

cure if appropriate remedies are taken and the habits of the patient properly regulated. We do not mean by candor on the part of the physician that he is to frighten the patient with stories of the terrible results of syphilis, for in ninety cases out of every hundred the destructive ulcerations and nervous lesions of the late form of the disease might not occur even if treatment were neglected. The object of candid statements is not to frighten, but to prepare the patient for that which is to come, to wit: a variety of lesions and a prolonged course of treatment. If we make light of his ailment and promise a speedy cure, time will reveal our deception, and with the attending disappointment the patient will become distrustful, and this is the first step towards that mental state which is sometimes seen in syphilitics,—syphilomania.

Patients suffering with syphilis regard their affection very differently from those who have acquired either gonorrhœa or chancroid. Instead of demanding an immediate cure and looking upon their disease as trivial, they seem dumfounded at their misfortune and are filled with terrible forebodings. With them the question is not "How long will it take to cure me?" but "Can I be cured at all?" We should aim to allay unreasonable alarm, but at the same time to impress the gravity of the condition, cheering him with the certainty of cure if proper care and attention shall be given.

Beside the duty of advising the patient and allaying his fears, the physician is under obligation to society to properly warn him of the contagious nature of the disorder, and impart to him such instruction as will help to protect those about him from his fate.

We must bear in mind that a person with syphilis is suffering with a contagious disorder which may be imparted to his associates in a hundred different ways, and *that sexual intercourse is but one of these modes of contagion.* The laity are usually ignorant of the nature of syphilis; hence it is the physician's duty to instruct, and in this way limit the spread of the disease.

Every syphilitic should be made acquainted with the fact that the contagious principle of his disease exists not only in the secretions of the initial lesion, but that it is found equally as virulent in the discharges of all the secondary lesions and in his blood prior to the tertiary stage.

If mucous patches exist upon the lips or in the buccal cavity, we should caution him against using the various articles of the household in common with other members of his family, and insist that kissing shall be absolutely avoided. He should be especially advised to be careful in the use of towels, bathing utensils, and the disposition of articles of clothing, during the existence of secondary skin lesions. If unmarried, we must insist upon his remaining in that state until his disease is eradicated. To convince him of the wisdom of our advice we must inform him of the consequences which would cer-

tainly result if marriage should be contracted before his syphilis is cured. The terrible picture of an innocent woman acquiring this most loathsome of all diseases from her husband, who has just sworn to love and protect her, one would think, would deter the most eager.

Dark as the picture is, its tints may be made still more sombre, for abortion after abortion will follow such a union, and still-born children will succeed each other from the disease-infected womb. If life shall be preserved during gestation, the offspring will come into the world burthened with the parental disease, and either die from its effects or else drag out a miserable existence.

Hygienic Treatment.—A prime object in the treatment of syphilis is to maintain the highest possible condition of bodily vigor, for the disease may be long-continued, and a tendency to anæmia and cachexia is often developed. Bumstead, in treating of this subject, says: "The successful management of any case of syphilis undoubtedly depends in a great measure upon attention to hygiene. The most careful administration of specific remedies will be of little avail unless the patient be willing to submit to the necessary restrictions with regard to diet, exercise, exposure, rest, and habits."

The Diet.—The diet of the patient should be interfered with as little as possible, so that he may partake of the ordinary food of the family, for we must ever remember that syphilis is a "*secret disease*", and we should aid him in his effort to conceal the nature of his affection. In ordinary cases a plain, nutritious diet is all that will be required. If signs of impairment of the general health are exhibited, we must put the patient upon a *highly* nutritious diet, but even then only those articles of food which are most easily digested should be advised, such as milk, eggs, fresh meats, fish, and fresh vegetables properly prepared. We have in several places, in the foregoing pages, recommended *cod-liver oil* in cases where exhaustive discharges occur, as in bone lesions, and wherever symptoms of cachexia are developed. We use it both as a food and a medicine, the trace of iodine which it contains seeming to exert a curative power over the disease. *Alcohol*, in all its combinations, is to be rigidly excluded from the dietary of the syphilitic. No fact in medicine is better proved than that alcohol, in excess, exerts a most baleful influence upon the course of syphilis; phagedæna is supposed to be the offspring of alcohol and filth. If the patient has been for years addicted to this vice of intoxication, we will have to allow him a certain amount daily, and the physician had better prescribe the quantity and times of administration. *The use of tobacco* must be given up, as both smoking and chewing have been found to promote the formation of mucous patches in the buccal cavity and to favor the development of troublesome lesions of the throat.

Clothing.—The body should be kept comfortably warm to prevent taking cold and in this way precipitating accidents which otherwise

might have been avoided; hence, flannel should be worn next to the skin, both in winter and summer, thinner suits being provided for the latter season. Several sets of underwear should be procured, so that they may be changed frequently. It will be unnecessary to again allude to the danger of infection which resides in the discharges of secondary lesions, and with which the underclothing of patients is often soiled.

Cleanliness.—We have seen how often the syphilitic dyscrasy is exhibited in lesions of the skin, hence the importance of using every effort to keep the surface of the body clean, for it has been found that where this is done, the eruptions are fewer in number and much more amenable to treatment. The surface should be washed every day with warm water, and at least twice a week a warm bath should be enjoyed. The temperature of the bath should be *warm, not hot*, for Keyes has thought that hot baths in the early stage provoke excessive skin manifestations.

Bodily Exercise.—During all the stages of syphilis sufficient exercise should be taken, but at no time should this be either violent or exhausting. From the fact that the disease is often seen among "sporting men" we must insist on the mean between the two extremes in this matter; certainly, such recreations as rowing, riding hard, ball-playing, racing, and hunting must be strictly forbidden, because they exhaust and tire, and anything which reduces the strength of the body promotes the vigor of the syphilitic disease.

The mind of the patient should be kept employed; hence he should remain at his business and attend to all the ordinary duties of life. If unemployed, the mind is prone to dwell upon the nature of the disease and conjure up pictures of its results until, finally, syphilomania results.

Sexual Intercourse.—Absolute continence is the best rule in syphilis, because the act and its attending excitement cause fatigue and exhaustion, and beside there is, until after the subsidence of the secondary stage, great danger of contagion. "In men addicted to sexual intercourse," says Bumstead, "continence may cause seminal losses which are to be avoided, if possible; hence, when the danger of contagion does not exist, indulgence to a limited degree may be allowed, but should never be carried to excess."

Mauriac* says the marital relation in syphilis should be absolutely suspended for a month or two months after the disease is contracted, the patient observing the most scrupulous cleanliness in order to obviate the possibility of danger and undergoing thorough treatment. During the secondary stage the same care must be taken, for a syphilide upon the penis may convey the virus as certainly as the chancre.

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* L'Abeille Médicale, Aug. 21st, 1882.

Beside the danger of infecting the wife, the patient should be instructed as to the danger of procreating syphilitic children. This danger is to be feared for three years after infection, even in cases which have been carefully treated; the time of greatest danger is during the early skin manifestations of the secondary stage.

The habits of the patient, concerning his hours of sleeping and the times of eating, should be carefully regulated, for rest is a necessity not only for the body but for the digestive organs also. In extreme cases, a visit to the seashore or to the mountains, or a stay in the open country, will be followed by a favorable change in the condition of the patient. Keyes has noticed that frequent changes are beneficial, he advising six weeks at the seashore, then six in the country, and so on, he considering that in six weeks the full benefit afforded by any locality is experienced.

In this connection a word may be said concerning the advisability of sending patients to the *Hot Springs of Arkansas.* We do not believe that the waters of these springs differ from any other hot water, nor that their curative properties are of any special value. Cases of syphilis visiting the Springs derive no benefit unless they continue the constitutional treatment which they have taken before leaving home, but the reputation of the place, undeserved as it is, the change of air and scene, the relief from business cares, all are factors which administer to the improvement of the patient; hence, send your patient to the Hot Springs if he can afford to go.

Medical Treatment.—The Organon, in which Hahnemann formally announced his discovery of a new system of therapeutics, was published in the year eighteen hundred and ten, at which time the theories concerning syphilis advocated by Hunter were universally accepted. It will not be necessary for us to state these views here, as we have considered them at length in an earlier chapter; Hahnemann accepted the pathology of his age, a knowledge of which fact is of the greatest importance, for without it many of his statements concerning the curability of syphilis are misleading. He says in the "Chronic Diseases":* "In that stage of the syphilitic disease where the chancre or bubo is yet existing, one single minute dose of the best mercurial preparation is sufficient to effect a permanent cure of the internal disease, together with the chancre, in the space of a fortnight." The best preparation, he afterwards states, is Mercurius vivus; and of the dose he says, "I was formerly in the habit of using successfully one, two, or three globules of the billionth degree† for the cure of syphilis; the higher degrees, however, even the decillionth,‡ act more thoroughly, more speedily, and more mildly. If more than

* Quoted by Hughes in his *Manual of Therapeutics.*

† *i.e.* the sixth centesimal dilution.

‡ *i.e.* the thirtieth centesimal dilution.

one dose should be required, which is seldom the case, the lower degrees may then be employed." He also says, "In my practice of fifty years' duration, I have never seen syphilis breaking out in the system, whenever the chancre was cured by internal remedies, without having been mismanaged by external treatment."

Mercury in the sixth and thirtieth dilutions should be as potent now as it was fifty years ago, and yet how many physicians of our school have found any such results following its administration? The great majority of the homœopathic physicians of to-day use Mercury in the treatment of this disease in the sixth and thirtieth dilutions, but they are unanimous, practically, in the statement that secondary symptoms always follow indurated sores. We can only reconcile these discrepancies in one of two ways: either Hahnemann did not treat true syphilis, or else the subsequent histories of his patients were not carefully noted. It is certain that he regarded all venereal sores as being syphilitic in their nature, for the chancroid was not even recognized until 1816, and its syphilitic character was not questioned until Bassereau, in 1852, stated his theory of the dual nature of these diseases; hence Hahnemann's cures of syphilis must have included many cases which we now know were *not* syphilitic and which *can not* be followed by constitutional infection. When a soft sore healed under the administration of a remedy, and general symptoms did not follow, the remedy was credited not only with the cure of the sore but with having prevented constitutional manifestations, and the case passed into literature as a cure of primary syphilis without secondary or tertiary phenomena.

The conclusions of Hahnemann and his co-laborers were in accord with the best pathology of the day, and while we may assail these conclusions as erroneous, as not in accord with now well-established facts, we must respect the men who formed them for their fidelity and truth. Even to-day, after half a century of careful observation, many of the masters in medicine teach that soft sores are sometimes followed by constitutional disease.

Again, Hahnemann's statement, "I have never seen syphilis breaking out in the system when cured by internal medication," may, we think, be reconciled to our own experience in another way. It seems impossible that Hahnemann should have practiced so many years and not have met with numerous cases of syphilis, and it seems just as impossible that he should have treated such cases, and not have had secondary manifestations following. Might it not be possible that his views of constitutional infection differed from ours? He lived at a time when the abuse of Mercury was at its height. It was used for every form of venereal disease, and pushed to its utmost bound; as a consequence, the constitutional forms of syphilis, a compound of that disease with mercurial poisoning, presented horrors of

which we know nothing, and these aggravated symptoms were looked upon by Hahnemann as constitutional infection. He, using the drug in a milder form, escaped its poisonous effects, and his cases, as a consequence, presented none of these terrible symptoms; and since visceral syphilis was not then known, he considered his patients cured beyond the possible occurrence of constitutional disease. His patients may have had, and in all probability had, secondary rashes, sore throat, and mucous patches, but as these were so modified from the secondaries which attended cases treated with heroic doses of the metal, he may have regarded them as merely attendants upon the chancre, and not as secondary phenomena. That this explanation appears hypothetical we admit, but it is suggested by the fact that most of the early homœopathists seem to regard erythemas, papules, mucous patches, and even sore throat, as primary troubles, and only look upon ulcerations, bone-affections, and other deep processes, as evidences of constitutional disease. Condylomata we recognize as an *unmistakable secondary symptom* of syphilis, yet Hahnemann regarded it as a distinct disease, existing independently of syphilis; and hence, when such growths occurred in his syphilitic cases, he considered them due to sycosis, and not to constitutional infection. Jahr* defines secondary syphilis as "phenomena which are no longer capable, owing to some essential modification of the nature of the contagium, of transmitting the syphilitic disease by direct infection of the individual. It is at once evident that buboes, mucous tubercles, and sycosic condylomata, being still endowed with the faculty of communicating the primary disease, cannot be classed among secondary phenomena."

From this quotation it is evident that Jahr applies the term "secondary" to that stage of syphilis which modern writers call "tertiary;". hence, when he says that he cures syphilis and prevents secondary symptoms, he means tertiary manifestations, and the most of us could furnish corroborate testimony to that effect. That the cases were not carefully followed up and their later history recorded, seems evident from the fact that so many writers claim to cure the disease in from two to six weeks. Cases of indurated chancre, pronounced cured, at three or even five weeks after infection, could only be cured in the sense that the initial lesion had healed, for secondaries do not usually appear until a later period; hence patients discharged as cured might have constitutional diseases develop without the knowledge of the physician.

From these considerations we are led to believe that the marvellous results recorded by early physicians in the treatment of syphilis are to be explained:

First. On the theory that many of the reported cures were cases of

* Venereal Diseases. Philadelphia edition, page 161.

chancroid, and hence could not have been followed by constitutional disease.

Second. That their idea of constitutional syphilis differed from ours, they regarding mucous patches and condylomata as primary disorders, and not considering their occurrence as indicative of constitutional infection.

Third. That the cases were not carefully followed up, and hence, the full history of the patient and the result of treatment was not known.

These errors are not peculiar to the followers of Hahnemann, but are found in the literature of both schools of that period, and, as we have already seen, were due to the pathological views of the disease held by all the writers and teachers of that day.

We have tried to explain the results recorded by the early writers in our school, but how shall we explain the assertions of modern physicians that they cure syphilis and prevent secondary manifestations? We must premise by stating that only *very few* homœopathic physicians of to-day claim such ability. In order to obtain the experience of the profession on this point, we addressed letters to a large number of prominent surgeons and physicians, asking their success in the treatment of syphilis, and inquiring especially whether they were able to prevent secondary symptoms; we have also carefully examined the literature of our school, and from these two sources have obtained the experience of forty eminent men in their efforts to prevent secondary syphilis. Of these, *one* says: "I always cure syphilis in the primary stage, and thus prevent secondary manifestations." Another says, that "nine-tenths of my cases recover without secondaries;" and two say, that they "rarely have secondaries;" the remaining thirty-six observers say that they "always have secondaries following indurated chancres."

Twenty-six of my correspondents indicate their views concerning the nature of syphilis, twenty-one holding to the dual theory, and five adhering to the unity of all venereal sores. Among the latter, I find the four correspondents quoted above as being able to either always prevent secondaries, or as rarely having them. Of the twenty-one believers in duality all admit the constant occurrence of secondaries, though two state that they have prevented them.*

Is not the fact suggestive that those who regard all venereal sores as syphilitic cure them without constitutional infection, while those who differentiate between them find that hard sores are always followed by secondary disease, and soft sores never?

We incline to the belief that the conflicting experiences noted above are to be attributed to erroneous views as to what is syphilis. Unicists

* Both of these use *Merc. protoiod.* in the first decimal trituration; may not this account for the absence of secondaries?

class chancroid as a species of syphilis, and publish cures of this local disorder as cases cured without secondary manifestations. Schneider's article on Syphilis, published in the *British Journal of Homœopathy*, vol. xxii., page 414, is sometimes quoted as confirming the statement of Hahnemann that the disease can be cured and secondary symptoms prevented by the use of attenuated remedies. The article is interesting and worthy of careful study. The author states that he has treated three hundred and twenty-five cases of syphilis, and in only four of them did constitutional disease develop. He reports in full nine of his cases, and among them the four in which general syphilis occurred. We have carefully examined these cases, and find in them evidences which prove conclusively that the five cases which were not followed by constitutional disease were cases of *chancroid;* the remaining cases—the report showing quite clearly *their constitutional nature*—were followed by secondary disease.* If five out of the nine cases reported as syphilis exhibit unmistakable evidences of their local character, and if the four cases which were syphilitic were followed by constitutional infection, what other conclusion can we reach than that Schneider's three hundred and twenty-five cases were all cases of chancroid, except the four cases which developed the general disease? We are convinced that secondary symptoms will follow the primary lesion of syphilis under any treatment; they can be delayed by the use of massive doses of Mercury, but after a little time they will break forth aggravated and intensified by the mineral.

This confounding of syphilis and chancroid has produced confusion and uncertainty in the therapeutics of venereal disorders. It is impossible to sift our entire literature and discover in every case of reported cure just what disease the reporter treated; hence we have a host of remedies which have been advised in the treatment of syphilis, and many of them are found worthless when put to the test in actual practice. Nitric acid is a remedy which will explain our meaning; we have failed to detect any good result from its administration in constitutional syphilis, and yet, every work on the subject speaks of the great value of this remedy. In chancroid it has an undoubted place, and its use, either locally or internally, will be followed by excellent results. We think that it has found its way into our literature, as an anti-syphilitic, through the mistaken diagnoses of those who have tried the remedy;† it has cured the local sore, and this has been reported as a cure of the graver disorder.

* The evidences to which we refer, and upon which we conclude that five of the reported cases were chancroid, are: the lesions were multiple, they were attended by suppurating buboes, the discharge from the primary sore was profuse, its tendency destructive, and, finally, the cases were cured in from six to eight weeks.

† We are pleased to find that so eminent an authority as Clotar Müller agrees with us in this view of the value of Nitric acid in syphilis. See an article in the *Medical Counselor* for July 15th, 1885, on "The Potency Question," page 268.

We would earnestly call the attention of the profession to the scantiness of our own literature upon the treatment of syphilis; we know that this dire deficiency is due, not to a want of experience, but in almost all cases to inexcusable negligence. The school sadly needs to-day the publication of numerous cases of this disease, in which the history and differential diagnosis, the remedy and potency, are carefully given, and the result faithfully recorded.

Mercury.—Mercury has been used in the treatment of syphilis from the earliest times; it has been abused, abandoned, and restored to favor, again and again, and to-day occupies the first place in the therapeutics of this disease. How its wonderful action was discovered, we do not know; but its use seems to have originated in Spain, and spread from there over the world. The race has suffered from no other medicine as it has from Mercury, but these evil results are traceable to the abuse of the remedy, not to its proper use. It is, undoubtedly, *the remedy* for syphilis. Other agents may be required to ameliorate this or that complication, but the final cure will result only after a course of this metal in some of its many forms. How Mercury cures syphilis is a question which has been frequently discussed, but which still remains unanswered. Many of our own school hold that its value is dependent upon its homœopathicity to the diseased condition. Franklin,* in defence of this view, gives the following table, contrasting the effects of syphilis with the toxicological symptoms of Mercury as given by Pereira.

Syphilis.	Mercury.
Syphilis produces on the skin pustules, scales, and tubercles.	Mercury produces severe forms of skin diseases.
Excites inflammations of the periosteum and caries of the bones.	Produces inflammation of the bones and periosteum.
Produces inflammation of the iris.	Produces a disease called mercurial iritis.
Produces inflammation and ulceration of the mouth and throat.	Inflammation and ulceration of the throat a well-known effect.
Produces enlargement and hardening of the glands.	Produces enlargement of the inguinal and other glands.
Produces chloro-anæmia, a diminution of the blood-corpuscles, and an increase in the proportion of serum.	Diminishes the coagulation of the blood, and increases the proportion of serum.
Produces ulcers on the genital organs.	Produces ulcers, with induration, on the glans and prepuce.

McClelland, in a paper on the "Homœopathic Treatment of Syphilis," read before the World's Homœopathic Convention, in 1876, says: "With singular unanimity, all schools—and times—have fixed upon Mercury as the great *anti-syphiliticum*, not by chance or arbitrary selection, but by virtue of its specific relation to the complaint; by virtue

* Manual of Venereal Diseases.

of its being one of the few known medicines having the inherent power of inducing—in all their phases—conditions similar to those produced in the human body by the syphilitic virus."

Helmuth* says: "No one can deny that the pathogenesis of the preparations of Mercury (and Arsenic) resemble in almost every particular the diseases we are expecting to combat."

We could quote many other names, eminent in our ranks, who firmly believe that Mercury cures syphilis because of its similar action upon the healthy body.

Richard Hughes, however, denies that Mercury produces symptoms essentially similar to those of syphilis. He says: "Have we anything in the pathogenesy of Mercury which answers to the true hard syphilitic infiltration (of which ulceration is but an accident), to the indolent and indurated swellings of the lymphatic glands, and to the papular eruption? I speak with restraint, but I cannot see that we have. Plastic effusion into the cellular tissue is a very unlikely effect of a drug so decidedly liquefacient. Such glands as are affected by it, swell from irritation, and tend to suppurate, and the eruption it produces is vesicular, not papular. I cannot but conclude that Mercury has no essential similarity to the syphilitic poison, and cannot be relied upon to neutralize its influence in the blood, or to combat it at every point of its attack." †

Again, he says: "Has Mercury, then, no place in the treatment of true syphilis? I should be the last to affirm such a proposition. There are certain local manifestations of the syphilitic poison to which it is thoroughly homœopathic, and of which it will always prove more or less curative. One of these is the affection of the mouth and throat; another is the subacute inflammation of the periosteum. But its main use is when the local manifestations of the disease become destructive, when the eruptions take the form of impetigo or rupia, or when ulceration attacks the skin and mucous membranes."

He thinks that, if it has any effect upon the local infiltration and the indurated and indolent lymphatic glands of true syphilis, it is in consequence of its liquefacient action, and not its similarity; but in the secondary stage both theory and practice indicate this remedy.

Our brethren of the old school give many explanations of the action of the metal. Bumstead says: "In my opinion, it acts directly upon the syphilitic diathesis, and also, as an antiplastic agent, upon the neoplasm which characterizes the lesions of this disease. Its action upon the lesions themselves is accomplished by controlling the hyperæmia of the various tissues invaded, and by causing the fatty degeneration and death of the specific cells which characterize syphilitic manifestations."

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* System of Surgery, page 172.

† Pharmacodynamics.

Mr. Jonathan Hutchinson considers Mercury as an antidote to the syphilitic virus, preventing its proliferation in the blood, and, by destroying it, restraining its effects on the tissues.

M. Rabuteau thinks its usefulness dependent upon its power as an arrester of destructive metamorphosis. Hallopeau considers it as a parasiticide, and believes its value in syphilis results from its power to destroy the parasitic micrococci which he thinks the cause of the disease. Other writers attribute its curative effect to the fact that it favors fatty degeneration and hastens destructive metamorphosis, in this way facilitating the removal of the cell-growths which cause the various phenomena of the disease. Dr. Keyes, of New York, is an advocate of the theory that the usefulness of Mercury in syphilis is due to its tonic action. Wibouchewitch discovered that the number of red blood-corpuscles progressively diminish during syphilis, and that the employment of Mercury stops this diminution. Keyes has repeated his experiments, and concludes that Mercury, in small doses, increases the number of red corpuscles, and that, in this way, it counteracts the anæmic tendency of syphilis, and thus promotes a cure.

From the above it is evident that the dominant school are not, any more than ourselves, a unit in their explanation of the action of Mercury in syphilis.

We will not attempt to explain the action of this wonderful drug. But the similarities of its symptoms to syphilis are, it seems to the writer, so marked, that the most inattentive observer would note them.

Is it not peculiar that all the so-called specific remedies of the old school are capable of producing the symptoms which they cure? Quinine in paludal affections, Mercury in syphilis, Iodine in the scrofulous diathesis, Arsenic and Sulphur in the herpetic diathesis, what does it mean other than the truthfulness of our law of cure? They may explain the action of these remedies by a thousand beautiful theories, but the fact will still remain that the disease cured presents symptoms similar to those produced by the curative drug.

Mercury is to be used during the earlier stages of syphilis. The following rule, laid down by Bartholow, exhibits at a glance the different spheres occupied by it and the Iodine preparations. "Mercury for the primary infecting sore and for the affections of the skin, especially macular and papular exanthemata; Iodine for the tertiary symptoms: gummata, tubercular syphilides, serpiginous ulcers, affections of the bones and periosteum, and nervous diseases."

Homœopathists employ Mercury in a variety of forms, having definite indications for their use. Our own experience would indicate that in the early stages of the disease *Mercurius solubilis* and *Mercurius corrosivus* are most frequently called for, while in the later period of

the secondary and throughout the tertiary stage, the compounds of the mineral with Iodine give the best results.

Dr. J. H. McClelland, of Pittsburgh, at the World's Homœopathic Convention in Philadelphia gave the following indications for the use of the various Mercurial preparations in syphilis:

Mercurius sol. (generally preferred to the vivus).—This preparation seems accurately adapted to the typical Hunterian chancre, as well as to the development that follows. Thus we find: Chancre with indurated base and margin; induration of the inguinal glands. Excessive languor with fever and sweat, which ushers in the secondary symptoms. Erythematous and papular eruptions, ulcers in the throat, etc., all of a milder type. The throat, at first dry and itching, becomes filled with excessive secretion; the fauces and tonsils are inflamed, swollen, and ulcerated. Mucous tubercles; small, itching pimples which ulcerate and become encrusted. Rupia, with violent itching becoming worse in bed. Excoriated spots which bleed easily. Syphilides, maculæ, and as further developments, unhealthy, brownish skin, with hard swellings (gummata); pains in the bones, with restlessness, worse at night. Exostosis, caries, and necrosis. Emaciation, with slow hectic fever. Swelling and induration of the liver.

Mercurius cor. sub.—This more active preparation of Mercury corresponds to a similar acting syphilitic virus. The chancres are more inflamed and painful. The ulcers have a lardaceous bottom and secrete a thin, ichorous pus. The bubonic symptoms are more acute and the secondary manifestations more prompt than usual in making their appearance. It is particularly useful in iritis and in affections of the conjunctiva accompanied by acrid discharges; in soft, flat condylomata or mucous tubercles. [Goullon employs it as a wash for the primary sore. Hofrichter recommends it in exostosis of the tibia, which advice Jahr confirms, and adds that he has found it of value also in exostosis of the cranium. The swellings upon the tibia are attended by sensations at night as if the bones would break. Müller and Yeldham both advise it in ulcerations of the mouth and fauces.]

Mercurius iodatus flavus.—The yellow iodide seems best indicated in painless chancre and where the glandular system is largely implicated. The inguinal glands are swollen quite large, although not much disposed to suppurate. The tonsils are enlarged, and the secretion of the throat is not profuse, but rather tenacious. It is, perhaps, the best preparation when the testicles are involved. For the secondary eruptions* and many of the sequelæ it is often better suited than either of the preceding. Helmuth prefers this form of Mercury to any other in the treatment of the early stage of the disease.

Mercurius biniodatus.—The red iodide is indicated when the chancre and bubo are particularly indolent. [Trinks has recommended this remedy for inveterate syphilis in scrofulous individuals, and Clotar Müller uses it chiefly for the syphilides. Müller has likewise used it, with excellent results, for ulcers of the face, at whose bottom the bone was seen denuded, rough, dry, and black. Yeldham says it is useful in scrofulous patients.]

Mercurius dulcis.—The chloride deserves more attention than it receives. It has been used in much the same class of cases as the *Merc. sol.*, and especially when the eyes and ears are implicated. The roseola is bright red. It acts well in infantile syphilis when the symptoms are less violent than those which require the bichloride.

Mercurius præc. rub.—The red precipitate is called for where the chancre shows a disposition to become phagedenic, and the various ulcerative processes become destructive. [Jahr recommends the *Merc. præc. rub.* when *Merc. sol.* does not seem to act with sufficient force: In old neglected Hunterian chancres; cartilaginous, violet-red induration, and swelling of the prepuce following the removal of Hunterian chancres by cauterization. Trinks recommends it for syphilitic destructions of the tonsils, fauces, and palate; also for syphilitic exanthems, especially the tubercular and pustular forms, for cutaneous ulcerations and osseous affections.] Care should be taken not to continue the lower triturations too long.

Cinnabaris.—This is one of the most useful of the mercurial preparations, particularly in secondary and tertiary forms of syphilis. It is in those cases where there is what might be called a "sulphur substratum" that this combination of Sulphur

* We think its value is greatest in the late secondary eruptions.

and Mercury is most curative. Chancres with hard bases in scrofulous individuals; the middle of sore becomes raised and fungoid. Indurated bubo, iritis with pains in supra-orbital region, commencing at the inner angle and passing around to the temple. It is suited to the whole range of the syphilodermata. Circular ulcerations of the skin, mouth, and throat. [Jahr says that *Cinnabaris* forms the transition from the remedies for *destructive syphilis* to those for *fungoid vegetations*. He thinks it of value when the chancre is on the point of becoming fungoid, and finds it of great use in neglected chancre if no Mercury has been used. Clotar Müller uses it in complicated cases of syphilis (scrofulosis and previous mercurialization).

Mercurius nitrosus.—Trinks recommends this remedy in the most inveterate and malignant forms of syphilis, and Rummel has used it with success in the treatment of filiform figwarts. The old school use it as local application in scaly and tubercular syphilides.

The Dose of Mercury Employed.—The following quotation, from the American editors of Cornil's work on Syphilis, shows us that large doses of Mercury are no longer considered necessary in the treatment of syphilis, even by the old school.

"Mercury does good in syphilis by facilitating the removal of the cell growths which cause the various phenomena of the disease, hence, *small doses* only are needed, as newly formed and immature tissues have less resistant power than normal structures. Hence, before the physiological effect of the metal is induced, as is shown by the salivation and emaciation, it is able to produce its beneficial results."

Cornil says, "salivation is now considered useless;" and Bartholow states, concerning the use of Mercury in syphilis, "small doses should be given and continued until all traces of hardness disappear; *the important point is not to induce ptyalism.*" Homœopathic physicians use larger doses of this drug in syphilis than in any other disease. Mueller uses Cinnabar in the 2^{x} and 3^{x} triturations; *Mercurius sol.*, *Merc. cor.*, *Merc. præc. rub.*, in the 1^{x} and 2^{x} triturations. Jahr uses *Merc. sol.* in the first centesimal trituration, two doses daily of half-a-grain each. Vehsemeyer uses the second and third decimal triturations, two or three doses daily, increasing the dose from one to five grains each. Yeldham uses the first and second decimal triturations, and in doses of from one to three grains of the first, or from five to ten grains of the second, repeated three times a day. He sometimes begins with the former and continues it for a week, or until amendment sets in, and then replaces it by the second trituration, and thinks he has seen good results from that mode of prescribing.

Buechner and Claude Mueller use the *Merc. præcip. rub.* in the first and second decimal triturations two doses of half-a-grain each daily; Jahr endorses this prescription. Yeldham gives the second or third decimal trituration, but in doses of five grains each three times a day, and Bähr one grain of the first decimal every other day.

Mercurius protiodide.—Helmuth uses this remedy in the early stage of the disease in two-grain doses of the first decimal trituration every night for a week. The next week, every other night; the third week,

every third night, and then continues it at intervals until the sore is healed, which takes place usually in about six or eight weeks.

The other mercurials are used in about the same preparations and doses.

Twenty-seven of my correspondents indicated the potencies which they employed; of these fourteen used from the crude material to the third decimal trituration; seven used from the third decimal trituration to the thirtieth dilution; and two used from the thirtieth to the one hundred thousandth. The high dilutionists claim to have excellent results in the treatment of syphilis. The following letter from Dr. Malcolm Macfarlan is a valuable contribution to our literature. "My experience with syphilis during the first few years (1862–7) of my practice was in the army and in army hospitals. I watched the treatment of two or three thousand cases with the Iodide of mercury and other mercurial preparations. The secondary and tertiary conditions were treated by an occasional mercurial, but mainly by the Iodide of potassium, with Sarsaparilla added. The wretched results following this routine system of medicine led me, after becoming acquainted with the use of homœopathic medicines in other troubles, to apply them in venereal diseases. From 1867 to 1878 I rarely used anything but highly dynamized remedies, and since then have occasionally used small but repeated doses of the Iodide of potash, low, when the patient has been saturated with crude Mercury, looking upon it mainly as an antidote to Mercury. I am convinced that the Iodide of potash, high, will do its work much more effectually in tertiary syphilis, this opinion being formed after comparative experiments in some hundreds of cases. After spending some years in searching the materia medica for purely homœopathic remedies for the primary disease (the hard chancre), and after giving each remedy a fair and prolonged trial, I now give the Iodide of mercury 2^c, or higher, every two hours until the papular rash over the body, due to the medicine, makes its appearance; then I stop, and that is often the end of the disease. I seldom see secondary symptoms, the papules disappearing in from two to three weeks. Secondary and tertiary symptoms are treated by me with no fixed remedy, but I am governed entirely by the appearances and conditions, and I fail when I attempt to treat them all alike. The Iodide of potash, either high or low, checks and modifies these symptoms more than any other drug. I use it in the syphiloderms where the skin has a crusty or scabby appearance, and use Nitric acid in the opposite condition, where ulceration is present. The secret of success, in my opinion, is to avoid anything like routine practice. Individualize where individualization is possible, as in the skin manifestations and marked general symptoms. In the primary lesion one finds this difficult, for there is so little to guide us."

The following wise conclusion of Jahr will fitly end what we have

to say concerning the dose: "Hahnemann's rational maxims demand that a physician should constantly seek to know how far a dose can be reduced without impairing the efficiency of the remedial agent in bringing about a speedy, safe, and permanent cure."

The old school also use Mercury in the form of inunctions, baths, fumigations, and by hypodermic injections. These may sometimes be needed, but so far as the writer's experience goes, the administration of the remedy in the usual way is all that is required, except in cases where it is desirable to quickly remove an eruption which has appeared upon the face. We have referred to this mode of treatment in another place.

Iodine and its Compounds.—Iodine, in the tincture and in the form of burnt sponge, was used in the treatment of syphilis as long ago as 1820. In 1831, Dr. Robert Williams, in St. Thomas' Hospital, first used the Iodide of potassium for periosteal nodes with wonderful success. He afterwards used it in rupia and tertiary ulcerations of the throat. Dr. Wallace, of Dublin, who had also used it in a number of cases, published his results in the *Lancet* for 1836, and immediately it became the remedy for tertiary syphilis. The discovery of this use of the salt is one of the greatest achievements of modern medicine, and has converted a terrible and destructive disease into one which can be managed with great certainty. How the iodides act in tertiary syphilis is an open question, but the action is certainly dependent upon the rapidity with which it finds its way into and out of the blood.* Hughes says that we can lay no claim to this action as being homœopathic. "It is one of the weakest points in our theory that we cannot account upon the law of similars for the power of this remedy."† Dr. Madden,‡ in a thoughtful paper on this subject, reaches the following conclusions:

"The Iodide of potassium has two distinct actions—

1st. The ordinary specific action to which we are surely guided by its pathogenesy.

2d. The power of destroying certain morbid germs, especially those which characterize tertiary syphilis.

3d. As a corollary to the 2d, the cure of tertiary syphilis by the Iodide of potassium is therefore *specific, but not homœopathic.*"

Whether the action of the remedy is to be explained on this theory or on the theory that it dissolves the cellular elements which compose the tertiary lesions, the fact remains that it is an important aid in the treatment of these affections. In destructive syphilitic ulcerations, in

* The diffusion of the iodides into and out of the blood takes place with such rapidity that in fifteen minutes they may be detected in the urine and saliva.. Bartholow's Mat. Med., page 218.

† Pharmacodynamics, page 332.

‡ British Journal of Homœopathy, vol. 26, page 415.

gummous formations, in diseases of bone, cartilage, and muscle, in epileptiform convulsions, mental disorders, paralytic states, neuralgias, nocturnal headaches, indeed in any and all of the late manifestations of syphilis, the iodides will be found to act as by magic. The following case will illustrate their power:

Mrs. B., æt. 35, consulted me, in February of the present year, for an obscure disease of the lungs which by several physicians had been pronounced phthisis. She had, during the previous three months, rapidly emaciated, had a bad cough, *but no expectoration*, constant excruciating pain in the left chest, which was dull on percussion and looked as if "caved in." Hectic fever, loss of appetite, night sweats, etc., had led her to believe that death was inevitable. From her husband I learned that he had communicated syphilis to her about six years before. Acting on this information, I ordered her the Iodide of potassium in doses of two-and-a-half grains, repeated four times a day. In less than two weeks the pain in the chest had ceased, and in a month the cough, night sweats, hectic fever had all disappeared, and to-day, though still under treatment, her health is greatly improved. I am certain that within a year she can be discharged cured.

This is but one of many cases that could be related, in all of which the relief has been as rapid and as prompt; in many of them death would certainly have claimed the patient had it not been for this potent medicine. Some homœopathic physicians refuse to employ this remedy; I can only say of such that they do an unpardonable injury to their patients, for no other drug will relieve so quickly and so certainly in tertiary syphilis.

The iodides are of value in *tertiary affections*, but in the *primary* and *secondary lesions they are useless.*

The Iodide of potassium is the preparation generally employed, though the Iodides of sodium and of Ammonium are sometimes substituted for it. They are not so certain in their action, and are more disagreeable to the taste.

Dose.—The dose usually employed by the old school is larger than is required. The following observation of Mr. Lane* is worthy of our attention:

"An important point in the administration of the Iodide is to abstain from large doses at the commencement. It is better at first not to give more than three or four grains thrice daily."

Good results can be had from even smaller doses than this; six grains a day, divided into three doses, have often acted admirably for me.

In another place we have referred to the use of very large doses of the remedy in certain nervous affections. We agree with Professor Helmuth in the statement that this drug has little or no value in

* Lectures on Syphilis, page 85.

potentized form; the farther we go from the crude substance, the less satisfactory will be its action.

The most favorable time for the administration of the Iodide is after eating. We usually dissolve six grains of the salt in three tablespoonfuls of water, and direct a tablespoonful to be taken after each meal. If the result is not satisfactory, we increase the dose until a response is elicited, rarely having to exceed twenty grains in the twenty-four hours.

Dr. David Thayer, of Boston, has found the salt to act more promptly when Iodine crystals are added to it in solution, as in the following formula:

℞. Iodide of potassium, ... ʒj.
Water, ... ℥viij.
Iodine crystals, ... gr. j.
M. Take a teaspoonful three times a day.

Whether Iodine can cure tertiary syphilis without the aid of mercurial preparations is a question which has been much discussed. Bumstead thinks that "unfortunately, the iodides possess greater power to subdue tertiary symptoms for a time than to cause their permanent removal." Ricord, Lane, and many others, differ from him, and rely upon it for an absolute cure. We prefer to accompany its use with one of the mercurials, and think the compounds of Mercury with Iodine, such as the Protiodide and Biniodide, of especial value in the treatment of tertiary syphilis. Dr. E. M. Hale combines the two remedies in the following prescription:

℞. Iodide of potassium, ... ʒj.
Merc. biniod., ... gr. j.
Aq. gaulth., ... ℥iv.
M A teaspoonful four times a day.

He claims excellent results from this combination, and prefers it to the uncombined remedies.

A majority of the cases of syphilis will be cured by the use of mercurials and iodides alone, though a number of other remedies have been suggested; some of them are of great value in relieving certain symptoms, but none capable of taking the places of Mercury and Iodine.

Nitric acid has been employed by both schools in the treatment of syphilis. We have seen but little effect following its use, and believe that its reputation as an anti-syphilitic is due to its power of counteracting the evil effects of Mercury rather than to any influence it has upon syphilis. The old school have so modified their doses of Mercury in recent years that we now rarely meet with cases of mercurialization, hence remedies like Nitric acid are much less frequently indicated. Lobethal recommends it in old chancres where Mercury has been abused; Büchner uses it in painless ulcers with gray everted edges, bleeding easily. The velum palati, especially

the left side, fiery red and shining; deep, shaggy ulcers on the border of the tongue. Yeldham uses the remedy with good effect in mercurio-syphilitic disease; he prescribes five to ten drops of the second decimal dilution two or three times a day. It is also advised in the various syphilides, if the patient has been previously drugged with Mercury.

Aurum.—Gold at one time enjoyed quite a reputation in the dominant school as a remedy in syphilis, but in recent years it has dropped into disuse; homœopaths, having discovered its true place, still use it, and often with great success. It is to be employed when the patient has been drugged with Mercury, and especially in diseases of the flat bones and of the nose. The peculiar melancholy will usually be found associated with the other symptoms. Dr. Burnett* cured a severe case of syphilitic hyperostosis of the cranial bones with *Aurum muriaticum* after metallic Gold had failed. Clotar Mueller has also found the Muriate of value in ulcers of the scrotum and penis. Other symptoms are: bones of the skull painful; pains in the bones of head and face as if broken; sore feeling in nose, with swelling and loss of smell; putrid discharge from nose; caries of palate bones, ulcers in mouth and nose, with necrosis of the nasal bones; burning boring pains in the bones.

Asa fœtida.—In diseases of the long bones when they become affected from the abuse of Mercury. Ulcers of the skin, discharging a thin, fœtid, and ichorous pus, sensitive to the touch. Osteocopic pains of a cramp-like character.

Berberis aq. has been advised in tertiary syphilis, and some cases have been reported in which relief has been afforded by its use.

Corydalis formosa.—One of the new remedies introduced by Hale. He reports two cases of syphilitic nodes of the tibia which had been treated with Iodide of potassium for a year, cured by this medicine, ten drops of the tincture being administered four times a day. He advises it in nodes of the skull with falling off of the hair; syphilitic eruptions of the scalp, and in ulcers of the mouth and fauces.

Carbo veg. in syphilitic cachexia with weakness, such as is caused by loss of animal fluids; impairment of digestion, acidity of the stomach, great flatulence; general or partial falling off of the hair; also in ulcers which are painful and bleed easily.

Ferrum, *China*, *Arsenic*, and *Sulphur* have also been employed successfully in syphilitic cachexia.

Kali bichrom.—Dr. Liedbeck† has reported two cases of syphilitic ulceration cured by this remedy. Watzke and Russell rate it very high in syphilitic sore-throat. "It subdues chronic inflammation and heals up superficial ulcers, but will not take the place of Mercury or the Iodide of potash in the destructive ulcerations of syphilis."‡ It has cured deep ulcers on the edge of the tongue, ulcers of the mouth and fauces; syphilitic laryngitis with dry, hoarse, hacking cough; fœtid discharge from the nose; pustular syphilides; suppurating tubercles forming deep, circular, "punched-out" looking excavations; caries of the bones of the nose; bone-pains with stitches as if from sharp needles, wandering all over the body. Guntz, of Berlin, has recently reported wonderful cures with this remedy, and advocates the treatment of syphilis with it alone, excluding Mercury entirely.

Hepar sulph. calc.—Jahr says this remedy is of no value in pure syphilis, but is useful after the abuse of Mercury. Alopecia; scaly eruptions and pustular skin affections. Painful tubercles on the head, and nocturnal pains in the integuments of the skull. In affections of the nose with tenderness from pressure. Moist humid soreness (mucous patches) on genitals, scrotum, and folds between thigh and scrotum.

Lycopodium.—According to Jahr this is one of our best remedies for certain herpetic affections of the throat accompanied by seconday exanthems; tetter-like eruptions on the skin; secondary ulcers in the throat of a dark, yellowish-gray color; hoarseness with desire to cough, as in laryngeal phthisis; osteocopic pains in the limbs during wet weather; low-spirited, despondent mood; condylomata.

Mezereum.—In mercurio-syphilitic diseases of the periosteum, periostitis, nodes, periosteal rheumatism: intense burning pains in the bones, worse at night; dark-red inflammation of the pharynx, with burning dryness; huskiness of the voice with hawking-up of mucus, worse in cold weather. Mezereum has been of great value in relieving the nightly bone-pains of syphilis.

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* British Journal of Homœopathy, vol. 34.

† British Journal of Homœopathy, vol. 15.

‡ Hughes's Pharmacodynamics.

Staphisagria.—In secondary syphilis when Mercury has been abused. Jahr has used it in alternation with *Phosphoric acid* for mercurial-syphilitic bone-pains; and in alternation with *Aurum* for the same condition when accompanied by the peculiar mental symptoms of Gold. Wahle and Rummel advise it in mucous tubercles, in soft, cockscomb-shaped condylomata; also in the dry, filiform variety.

Silicea.—Has been used by Yeldham with good results in the treatment of nodes in tertiary syphilis. Caries and necrosis with the discharge of offensive pus.

Stillingia sylvatica.—A very valuable remedy for secondary and tertiary skin manifestations, of a torpid, scaly, obstinate character; cases which have been treated unsuccessfully with mercurials and the Iodide of potassium. Syphilitic ulcers; dark-red, soft tubercular eruptions, ulcerating and furnishing a quantity of unhealthy pus; enlarged cervical gland; severe osteocopic pains; nodes on the head and legs.

Phytolacca.—A new remedy and of great value in syphilis, especially where the glandular system is deeply involved. Syphilitic ulcerations of the throat; periostitis with pressing, shooting, aching pains, worse at night, from motion and from pressure, nodes on the tibia; secondary syphilides and rupia; syphilitic rheumatism.

Phosphorus.—Syphilitic psoriasis of the palms and soles; relapsing roseola syphilitica; syphilitic psoriasis, mercurial-syphilitic ulcers on the prepuce; vague bone-pains and exostosis.

Phosphoric acid.—In mercurial syphilis; ulcerations of the lips, velum, and gums; intense pains in the periosteum of all the bones, as if scraped with a knife; swelling of the bones (periosteal nodes); affections of the ends of long bones; depressed spirits and loss of strength.

Arsenicum.—In gangrenous affections, in scaly eruptions, and in tubercular exanthems.

The following remedies have also been advised in syphilis: *Fluoric acid; Hecla lava; Calcarea carbonica; Calcarea phosphorica; Sulphur; Ruta; Lachesis; Arsenicum iodatum; Corallium rubrum; Iris vers.; Podophyllum; Platina; Argentum nitricum; Hydrastis; Sarsaparilla.*

How to Administer Remedies in Syphilis.—The treatment of syphilis differs from that employed in any other disease. We have to deal with a protean poison which to-day may riot in the tissues of the patient, but which a month hence may become latent, and remain inactive until years have passed away, then to resume its destructive work. Medication must, therefore, be prompt, and is to be continued until every trace of the disease has been removed. Mercury is undoubtedly the best remedy for the early stages of syphilis, and usually *Merc. sol.* will be found to give satisfactory results. The treatment should begin as soon as we are convinced that the lesion is syphilitic, giving the first decimal trituration of the remedy in 3-grain doses, repeated three times a day. This we continue, without interruption, for three months. If the secondaries are now mild in character, and the hardness about the initial lesion is removed, or greatly reduced, we suspend the medicine for a month, resuming it again in the same potency, dose, and repetition for another three months. Thus we continue for eighteen months, and then vary it by the addition of a daily dose of 2 grains of the Iodide of potassium, and use this mixed method for six months longer, in periods of two months each, with a rest of a month between each period. If, at the end of two years, the patient's health seems good, and no trace of syphilis can be detected,

treatment may be suspended, but the patient must be kept under observation for another year before he can be pronounced cured.

The above treatment we would advise in profound cases of the disease. In milder cases the periods of rest may be lengthened and the periods of medication shortened, but in all cases the duration of the treatment should be insisted upon. As mentioned in another place, during the late secondary and throughout the tertiary periods, we prefer to use the compounds of Iodine and Mercury instead of Mercurius solubilis. If, after the suspension of treatment, symptoms of the disease again develop, another six months' use of the iodide and the indicated mercurial must be given. Relapses during the early stage commonly show themselves upon the tongue and in the fauces in the shape of ulcerations and fissures; later, the viscera, bones, and muscular tissues exhibit gummy infiltrations. The tablet triturates of Boericke & Tafel will be found a convenient form in which to administer remedies in syphilis.

The treatment of special symptoms will, of course, call into use many other remedies beside Mercury and the Iodide of potassium, but their mode of administration does not call for any special comment.

The patient, at his last visit, should be informed of the importance of relating his syphilitic history to any future medical attendant, and be advised to lead a temperate life as the surest way of avoiding future relapses.

HEREDITARY SYPHILIS.

BY GEORGE WILLIAM WINTERBURN, M.D.

Syphilis in the new-born has been the occasion of much ingenious sophistry. The obscurity of its origin, the intangible but potent mechanism of its development, and its usually fatal termination have furnished conditions upon which dogmatical writers have been able to frame the most adverse theories. The study of infantile syphilis can only be satisfactorily conducted by, in the beginning, discarding all the theories with which it has been associated, and permitting the facts to be observed unobscured by preconceived and fanciful notions as to its nature. To do this, it will be necessary for us to receive with precaution, if we do not altogether discard, much contemporary observation. For it must be admitted that very litle modern research in this direction has been undertaken, save by those who had pet theories to be sustained; and it is merely human that facts, filtered through a mind imbued with a theory, subsequently possess the coloring of the media through which they came. In the discussion of syphilis by entail, there is abundant opportunity for the imagination to run riot; but the irreparable injury done by professional advice, founded upon a mistaken hypothesis, to the health, lives, and honor, not only of in-

dividuals, but of families, may well give us pause before answering the many questions as to the transmissibility of the poison from sire to son, and the contagiousness of the disease thus received.

Vella, in 1508, was the first to suggest the possibility of the inheritance of syphilis: "Quare autem parentes non generant prolem infectam, cum materia quæ subjicitur pro generatione spermatis sit infecta;" though, a decade previously, Torella pointed out the existence of syphilis in young children. The first positive declaration came from Paracelsus (1529): "Fit morbus hereditarius et transit a patre ad filium." But the light was soon clouded, and we find Massa (1532), Gallus (1540), Theodosius (1541), Montanus (1550), uncertain as to its heredity, and it was not until Ferrier (1553) that the mode of infection during intra-uterine life was clearly defined. Even now it was stated merely tentatively, although in accordance with more recent observation; and it was not until Rondelet (1560) that we find the record of an actual case: "Ego vidi puerum nasci totum co-opertum pustulis morbi gallici." From this time on, the idea that syphilis might be entailed has prevailed in the profession, although there have been, at various periods, those who have denied its probability—(Hunter, Ricord, *et al.*), while, on the other hand, others have exaggerated its frequency to cover nearly every ailment of infancy.

An infant may have either *congenital* or *acquired* syphilis. During the intra-uterine and formative period it may receive from its parents directly into its blood the results of the poison in theirs; but it may also become infected by a maternal chancre at the moment of birth, or, later, in any of the recognized ways, with the primary disorder, which in that case runs its natural course, the same as in an older person. With this latter condition our present inquiry has nothing to do, being limited to such lesions as directly result from contamination of the fœtus in utero.

The Transmission of Syphilis.

The question of the mode of transference of syphilis from parent to child is as yet undetermined. Many physicians hold, with Vassal and Cullerier, that the condition of the father's health has nothing whatever to do with the syphilization of the offspring, and that inherited syphilis occurs only as the result of constitutional syphilis in the mother. When the father alone is syphilitic, the child unquestionably frequently escapes if the mother remains well. I have seen confirmatory evidence of this in my own practice, and am fully convinced that a healthy woman may have a healthy child by a syphilitic father. One case, of several, in which the man had the secondary form of syphilis, which, under treatment, seemed to completely disappear, but after marriage reasserted itself, I have had under observation for ten years. The wife has had exceptionally robust health,

and has never shown the slightest sign of the disease. Their children, three in number, are all healthy and well developed.

In 1862 M. Notta (quoted by Sturgis) published the details of eight cases where syphilitic fathers had healthy children by healthy mothers, without the latter becoming contaminated. Two years later, M. Charrier gave, in the *Archives Générales de Médecine*, the histories of four similar cases. In 1867 M. Mireur gave a case which is well worth reproducing.

In January, 1863, the man had an initial lesion, followed by a maculo-papular eruption, ulcerations of the throat, and papules of the scalp. In December, 1863, after a vigorous treatment, and believing himself well, he married. The woman has exhibited no evidence of syphilis up to date of report (1867). A child was born in October, 1864. Up to the end of 1866, two years, it had presented no evidences of syphilis. At that time the father, who yet retained vague souvenirs of his previous disease, and who was delighted at the wonderful health of his boy, had a slight erosion at the anterior portion of his lower lip. Thinking nothing of this little local affair, which remained perfectly indolent, he did not deprive himself of the pleasure of kissing the child. The result was an excoriation on the child's lip, nearly two-fifths of an inch in diameter—*un chancre infectant*—the surface of which was depressed, its tint livid, and its base manifestly indurated. Associated with the lesion of the lip was a premaxillary adenitis, and in due time a macular syphilide of the body and mucous patches of the anus made their appearance.*

The infection by a kiss shows that the boy was taint-free actually as well as apparently, thus disposing of any question of latent syphilis. This is a most interesting case, and proves conclusively, even though there were no other evidence, that a syphilitic father can have a healthy child. There are, however, a number of later reports by apparently trustworthy observers of the same tenor.

While, therefore, there can be no reasonable doubt of the fact that a healthy woman *may* have a healthy child by a syphilitic father, it is by no means proved that she *must* have such a one. On the contrary, the evidence is conclusive that syphilitic offspring may proceed from a syphilitic father without the mother apparently being infected. There are upwards of one hundred and fifty well-authenticated cases on record, but the two following are sufficient and determinative.

V. Cl. Guérard, *Journ. de Siebold*, tome x., § 553, mentions a woman of good family and excellent reputation who gave birth to a child which was covered with yellow spots and had ulcers, situated chiefly on the fingers and toes, which were unanimously recognized as syphilitic. The woman had never had any affection of this kind, not even

* Sturgis's Diday, page 21, from Esssai sur l'hérédité de la Syphilis. Paris. 1867.

leucorrhœa. The author examined her, and did not find any suspicious appearances. The husband confessed that while on a journey, a short time before begetting this child, he had contracted a chancre. On examination he was found to have copper-colored spots on the forehead, feet, and sternal region, and to be suffering from pains in the bones. He was cured by Bichloride of mercury, and the child by Hahnemann's soluble Mercury.

Bœhr, *Journ. der pract. Heilkunde*, 1836, knew a Mr. W———, who got a chancre of which he was cured by Mercury. Some time after his cure his wife joined him; she soon became pregnant, and during the whole period of gestation showed no indication of syphilitic infection. She gave birth to a female child which she suckled. When three weeks old, the child was covered with deep corroding ulcers on the buttocks, arms, and labia majora, and with copper-colored spots on the calves of the legs. It had also had coryza, with crusts of a peculiar character. The author administered Mercury to the child, and its disease, which had resisted all means previously employed, began at once to improve, and was speedily cured.*

I say the mother *apparently* escapes the infection, because in none of the cases is it absolutely proved that she does. The only actual proof would be that the mother afterwards becomes inoculated with the poison, and has the disease in the regular way. Even the second case above has a suspicious look, for it is said that the mother suckled the child, while it is known that a healthy nurse is extremely liable to take the disease from a syphilitic babe. This is negative evidence that the mother was insusceptible to the poison. Could it have been that, though showing no external lesion, she had had the disease in a mild form, and was thus protected against it? This is what is known as Colles's law, enunciated in 1837, and never disproved.† Certain it is that women may acquire a strange immunity from further infection by bearing a syphilitic child, without at any time showing any local or general impairment of health. Dr. Kassowitz has shown that careful observation, extending over a long series of years, may fail to detect signs of syphilis in women who have borne diseased children.‡ But that this escape is more apparent than real, seems evident from an experiment by Caspary.§ He found a seemingly healthy woman with a syphilitic husband and a syphilitic child. He inoculated the woman with the secretion of syphilis without effect, thus seeming to prove that, although apparently healthy, she already had syphilis (Keyes).

The proposition has been advanced that a syphilitic man may have

* Diday, on Syphilis, page 13.

† On the Venereal Disease, page 385.

‡ Die Vererbung der Syphilis: Braumüller. Wien, 1876.

§ V. f. Derm. u. Syph., 4th Heft, 1875.

connection with a pregnant woman and communicate the disease to the fœtus without infecting the mother. Without denying that this may be the case, it is evident that this must take place, if at all, through the mother's circulation, for the semen cannot immediately affect the fœtus in any way. If a fœtus may have small-pox while the mother remains exempt, it cannot be asserted positively that other morbific agents may not act upon the fœtus through the mother without compromising the integrity of her health. Such a question could only be definitely determined by a repetition of Caspary's experiment.

Le choc en-retour—the return shock—is a phrase used to express a supposed fact that a healthy ovum impregnated with syphilitic semen in its turn affects the healthy mother. The possibility of the mother being affected through the fœtus is taught by Diday, Hutchinson, and many other eminent syphilographers, and denied with equal emphasis by Berkeley Hill and a large number of experienced surgeons. If syphilis can be transmitted by means of vitiated semen, and there is much reason to believe that this is possible, it may well be that the mother receives directly into her blood from the growing fœtus a modified form of syphilis, not pronounced enough to cause manifest secondary symptoms, and yet sufficient to protect her from acquiring the disease in the regular way, or while suckling her child (thus sustaining Colles' law), or by the inoculation of Caspary. Nay, more, it seems well attested that a woman widowed from a syphilitic man may subsequently marry a perfectly healthy husband, who has never had a chancre, and bear him children who are actively syphilitic, and yet she be then, and at all previous times, and subsequently, in the apparent perfection of health.

The influence of a syphilitic mother is less debatable. She may infect the fœtus by having syphilis prior to conception, or when she is herself inoculated at the moment of conception, or if she have a chancre subsequently during the months of pregnancy. Some writers restrict the term congenital syphilis to this latter form. The earlier in fœtal life the mother is infected, the more virulent are the effects upon the child. If the mother becomes pregnant and syphilized at the same moment, she miscarries; the child is born dead, or dies in a very short time. If the impure embrace does not take place until the sixth month, the effects on the child are much less disastrous, as a rule; and if the seventh month is fully completed before the mother is diseased, the child may be born healthy. This last aphorism must be applied with caution.

If the primary symptoms in the woman have entirely subsided previous to conception, and the man has never had syphilis, the chances of the child's escape will depend upon the length of time which has elapsed since the mother was diseased. If she has recently

shown even slight secondary symptoms, the child is sure to be syphilitic; but if several years have elapsed since the disease has given evidence of activity, the child will probably be healthy. In other words, if the mother has so far recovered her physical integrity as to be able to produce a healthy ovum, the child will be healthy. Much here will depend upon treatment, and no general law can be adduced.

Syphilis is probably rarely transmitted to the third generation, for the reason that, while the poison is exceedingly active in a growing child, it either destroys life at puberty or before, prevents complete sexual evolution and so causes sterility, or else the patient gets along so far in the tertiary stage as to be incapable of transmitting the disease in a recognizable form. Nevertheless, instances of such transmission have been authenticated, and they may occur more frequently than is supposed. It is undeniable that syphilis in the progenitors partly protects their descendants, so that if these take the disease in the natural way they have it but mildly; and in those nations which have been ravaged most severely in former times, as for instance the Portuguese, the disease has now become almost innocuous. This would indicate that a constitutional effect is wrought which permanently affects the race.

The Question of Marriage.—Unfortunately it is not alone the unmarried nor the vicious who contract syphilis. Leaving out of view the comparatively small number who are the victims of accident, and upon whom the original lesion is elsewhere than on the genitals, probably the majority of the sufferers from syphilis acquire the disorder from some chance lapse from virtue rather than as the result of habitual immorality. To these terror-stricken victims it is our duty to bring all the hope of restoration to physical integrity, and of happiness in future years, which our experience and our earnest endeavor for their welfare may permit. This terrible disease, loathsome as it undoubtedly is, may be cured under proper regimen; and in our day it is not the black slough of nastiness which the recent victim, in the horror of his first discovery, is apt to picture it. While our duty is thus clear as to the victim of syphilis, we have an equally plain duty to perform in regard to marriage and marital rights. The physician owes it to the community to prevent, so far as his influence may permit, the marriage of a syphilized person until all secondary symptoms have disappeared permanently. How long a time may be required from the date of the initial lesion it is not possible to determine in any given case, but I should say never less than four years. It is not enough that the evidences of the disease remain in abeyance during treatment; but the physician should satisfy himself by stated observations after medicine has been suspended that the disease is no longer smouldering in the system. It is well known that under mercurial treatment all evidences of the disease may disappear—in either

sex—only to reappear after the lapse of some indefinite period, when treatment is suspended. It is rash on the part of the practitioner to certify to the cure of any case, or to sanction marriage, until several years have elapsed since anti-syphilitic remedies have been used by the patient, and he yet remains without symptoms of the disease.

In the married it will probably be impossible to enforce sexual continence after the primary disorder has been controlled. There is good reason to believe that after the chancre is completely healed, if there be no mucous patches, sexual congress may be permitted with safety to the wife, provided she does not become pregnant. Many women live in marital relation with a syphilitic husband for years without becoming pregnant and without showing any evidences of being infected; but after the birth of a syphilitic child the woman also shows secondary symptoms, often of very pronounced character. If the child is born healthy, the mother remains healthy. It is further a matter of evidence that a syphilized woman may give birth to a syphilitic child, and at her next pregnancy, being put under mercurial treatment, the child will be born healthy and never show signs of being infected, while at the following pregnancy, no treatment being given to the mother, the child is diseased. This proves that the fœtus can be guarded against the effects of the poison by proper anti-syphilitic treatment, administered continuously to the mother during the time the child is within the womb. If, therefore, a syphilized man marries, supposing himself cured, and subsequently secondary symptoms develop, or if a married man acquires chancre, and resumes marital relations after the primary sore is healed, the wife has a fair chance of escape until she becomes pregnant, when, even though no symptoms develop, she should be put on anti-syphilitic treatment, and the remedy given continuously until the child is weaned. There seems good reason to believe that in this way both mother and child may be protected from the disease.

The Syphilitic Fœtus.—The ovum may be so thoroughly diseased as to be incapable of development into a recognizable form, and is then cast off after a few weeks as a shapeless mass. This happens usually when the disease is in an active stage in either parent. When the disease in either parent is recent, but less intense, the fœtus may be properly formed, but dies in utero. It is very uncommon, when either parent at the moment of conception has a chancre, for the child to be born alive. If it dies in utero, it may be retained until the end of the ninth month, but, as a rule, the labor is premature. Abortion should not be induced, save for obvious reasons, and in general no harm arises from leaving it where it is. Even though the child be dead, I have never known of labor being unnatural in any respect, though the liquor amnii is sometimes foul-smelling, and the epidermis of the cadaver macerated or perhaps entirely missing in large patches.

The occurrence of frequent abortion in syphilized women, some having as many as ten or twelve in succession, has been recognized for the past two hundred years. In truth, there is no pathological fact more strongly supported by irrefragable evidence than the frequency of abortion in syphilitic women; and the recurrence of miscarriages in successive pregnancies, without known cause, should direct attention to the possibility of syphilis, which may perhaps be latent and unsuspected by either parent.

The syphilitic fœtus shows *invariably* pathological changes in the bones and viscera; and in questions of doubt the absence or presence of certain definite changes, more or less strongly marked here, will decide whether the dead-born child is the victim of inherited syphilis. Interstitial hyperplasia of the parenchyma of the liver and lungs, of the kidneys and spleen and of the thymus are invariably present in the case where the child dies of syphilis in utero; but even more characteristic than this is the condition of the bones. The bones most often diseased are, in the order of relative frequency, the long bones of the limbs, the scapula, the clavicles, the bones of the head, the ileum, the ribs, the bones of the hands and feet and, with least frequency, the vertebræ. These lesions, like all syphilitic affections, are, as a rule, symmetrical. At the ends of the long bones these syphilitic changes may be clearly observed, manifest usually to the unaided eye, but sometimes requiring the aid of the microscope for their detection. They consist of the results of a morbid process in which the cartilage-cells become disintegrated after a previous too active proliferation. On cutting into the bone, the diseased tissue between the epiphysis and diaphysis may be distinguished as a reddened or grayish-yellow band. This condition of permanent thickening may lead to inflammatory adhesions to the skin, with or without bone softening; but this latter is not usual in the fœtus.

Syphilis in the Infant.—A child born with inherited syphilis has but an uncertain tenure. It may be round and rosy, and robust in appearance, or it may already show epidermal evidences of the poison within. It may moan out its wretched life in a few brief hours, or under kindlier aspects vitality may gain the ascendency, and life be prolonged in tolerable comfort. Just as the ovum may be so completely blighted as to be incapable of development into a recognizable form, or may shape itself into fœtal life and then die, or may survive to be still-born at term, so the viable infant, which is viable simply because less thoroughly poisoned, may have vitality enough to carry it on through threescore years, or it may exhaust itself in the effort of an hour. If it dies from syphilis soon after birth, the cause will be cellular changes interfering with organic function. Thus, the lungs may be so stiffened as to be incapable of efficient expansion, or the parenchyma of the liver may be so hardened as to prevent the formation of bile, or the

pancreas may be indurated and interfere with digestion. Sometimes the babe dies in convulsions without visible cause, and only a post-mortem examination, by showing epiphyseal bone changes, will determine its nature.

Ordinarily the syphilitic infant shows no characteristic appearances of the infection at birth. Usually, during the second three weeks of life, the face, heretofore plump and rosy, begins to wrinkle and becomes old-looking; livid patches or excoriations appear, ulcers form at the anal and other openings of the body; gradually the skin peels off about the nails, the denuded patches sometimes covering the entire palmar and plantar surfaces, the nostrils become plugged with scales, and the voice grows husky and hoarse. These symptoms develop with slow persistence, and occasionally may be altogether absent until the infant is several months old. If the mucous membrane is the principal seat of the disorder, erosions and patches form on the lips, within the buccal cavity, pharynx, or larynx (with aphonia and convulsive coughing), and sometimes in the small intestines. In the viscera syphilitic lesions assume the form of diffuse or circumscribed fibroid growth, in which the parenchyma of the organ is obliterated. Both these forms are essentially the same, but, when circumscribed, have a tendency to break down by fatty degeneration; these are denominated as "gumma." Gummata have been found in the (hypertrophied) walls of the heart, in the supra-renal bodies, and indeed in all the organs save the thymus. The spleen seems always to be enlarged, and the amount of splenic hypertrophy may be taken as a fair gauge of the severity of the cachexia; even when, under appropriate treatment, other symptoms give way, there remains evident induration of this organ, persisting for years or permanently. The microscopic examination of the liver in infants dying of this disease shows diffuse fibroid change. The cut surface is a yellowish ground with layers of opaque whitish grains. The capillaries are obliterated, and the calibre of the larger vessels increased. Gummata may be imbedded at various points, showing as bright-yellow masses, softened in the centre, and surrounded by giant cells (Gübler). Gummata in the lungs are grayish in color, firm in texture externally, but containing at the centre puriform matter. Diffuse fibroid change is more common in the lungs of infants than gumma, and on section there is seen a solid, smooth, shining surface, gray in color, and consisting of round cells, spindle cells, and fibrous tissue. The area of the lung thus affected may be one lobe or only a portion of it (Eustace Smith). The kidneys are usually unnaturally firm, and under the microscope show changes similar to those occurrent elsewhere. Hecker, Bärensprung, and Keysel* have stated that syphilis of the viscera shows inheritance from the father,

* Bayer, Aerztl. Intelligenzbl., No. 21, 1876.

and dermal and mucoid lesions from the mother; but this is not by any means proved, and seems to me fantastical.

The Contagiousness of Infantile Syphilis.—The contagiousness of congenital syphilis has been confidently affirmed and strenuously denied. That hired nurses frequently, and other persons occasionally, take syphilis from infants is admitted by all observers; but the contention put forward by men like Ricord and Hunter is that whenever an infant transmits syphilis, it is because it has itself a primary chancre, and that constitutional lesions are not infectious. To deny the transmissibility of inherited syphilis from the child to the nurse, it must be presumed that in every instance in which the nurse has a chancre on her breast, she either contracted the disorder independently of lactation, or else that the infant has acquired a primary sore in the mouth from some other source than suckling. If these cases, in which the child has syphilitic ulcers in the mouth, and the nurse similar ulcers on the nipples, were unfrequent, it might then be supposed that the nurse was the infecting party; but, unfortunately, these cases are too numerous and the evidences of disease in the parents too patent for us to accept such an explanation as covering all the cases reported. That nurses do give primary syphilis to infants while suckling them is not to be denied; but it is equally true, and incontestably borne out by evidence, that the child, inheriting syphilis from its parents, passes it on to the nurse, and she again may transmit it to other innocent victims. It is the duty of the physician, therefore, to exercise his authority to prevent the child of syphilitic parents, even although it shows no sign of disease, from being given out to suckle a healthy wet-nurse. It is not necessary that the nurse, in order to take syphilis, should be exposed to, or herself exhibit, an open ulcer. Says Diday: "I have seen a papular spot *not in the least degree ulcerated* present the initial lesion in a nurse, the starting point of the constitutional syphilis which she had contracted from her suckling."*

While secondary syphilis may be communicated to the nurse, or others, by the infant from any moist patch, the transmission is more probable from an ulcerating mucous tubercle, as it furnishes an abundant liquid secretion, the most minute particle of which, accidentally smeared on an abraded surface, is all-sufficient to carry the infection. As the mucous tubercle is generally the earliest manifestation of inherited syphilis, and often makes considerable progress without its specific nature being suspected, the probability of spreading the infection by contagion amounts almost to a certainty.

The Syphilitic Countenance.—The child with syphilis, although at birth possessing every outward manifestation of health, soon takes on certain unmistakable appearances. Not alone the face, but the entire

* A Treatise on Syphilis, page 173.

body becomes strangely changed, and it presents a miniature picture of decrepitude (Doublet). The countenance is curiously like that of a diminutive old man, and this is so essentially pathognomonic as to direct the attention of the practitioner to the source of the disorder without asking a question. Associated with this wrinkled appearance is another characteristic sign in the color of the skin. Trousseau thus describes it:*

"Before the health becomes affected, the child has already a peculiar appearance; the skin, especially that of the face, loses its transparency; it becomes dull even when there is neither puffiness nor emaciation; its rosy color disappears and is replaced by a sooty tint, which resembles that of Asiatics. It is yellow, or like coffee mixed with milk, or looks as if it had been exposed to smoke; it has an empyreumatic color, similar to that which exists on the fingers of persons who are in the habit of smoking cigarettes. It appears as if a layer of coloring matter had been laid on unequally; it sometimes occupies the whole of the skin, but is more marked in certain favorite spots, as on the forehead, eyebrows, chin, nose, eyelids, in short, the most prominent parts of the face; the deeper parts, such as the internal angle of the orbit, the hollow of the cheek, and that which separates the lower lip from the chin, almost always remain free from it."

Although the face is commonly the part most affected, the rest of the body always participates more or less in this tint. It is preceded by general paleness, which renders its appearance more appreciable; it increases slowly, is often associated with œdema and always with prostration, and disappears rapidly under appropriate treatment. It seems to be the expression of the general chloro-anæmia, which differs only from that following in the wake of the primary disorder in being more rapid in its progress and more amenable to treatment.

Children in whom the evidences of the disease are less transparent may not show any facial change, but as they grow older they remain dwarfed in stature, or become ill-shapen. The mind is rarely normal, and they are either abnormally precocious or stolidly stupid. The skin is coarse, the hair thin and brittle, the eyebrows and lashes scant or absent, and the nails crippled.

Syphilitic Teeth.—The milk teeth in syphilitic children show no pathognomonic condition, though they may be soft or brittle and fall rapidly into caries. The permanent central incisors of the upper jaw are liable to show a peculiar deformity, which, however, is not invariable. A syphilitic child may have perfect teeth. The "test teeth" of Hutchinson† are smaller than natural, the cutting edge narrower than the base, making them peg-shaped, and the lower border broken by a

* Arch. Gén. de Méd., 1847, and Gaz. de Hôpital, 1848.

† Illustrations of Clinical Surgery. Fasc. III. Plate XI. (1876).

single broad notch. These single broad notches are what stamp them as syphilitic. Sometimes all, or most, of the teeth will show this peculiarity. Shallow notches, irregular notches, unnotched peg-shaped teeth, or merely deformed teeth, count for nothing in this regard. Some American syphilographers doubt the value of notched teeth as a pathognomonic sign. At a meeting of the American Dermatological Association (1882), Dr. White, of Boston, related the case of a boy who presented the central incisors notched from side to side, and the lateral incisors wanting, where the suspicion of syphilis seems to have been excluded. The other teeth were normal. The deformity succeeded a sudden and severe attack of cervical adenopathy (Sturgis). Mercurial and other forms of stomatitis, at the period of tooth formation, cause deformities, and these were confounded with the effects of syphilis until the latter were defined by Hutchinson.

Interstitial and Diffuse Keratitis.—Syphilitic affections of the cornea are of frequent occurrence in children, and may be diffuse or interstitial. The former begins as a cloudiness, which gradually extends until it includes the entire interstitial and epithelial layers. Upon the surface of the cornea are seen the injected bloodvessels, which may be so numerous as to give it a deep-red appearance. The inflammatory process is liable to extend to the conjunctiva and iris. Finally, minute gummata form in the interstitial layer of the cornea, and these break down into intractable ulcers. The consecutive iritis is prone to destroy vision; but independent of this, permanent corneal opacity remains when the ulcers heal.

Interstitial keratitis commences insidiously as minute gray-colored points, which extend very slowly, are unaccompanied by pain or inflammation, and never go on to ulceration. Unless numerous, they do not interfere with sight. Gradually these spots disappear from the periphery towards the centre; both eyes may be involved consecutively, each for a year or more. The disease is most common during the second dentition, though it may occur as early as the seventh month, or be delayed till puberty. In rare cases it recurs.

Syphilitic Pemphigus.—Children intensely syphilitic may, shortly after birth, have a pemphigoid eruption, beginning on the palmar and plantar surfaces, and sometimes wholly confined thereto. This eruption seems to be due, however, not directly to the syphilis, but rather is the result of the cachexia which the disease has caused. Syphilitic pemphigus never occurs in adults, and bears in the infant no pathognomonic signs of specificity. It begins a few days after birth in a violet tint on the palms of the hands and the soles of the feet. In the course of two or three days minute vesicles appear; these coalesce and form bullæ containing a yellowish serum, and, bursting, leave eroded surfaces. The infant becomes marasmic, refuses the breast, and dies. Even if it recover from the pemphigus, it rarely survives

many weeks. The most careful hygienic and therapeutic treatment seems to avail nothing, and the quicker the little victim is out of its pain the better.

Masked Congenital Syphilis.—As a rule, the period of the appearance of syphilis, when inherited, varies with its intensity, and this, in turn, is in proportion to the length of time which has elapsed, at the conception of the child, since the infecting parent had the primary disorder. Doubtless, as the usual date of the appearance of syphilis varies from a few days after birth (presuming the infant is born mark-free) to several years, it is possible that in an occasional case it may be delayed until puberty, or beyond. Instances which bear the earmarks of authenticity have been recorded of constitutional syphilis making its appearance in youths in their teens, who had been previously healthy, and upon whose bodies could be found no trace of a primary lesion, but whose parental history gave opportunity for syphilitic inheritance. Cases of this kind are more or less subject to doubt, and while by no means denying the possibility of their occurrence, I should subject such an one to the most rigid scrutiny.

It has been claimed that syphilis can, by inheritance, be transmuted into other dyscrasiæ, as, for instance, scrofulosis. Thus Troncin* says that inherited syphilis, not showing itself by any specific sign, will subsequently cause glandular swellings, tardy dentition, and enlarged abdomen, and that such children are more liable to rachitis and phthisis. Puberty often frees women from this condition; but it may reappear after pregnancy. Hufeland believed positively that syphilized parents produce scrofulous offspring. Ricord, speaking of the tertiary stage of syphilis, says, the specific influence appears to go on decreasing until it becomes only one of the hereditary causes of scrofulosis.† Diday says that from his own observation it is no longer possible to doubt the capability of hereditary syphilis to produce scrofulosis.‡ Those who claim that syphilis can thus degenerate into scrofulosis do not go so far as to assert that this disorder is identical with true scrofulosis, and Maisonneuve and Montanier have designated it by the term scrofuloid.§ The substance of their observations seems to be this, that the child of syphilis in the tertiary stage, when not itself actively syphilitic, inherits a tendency to disease-conditions, and that it may have ophthalmia, otorrhœa, coryza, affections of the bones, etc., without any apparent external causation. On the other hand, when we remember how constant and undeniable the marks of syphilis are in the primary and secondary stages, and how like produces like, after its kind, does it seem probable that in the tertiary

* De l'Extinct. de la Mal. vénér., page 64.

† Lettres sur la Syphilis, page 249.

‡ On Syphilis in New-Born Children, page 121.

§ Traité prat. des Mal. vénér., page 365.

stage it should propagate conditions so dissimilar to itself? Does it not seem more probable that syphilis is always syphilis? Says Professor Keyes: "Syphilis is transmitted only as syphilis. Scrofula is not syphilis. Debility and nervous disease in children is not syphilis. A syphilitic parent may produce a weakly child, because she has had her own health broken by syphilis; but she would have produced exactly the same child had her health been broken by want and privation, by cancer, by malaria, by alcohol, or any other cause. Syphilis does not change in type by transmission. It does vary greatly, as seen in the child, but it varies in activity, in intensity, not in type. A child, born to parents whose disease is on the wane, perhaps nearly exhausted, shows but few evidences of disease, and those, perhaps, only during adolescence; but what symptoms it does show, bear the brand of syphilis, and are relievable, if at all, mainly by antisyphilitic treatment."* This seems to me sound doctrine. When syphilis has ceased to propagate its characteristic conditions, it has ceased to be syphilis.

Symptoms.—There are three very noticeable and characteristic symptoms of constitutional syphilis in the infant—the snuffles, hoarseness, and the rash. Snuffling is one of the earliest symptoms, and, as the mother attributes it to a cold, medical aid is not sought. It will be noticed that the infant breathes through the mouth, the nose seeming to be all clogged up. As soon as the child attempts to nurse, the difficulty of breathing through the nostrils becomes more apparent. It will make two or three pulls at the breast, and then leave off as if choking. While it is nursing, respiration ceases, and so the act of feeding consists of a series of two or three spasmodic pulls at the nipple with breathing-spells between. The result of this is that the child is badly nourished, as it becomes peevish from the interruptions, and refuses the breast. Not having enough food, it is restless, and consequently its sleep is disturbed and unrefreshing. When asleep, it lies with its mouth open, and often snores in a frightful manner.

This stoppage in the nose is the result of mucous patches on the Schneiderian membrane, from which oozes a thick discharge, forming crusts which plug up the nasal passages. In bad cases, after a time, the ulceration eats down to the bone, necrosis follows, the septum is perforated, and the nose becomes flattened and sinks inward at the bridge. A peculiar characteristic of the secretion is the vile and penetrating stench which it communicates to the expired air, and which sometimes fills the room in which the infant may be with a sickening odor. The inflammation will slowly spread, unless held in check by appropriate treatment, involving the frontal and Highmorian cavities,

* The Venereal Di eases, page 237.

while the corrosive discharge, leaking down upon the upper lip, causes excoriations and fissures. These, in turn, form scabs, and present a very filthy appearance.

Another early and noticeable symptom is the peculiar hoarse cry. Syphilitic infants, according to my observations, cry a great deal. This is partly due to hunger from being insufficiently nourished, and probably to some extent to bone-pains, analogous to such as often affect adults at the outbreak of constitutional symptoms. The cry is hoarse and high-pitched, which qualities seem to be caused by the extension of mucous patches to the larynx. Occasionally the hoarseness is accompanied by attacks of laryngismus stridulus (E. Smith).

The pemphigoid eruption to which infants with the syphilitic taint are subject has been elsewhere described, and has been shown to possess no essential marks of specific origin. But there is a specific roseola which is not only a very common, but very early, symptom of inherited syphilis. This usually appears a few weeks after the beginning of the coryza. It consists of coppery-red, round, slightly elevated spots of the size of a silver dime, and larger, which appear shining when viewed from the side. These coalesce and become deep-red or brownish, more or less desquamating patches. Instead of the roseola, I have twice observed round, dark-red papules, these being more especially on the lower limbs, while the roseola is most pronounced on the abdomen, face, back, and shoulders. At the same time mucous patches will most likely be found at the outlets of all the openings into the body, in the arm-pits, groins, or wherever the skin is particularly thin and delicate. Other varieties of eruption are not uncommon, especially in the more weakly children, but they are invariably surrounded by a copper-colored erythema which suffices to define their specific character. The skin itself is usually dry, inelastic, and wrinkled. The dermal capillaries are shrunken and their coats apparently stiffened, so that the skin has a singularly bloodless appearance even when not otherwise diseased.

Young infants rarely show the effect of bone lesions, but after the second year these may become very pronounced. If the disease in the parent has been intense enough to cause interstitial bone changes, the child is still-born. When developed at this later period, one of the long bones is generally the seat of disorder, which is due to an exudation beneath the periosteum, and may be felt as an enlargement on the shaft, or, more likely, at the extremity of the bone. This swelling remains for some time very hard, then softens, opens through the skin, from which opening exudes a viscid or sanious pus. As the suppuration progresses, the necrosed bone is cast off, and spontaneous healing may occur by its place being filled with fibrous tissue. As the periosteum is destroyed, no new bone can grow. The process is the same when one of the flat bones is attacked; the exudation is absorbed, or

else necrosis and suppuration follow. When separation of the epiphyses of the long bones takes place, a very peculiar symptom develops, which Parrot has named syphilitic pseudo-paralysis.*

The child appears as if paralyzed in the affected limb or limbs, which lie pronated on the bed and dangle like the legs of a doll when the little patient is lifted up. Bednàr was the first to recognize the importance of this symptom. In sixty-eight cases of congenital syphilis, sixteen had pseudo-paralysis of the arms, one of the legs, and two of all the limbs.†

Local paralyses sometimes occur, according to Henoch, mainly of the upper extremities, and are due to an affection of the brachial plexus. He instances two cases in which voluntary movement in the upper extremities was almost completely lost, the flexor muscles of the fingers alone retaining a slight trace of contractility. This disorder disappeared under the influence of Mercury.‡

As the child grows older, the active symptoms disappear, though it will probably remain stunted and unhealthy-looking. From the third to the sixth year it may have very fair health, but with the second dentition a new series of symptoms may develop. Gummata may destroy the nose, suppuration of the middle ear cause deafness, diffuse keratitis produce blindness, and extensive ulcerations destroy the tongue.

Diagnosis.—The diagnosis of syphilis in children, to any one familiarized with the symptoms of this disorder, is by no means difficult; though it must not be supposed that all the symptoms of the disease are well-marked in any one case. Frequently only a small number will be present, and deviations and variations are not uncommon. The snuffles, the hoarse cry, the weazened face, the dusky complexion, the eruption—all these symptoms are so sufficiently characteristic as to be unmistakable when occurring in conjunction. Non-syphilitic roseola, or other eruptions, doubtless might occur together with coryza, but the persistence of the syphilitic form is so manifest as to make the differentiation easy. In the syphilitic cases there is a general pallor and elasticity of the skin which is wanting in the non-specific form. Persistent snuffling in babies is almost invariably syphilitic in origin. This chronic coryza is sometimes the only positive symptom present, though negative ones will always be found if looked for properly. When in doubt from the indistinctness of the symptoms, an examination of the mother may reveal a history of previous successive miscarriages which will help to confirm the diagnosis.

In older children, enlargement of the bones at the wrist or about

* Archiv. de physiol. norm. et path., 1876.

† Krankheiten der Neugebornen, 1853.

‡ Diseases of Children, 1882.

the knee, a flattened nose from sinking of the bone, notched teeth, a protuberance in the median line of the forehead between the frontal eminences, cicatrices at various points upon the skin, enlarged spleen, pallid complexion, alopecia, and stunted growth form the picture of this diathesis.

Bone-disease in scrofulosis and syphilis may be differentiated by remembering that in strumous necrosis the bone is enlarged unevenly, while in syphilis the enlargement is symmetrical; in the former abscesses form readily; in the latter, tardily. In rachitis the ribs are usually the first bones to be affected; in syphilis they are rarely attacked even in the later stages of the disease. In syphilis separation of the epiphyseal ends of the long bones is not uncommon, but this never happens in rachitis. The two diseases might be found conjoined in the same patient, but such a circumstance must be extremely unfrequent.

Prognosis.—In determining the probabilities of recovery, more depends upon the general condition of the patient than upon the severity of any particular symptom. The progress of the disease will depend on the intensity of the cachexia, and this can, as a rule, be measured by the earliness of the first symptoms. If these appear during the earlier weeks of life, and the assimilation of food is seriously impaired, even though the symptoms run a mild course, the chances of recovery are very slight. Debility of nutrition, and the derangements of the digestive tract concurrent therewith (vomiting and diarrhœa), is the usual primary cause of death in these cases. Especially when in these earlier weeks of life the coryzal symptoms are pronounced, and the nasal passages are occluded with the hardened discharges, so that the child cannot breathe while it sucks, and cannot suck when it breathes, death is imminent from starvation. Death, as the direct result of syphilitic contamination, is unfrequent; but this cachexia renders the child susceptible to deleterious influences and unfits it to cope successfully with the numerous febrile disorders to which it is necessarily exposed. While syphilis is confined to no grade of society, and is no respecter of persons, the inherited form is most frequently found in the new-born of our tenement-house class, where even robust children are heavily handicapped by their surroundings.

Evidences of disease of the viscera or of the bones will ever indicate a grave prognosis. Mucous patches and tubercles may be numerous and severe without destroying life, if nutrition can be maintained. I have seen infants who presented a most horrible sight from ulcerations on various parts of the body recover completely under appropriate medication. One child, at my clinic at the Manhattan Hospital, in 1881, had ulcerations in the armpits and in the groins which ate into the tissues so greedily as to threaten to dismember the body; yet

Mercury made a complete and lasting cure. But interstitial changes in the viscera and bone are irremediable when they occur in the first months of life, and as they permanently interfere with function, the chance of the child surviving an attack of any of the ordinary ailments of infancy is meagre.

If the disease does not evidence its presence until the period of dentition, and the child remains plump, and appetite and nutrition are maintained, even though particular symptoms prove intractable, the prognosis is hopeful. Much, of course, depends upon the prompt recognition of the cause of the disorder, and upon appropriate and persistent treatment.

Diday has eloquently limned the destructive energy with which the poison seizes hold of its little victim even when its smouldering embers in the parent seem to have lost all virulence. This power of syphilis to renew its grip upon the human constitution as it descends from sire to son, is one of its most remarkable characteristics. He says: "These corroding ulcers which recall the fabulous times of syphilis of the fifteenth century; these suppurations which destroy in a week the bony structures of the nasal fossæ; these bullæ, invading almost visibly the whole external integuments; these hideous crusts under which the face of the child remains buried until the last day; these collections of pus which undermine the parenchyma of the most important viscera; these mucous patches, crowded and convergent, which multiply and propagate themselves with a rapidity which nothing can arrest; the undoubted contagiousness of many of these tegumentary lesions; the deep and sudden impression which such changes make upon the health; the early cachexia, and the termination which is its too common consequence: does not all give evidence of a peculiar virulence in the morbid agent? does not all indicate here symptoms in which nothing is wanting of the devouring activity of primary, any more than of the almost instantaneous generalization of constitutional affections? I have cause to say, then, that congenital syphilis affects a gravity incomparably greater than that of acquired syphilis."* Nevertheless, while admitting all that can be said of the destructiveness of hereditary syphilis, I desire to emphasize my faith in the effectiveness of appropriate medication. Frightful as the ravages of the disorder may be, the onward progress of the disease may generally be stayed by the right remedy. I am a firm believer in the therapeutic efficiency of homœopathic prescriptions when properly made, here as elsewhere; and while compelled to acknowledge the frequent failure of remedies to produce desired results in this as well as in the simplest disorders, I have seen too often the magical effects of similia in the treatment of syphilis to ever be contented to err, save on the side of work tinctured with hope.

* On Syphilis in New-born Children, page 131.

Treatment.—The preventive treatment has already been outlined. Where pregnancy exists, and either parent shows signs of the disease, the mother should be given Cinnabaris, in the third or sixth decimal, unless some other remedy seems more particularly indicated, so as to give the child every opportunity to overcome the chances of infection. Various salts of Mercury are used beside the Sulphide; principally the chloride and the black oxide, as well as the metal itself. Women who have been already overdosed with Mercury will do better under Nitric acid, in the sixth or twelfth decimal. Thuja, Sepia, or Mezereum may, in rare cases, supersede the preparations of Mercury; but remedies like Carbo veg., Hepar sulpur., and Kali iod. arouse latent symptoms, and while often useful at other times, had better be avoided during pregnancy. Whatever remedy is decided upon, its action should be maintained without intermission until the child is weaned. Changing about from one remedy to another destroys all anticipated benefit.

In proportion as the mother shows the syphilitic dyscrasia, it will be needful to observe her hygienic surroundings and dietetic habits, and correct errors in either. Attention to careful feeding is of the utmost importance. Nutritional activity cannot be maintained without a liberal and uniform supply of properly prepared food, and if nutrition is not maintained, and the mother is not well nourished, neither she nor the child can withstand the inroads of the blood-taint. Pure, warm, and dry air, the most scrupulous cleanliness, and freedom from mental annoyances are of almost equal importance. I have found the Turkish bath a very useful adjunct. Under its use appetite improves, sleep is sounder and more refreshing, the nervous system is less irritable, the muscles become firmer, and the prolonged stay in the hot room accelerates depuration, and so, probably, eliminates to some extent the morbific principle. Unfortunately, a large majority of this class of patients cannot secure even the more obvious comforts of life, and are, in the main, too ignorant and too careless to take advantage of our well-meant advice.

Syphilis is remarkable in showing peculiar and unexpected periods of latency, during which the diseased parent might give birth to a healthy child without having been subjected to the above treatment. But the fact that one child was healthy would not insure the safety of the next. It is therefore desirable, as a precautionary measure, to follow up the protective treatment here advised for at least three successive pregnancies. If we can protect the fœtus in these from contamination, the disease will by that time have progressed beyond the infecting stage.

As regards the father, when he is the infecting party, my advice is much less positive. I do not deny that he may not contaminate his wife, from secondary lesions, during gestation. If this be true, he also

should be put under treatment. We certainly err on the safe side, if we err at all, by following this course whenever the man shows even the slightest signs of the disorder, which he will do in an overwhelming majority of cases.

Notwithstanding all these precautions, it is possible that the child may be born syphilitic; nor is it necessary to conclude on this account that our efforts have been in vain. No matter how meagre the apparent results, doubtless both mother and child are much the better for our exertions. While there will be failures because our advice has not been conscientiously followed, and from other and perhaps inexplicable reasons, yet in the great majority of cases the good effects of the treatment will be manifest.

If the child, when born, presents a healthy appearance, and the mother has so far recovered from the effects of the disorder as to show no active lesions, by continuing the treatment of the mother the child will receive all needed medication through the mother's milk. The question whether the milk under these circumstances actually contains Mercury has been much discussed; but the clinical fact that such milk possesses unquestionable therapeutic value cannot be successfully assailed. Personne verified the presence of Mercury in the milk of women who had taken three-fourths of a grain of the protoiodide daily for two months;* and even where the amount is infinitesimal, and chemically inappreciable, it having passed through nature's laboratory doubtless peculiarly fits it to act upon the delicate tissues of the nursling. It has been observed that Corrosive sublimate in minute doses ($\frac{1}{120}$ grain) acts more kindly when mixed with the milk fed to the child than when given separately in watery solution. If a mere mechanical mixing with the food improves its therapeutic action, how much more may be expected of it when it is dynamically a part of the lacteal product. Many of the older syphilographers affirmed the therapeutic efficiency of a medicinal milk obtained from an ass or a goat after shaving a portion of its hide and introducing mercurial ointment by inunction;† and I can myself bear witness to the efficacy of this method in a case where it was necessary to provide some form of artificial food.

The best food for a syphilized babe is its own mother's milk, provided this is of good quality. The milk of syphilitic mothers is very often poor and watery, and ill-adapted to the nourishment of their offspring; but if her health has been guarded by the administration of Mercury during pregnancy, she will probably make a good nurse. If the child is peevish and restless after a meal, and desires the breast at too frequent intervals, and especially if it emaciate, its food will

* Bulletin de Thérap., 1852, page 866.

† Traité complet des Mal. vénér. ou Syphilis, tome ii., page 133.

need to be reinforced by some one of the artificial preparations. Murdock's Liquid Food, in five-drop doses, every two hours during the day, and a larger portion at bedtime, I have found to act well. If the mother's milk is scanty as well as poor in quality, an alternate meal should be provided of cow's milk diluted with an equal amount of barley-water, and reinforced by Mellin's Food, or Imperial Granum. There are at all times quite a choice of artificial foods on the market, many of them of real value, but I speak of these two because they have been maintained at a uniform excellence for a number of years, while too frequently such preparations, after having obtained a popularity, are permitted to deteriorate in quality. When the mother is too feeble to nurse her child, the best substitute is a sometime syphilized woman who has recovered her health, and has now a nice, fresh breast of milk. This is a combination of good qualities rarely attainable. Of course, so for as the child is concerned, any healthy breast, of proper age, is all-sufficient; but we cannot subject a healthy nurse to the almost certain danger of infection, both on her own account and that of others to whom she might carry the disease. It must be laid down as a rule never to be transgressed that a healthy person should not be sacrificed in the interests of a diseased one; and the fact must not be overlooked that the child, though apparently robust and ruddy, may at any moment become the unsuspected source of contagion. This is inevitable if the wet-nurse is sought on account of the debility of the mother. The attendants upon such a child should be warned of the danger of infection from even the most minute mucous patch at the commissure of the lips, on the anus, or elsewhere; they must not use the same towels as the infant; they must avoid the common practice of testing the quality of the food in the feeding-bottle through the rubber teat by putting it into their mouth; and the slightest abrasion upon the hand should be properly protected.

When the child is apparently healthy, and the mother unsuspicious of threatening disclosure, the family physician is placed in a most embarrassing situation. If he keep his own counsel, he takes the risk of being a party to the infection of an innocent servant, and through her, perhaps, of others. But not only the attendant is in danger. All who come in intimate contact with the child share the possibility of infection—the young nieces and aunts who are so fond of smothering it with caresses and kisses. While, on the other hand, if he speaks out, he endangers his own relations with the family. He is accused, perhaps on the strength of pretended confessions on the part of the patient, of violating professional confidences. Evidently it is his duty to act with good faith towards all, but he will need all the tact of which he is master to speak the word of caution without giving offence. If the diagnosis is a certainty, he must protect the innocent at any cost,

and this can usually be accomplished by taking only the nurse into the secret.

The utmost cleanliness must be observed. The napkins should be changed as soon as soiled, to avoid irritation of the parts about the perinæum. Warm baths should be given twice daily, and great care taken afterwards to dry the body thoroughly. Warmth is essential both in clothing and in the temperature of the air of the room, but purity of air must not be sacrificed to heat. If the little patient is strong enough, and the weather be dry, it should be taken out into the sun as much as possible; but it must be warmly clad if good results are to be obtained. It is one of the curiosities of syphilis that cold perpetuates it, while heat renders it less refractory.

I come now to the treatment of the child by direct medicinal means. We will suppose that our treatment of the mother during pregnancy has not availed to ward off the evident presence of the disease in the infant; or that the child, while fresh-looking and well-nourished, is the offspring of a mother so palpably disabled by the disorder as to be unfit to serve as the nurse; or that the parents, lulled into a false sense of security by the birth of a healthy child and by their own continued freedom from the return of noticeable symptoms, fail to apply for treatment on the wife again becoming pregnant, and so give birth to a child unguarded by medicine during its intra-uterine life. Under these varying circumstances, when should treatment be instituted, and how should it be conducted? It is evident that no absolute rule can be laid down on this point. The indirect treatment, that is through the mother's milk, cannot be relied upon, if active symptoms appear, and it is altogether inapplicable when the mother is not the nurse. It has always seemed to me that, whenever the babe is presumably syphilitic, treatment ought not to be delayed until symptoms are manifest, but we should at once institute such measures as experience and the circumstances of the case warrant, and in this opinion I have only been confirmed by the lapse of years.

The salts of Mercury will always form the basis of our treatment, but there may be a nice adjustment of choice as to which will act best in any given case. My preference is for Cinnabaris, but this may be rather as a matter of habit than for any real excellence on the part of the sulphide over the other salts of Mercury. I should not like to say that the soluble Mercury of Hahnemann (the black oxide) is not as agreeable to the patient and as obnoxious to the disease. I have certainly seen this latter act efficiently and quickly on an anal mucous patch. Usually, I give Cinnabaris in the third, sixth, twelfth and fifteenth decimal, descending in the scale and increasing the frequency of the dose according to the urgency of the symptoms. *To a young* babe, showing as yet no syphilitic lesion, and to whom treatment is given as a pseudo-prophylactic, a dose of the fifteenth trituration, once

a day, would meet my idea of conservative treatment. Where the disease is very active, and mucous tubercles eat greedily into the tissues, I give Corrosive sublimate (Mercurius corrosivus) one-half grain dissolved in a pint of water, a teaspoonful of which is mixed in the feeding-bottle with each meal. When improvement sets in, the dose is reduced to three or four times a day. Its effects are often astonishing.

When the syphilitic cachexia is the most prominent symptom, and the infant is weazened, shrunken, and cadaverous, the combination of Iodine with Mercury—Mercuric iodide—is a very hopeful remedy. If mucous patches and ulcerations form upon the skin and tend to spread, a mercurial bath, once a day, will be advantageous. This is prepared by dissolving ten grains of corrosive sublimate in a gallon of hot water (110° F.), in which the child is immersed for five minutes, during which its flesh is gently manipulated. It must then be very carefully dried, and the larger ulcerations lightly dusted with Calomel. If the child is too feeble to make the hot bath judicious, I use a vaserole of the red oxide, ten grains of the salt to the ounce, a small quantity of which, say, the size of a split pea, may be lightly smeared over the more virulent ulcers. I used this to a considerable extent at the Manhattan Hospital, and always with the most charming results. The vaserole is allowed to remain about twelve hours, and is then thoroughly washed off with warm soapsuds, and is not renewed until the next day.

The condition of the nasal fossæ will demand particular attention. If these be clogged by inspissated discharge, they must be thoroughly cleaned out, and kept clean. For this purpose I have used a solution consisting of one drachm of the tincture of Phytolacca to an ounce of hot water. Into this is dipped a pledget of absorbent cotton, and the nostrils swabbed out. Afterward, the same solution is used in a spray-producer. When the mucous patches are exposed, they may be lightly touched with a camel's-hair pencil moistened with the fluid extract of Geranium. By keeping the nasal passages clean, fœtor is prevented, as well as the further destruction of tissue.

Mucous patches in the folds of the neck, groins, about the anus, etc., must be very carefully cleansed, and then brushed over with Geranium, or they may be dusted over with Calomel or Iodoform. The main point in the treatment of these lesions is cleanliness and dryness.

In neglected cases crusts sometimes form a complete mask over the face. This can be softened by the use of Vaseline, but, unless so thick as to interfere with the action of the mouth, eyelids, etc., it is best left alone.

Hoarseness is often a well-marked symptom, and sometimes this goes on to complete aphonia. So various are the manifestations of syphilis that sometimes this hoarseness will be the only characteristic symptom in the case; as, for instance, in the following:

Jessie Lowden, aged five months, suffered for three months with hoarseness, and for the past three weeks with total aphonia. Her respiration is normal, and she has had no cough. Laryngoscopic examination showed a condylomatous ulcer, involving the right vocal cord. When six weeks old she had suffered from coryza and roseola, which disappeared under Cinnabaris. She was now given Mercurius sol. 2^x, and at the end of a fortnight her voice was restored to its natural tone.

Beside the remedies which have been mentioned, there are a few others which demand recognition. These are Calcium iodide, Corallium rubrum, Kali iodide, Phosphoric acid, Phytolacca, Sepia, and Staphisagria; perhaps, also, Aurum, Arsenicum, Carbo veg., Hepar sulphur., and Ferrum iodide.

The duration of treatment will vary with circumstances. In the mildest cases the internal administration of the selected remedy should be continued to the sixth month, when, no further symptoms developing, it may be suspended. In more pronounced cases it will be well to persevere with the remedy until the child is a year, or a year and a half, old. Those cases which have been so severe as to require medicinal baths and inunctions, will require oversight until they have passed their second dentition. The frequency of the dose must be determined by the activity of the symptoms, from once a week to every two or three hours, watching carefully to avoid the production of medicinal aggravations.

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GENERAL INDEX.

LIST OF CONTRIBUTORS

TO A SYSTEM OF MEDICINE BASED UPON THE LAW OF HOMŒOPATHY.

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ERRATA.

Vol. I., page 72, in figure 5 erase the two numbers "10" in the shaded portion between the pointing lines 5 and 6.

" 242, 39th line from top, instead of "becomes" read "become."

" 244, 21st " " " "swells" read "wells."

" 258, 6th " " " "sputa" read "sputum."

" 260, 16th " " after "œdema" insert ", œdema."

" 265, 2d " " after "oil" insert "after."

" 336, 12th " " instead of "lymphatic" read "sympathetic."

" 342, 32d " " " "systole" read "diastole."

" 439, 15th " bottom, instead of "1^{x}" read "1^{o}."

" 473, "Cocoa" should read "Erythroxylon Coca."

" 526, 12th line from top, read as follows: "This exudation is sometimes mistaken for that of diphtheritis, but is readily distinguished by its want of all organization as a true membrane and by its easy removal; when the gland is seen honeycombed, and its mucous covering otherwise intact. Sometimes."

" 543, 4th line from top, for "crested" read "everted."

" 554, 8th " " for "remitted" read "remittent."

" 557, 25th " " for "Dr. Sidell" read "Dr. Lidell."

" 557, 9th " bottom, for "Antrac." read "Anthrac."

" 558, 14th " top, for "Dr. Sidell" read "Dr. Lidell."

" 566, 18th " " for "Mer. sol." read "Merc. sol."

" 576, 4th " bottom, for "Carbo" read "Carbo an."

" 576, 4th " " for "Galium aperine" read "Galium aperinum."

" 577, 15th " " for "depending" read "depend."

Vol. II., page 103, 7th " " instead of "nine pounds" read "one pound."

" 341, 2d " " instead of "schirrous," read "scirrhous."

" 366, 24th " top, instead of "root" read "roof."

" 552, 14th " " instead of "syncopic" read "syncope."

" 575, 26th " " instead of "develop" read "develops."

" 581, 2d " " read sentence as follows: "Each embraces several distinct parts of the spinal cord, the former including the columns of Goll and Burdaeh, or the posterior columns and the posterior horns of gray matter, and the latter, or kinesodic system, embracing the lateral columns and the columns of Türck, or the entire antero-lateral columns and the anterior horns of gray matter."

" 586, 8th line from bottom, instead of "mortality" read "motility."

" 596, 6th " " " "vaginal" read "regional."

Vol. III., page 132, 9th " " " "doorway" read "doorways."

" 137, 28th " top, instead of "ulnar" read "ulna."

" 138, 14th " " " "adduction" read "abduction."

—1886.—

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