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He alone is the true physician who can restore health.

*Charaka Sanhita.*

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## TREATMENT OF CHOLERA

BY

Dr. Mahendra Lal Sircar, M.D., D.L., C.I.E.

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[No. 10.

RAT AND PLAGUE.

The dissemination of plague by rat still remains an undetermined speculation. The game of chance plays the principal part. Giridih is said to be devoid of plague for the crusade against rats. The public were assured of the fact by the rat-killers, but one of their chiefs, the Sanitary Commissioner of Bengal, cannot safely proclaim the immunity of Giridih from the extermination of these creatures. He says in his report for the year 1905 thus :

“ During the year under report, rat extermination has been carried on in many places, but notably in the Giridih coal fields and in Bihar. As plague has not been anything like so prevalent this cold weather throughout the whole province, it is scarcely reasonable to conclude that there has been little or no plague in places where rat extermination has gone on that it is the removal of the influence of the rat that has saved the places.”

The unmitigated hatred of the modern sanitarians towards all lower animals has assumed the hypothesis that almost all our diseases are conveyed by them. Perhaps, it would be reasonable to conclude from their assertion that these poor creatures should be removed from their land of life. They create pestilence during their period of living. After death, it is expected that they can be useful to the Chicago meat-packers.

The formidable energy displayed in the business of rat-killing is manifest from the following observation of the Sanitary Commissioner :

“ Rats under natural conditions, breed twice in the year—in March and in October, hence it is obvious that it is not possible to relax the measures for any length of time if extermination is aimed at. Further, in the rainy season many of the field rats may be driven into houses through floods or through famine. This variety does not usually go into villages and houses, nor do they usually suffer from epidemics of plague, consequently they are in all probability very much more likely to be susceptible to the disease than the surviving house rats, who have passed through an epidemic of plague the previous cold weather. This I believe is the correct explanation of the isolated recrudescences of the disease that occur in Bihar in August and September. The rat population of any village is suddenly augmented with a large number of susceptible field rats; these new arrivals contract plague from the house rats and the villagers themselves suffer.”

A plausible theory, indeed! The field-rats enter the houses in the rainy season, when there is no plague. They remain as friends of the house-rats till winter, and are attacked with plague given by their hosts, the house-rats. The guests suffer and disseminate plague.

The field-rats come to their friends the house-rats. Then they forget their old habit and remain with them. They could find out means to cultivate acquaintance of the house-rats. They are charmed by their hospitality and remain captivated. They come to the homes of the house-rats, and forget to retrace their steps. Such amity and cordiality between the two kinds are unknown in nature. The Darwinian theory of the struggle for existence is lost sight of by the Sanitary Commissioner.

Are we to assume, after all, the house-rats, the remnants of the plague stricken creatures do not breed and bring forth fresh progeny? Perhaps, their procreative functions are des-

troyed and they adopt the field-rats to take care of their home and hearth.

Other theories are at stake. The house-rats after acquiring artificial immunity communicate plague to the field-rats. It is supposed that the fields-rats are devoid of natural immunity. Many suppositions and ideal speculations are sought to relieve the distress of a plausible explanation.

The nationalities of rats now come to the consideration of the authorities. The Sanitary Commissioner of Bengal received the following information :—

“ Captain King, I. M. S., on plague duty in Bihar, has been investigating the subject of rats in Bengal and has given me the following notes : In Patna and other large towns in Bihar, he found two varieties, viz., *Mus Rufescens*, about 80 per cent., and *Mus Alexandrinus*, about 20 per cent. There are no *Mus Decumanus*. In other places and in villages the *Mus Alexandrinus* does not appear to be so common, but occasionally a variety, *Nesokia Bengalensis*, the Indian mole rat, has been captured in houses. This last species is in reality a field rat, but does enter houses and stables not infrequently. The fourth species that may be met with in houses in Bihar, though only very occasionally, is the common Bandecoot, *Nesokia Giganticus*; all these five species are met with in villages. There is one feature common to the lot of them, viz., that however much the colour of various specimens may vary, they all have black or very nearly black, tails. This is a useful point, for when tails are sent up for rewards, all the grey and yellow ones can be rejected as field rats, while the black ones may be paid for as being caught in villages.

The field rats proper that have been identified in Bihar are (1) the Jerboa rat, *Gerbillus Indicus*, (2) a rat that is probably the soft furred field rat and (3) a variety which Captain King cannot classify from any of the works on the subject.”

The enquiry of Captain King turns to the point of differentiation, the house-rats have black tails and the field rats have grey and yellow tails. According to him the house-rats can

propagate plague and not so the field-rats. The transformation of field-rats into the house-rats is against his theory, for only the killers of house-rats deserve the reward. This enunciation of fact is against the theory of the Sanitary Commissioner of Bengal.

As for the study of the habit of house-rats in propagating plague, it still remains unsolved. The connecting links are taken to be certain kinds of rat-fleas. About them, the following remarks have been added :

“Several batches of rat fleas were sent down to Bombay for identification. Out of some 700 sent, almost all were the black rat flea, *Pulex Cheopis* (pallidus), whilst only two turned out to be the brown rat flea, *Ceretophyllus Fasciatus*. Captain Glen Liston informs us that in England the latter of these two varieties is extremely common and the former practically never seen, but the results of his investigations in the Panjab correspond largely with those in Bihar.”

The fleas of black rats have been partially identified. The next point for consideration is, whether the flea *Pulex Chenopis* communicates plague from rat to man? We wait for further reports on the investigation.

---

#### A REPROVING OF BELLADONNA.

There is ample necessity for reproving the noted medicines of our materia medica. The necessity was felt for a long time to the cause of progressive and scientific medicine as enunciated by the principle of *Similia Similibus Curantur*. The arduous task was undertaken by the American Homœopathic Ophthalmological, Otological and Laryngological Society. In more sense than one the reprovings are considered as test drug proving for they are the carefully recorded physiological actions of a drug as Belladonna without the so-called poisoning symptoms which endanger life. Neither of these symptoms are due to local applications, for they do not form actual test symptoms of a drug. The General Director of the proving is Dr. Howard P. Bellows who was formerly professor of physio-

logy in the Boston University School of Medicine. It was considered safe to rely the new experiences in the hands of an able colleague, as a former professor of physiology. In the introduction, the necessity of reprovng was particularly considered. Dr. Bellows writes: "It can hardly be realized, without critical study, how large a percentage of the symptoms ordinarily ascribed to Belladonna are the result of poisonings, some of them fatal, the effect of external applications, or the action of over-doses administered to the sick. For instance, in Allen's Encyclopædia of two hundred and fourteen authorities cited which can be tabulated, one hundred and nine deal with poisonings, sixty-four with the effects of overdoses, liniments, plasters, berries, etc., and only the remaining forty-one are provings, properly so-called. In the Cyclopaedia of Drug Pathogenesis, of forty-one authorities quoted, twenty-one deal with poisonings and the remaining twenty with provings."

On the other hand the O. O. and L. Society has given fifty-three new provings. They serve to test the reliability of the former provings.

The preference of the new provings rests on the following considerations:

"The result of this compilation and mixing of symptoms in our older symptomatologies is an undue prominence given to symptoms of an exaggerated character, and to the more violent and more striking drug-effects characteristic of poisonings. In comparison with these older records, the new one here presented may, for this reason, seem to be somewhat lacking in force and in consequent value. In point of fact, what it may lack in this kind of force enhances its value as a guide in practice. The drug-effects which this proving has developed are those seen in patients in ordinary states of sickness, while under treatment with reasonable hope of recovery, and not those seen in cases perhaps already moribund and beyond hope from any therapeutic measures. It is far more useful and reliable for our guidance in prescribing that we see such effects as these plainly presented in their true relationship to other symptoms and in a just



degree of intensity, as developed in a pure proving, rather than to have the attention caught by the more glaring effects which are, perhaps, never seen in curable cases. These should be incorporated in our future records, but should be distinctly marked as poison effects, which must not be taken unduly into account in an ordinary prescription." Narratives and synopses of provings form an unusual importance, as they contain the daily diary of provings and the successive development of symptoms of the fifty-three provers. The results are presented in a new schematic form contrasting with those of the old form.

The old classification into mind, sensorium, inner and outer head, has been retained. The new division into mind and nervous system takes the lead.

The principal symptom of the mind in respect to Belladonna is delirium. The provings record the following symptoms:—  
"Very delirious; talks wildly, eyes look staring and wild; delirious, so that he did not record any symptoms or see examiners, but talked a great deal during latter part of p.m., and evening, followed by heavy sleep during night."

With a view to find out the difference with the symptoms mentioned in our materia medica, we find the following statement:—Delirium; with springing out of bed, laughing; constant talking; fury; pulling at the hair of bystanders; inclination to tear everything into pieces; attempted to bite and strike, broke into fits of laughter and gnashed her teeth, look wild and fierce; her; fury with staring eyes and continually spitting at those about delirium with picking at bed-clothes off; threw herself from a height in delirium; with violent motion of arms and legs; running into the street naked; gesticulating, dancing, laughing, uttering and doing many absurd things; abhorrence of liquids; garrulity; using absurd language, laughter and singing.

It will be seen that the most prominent symptoms recorded in our materia medica are the fruits of poisoning, differentiating from those of proving. In other words, the above mentioned violent symptoms never appeared in the provings of Belladonna

and consequently, they can not be generally used. There are exceptions where the poisoning symptoms are necessary to be considered as in cases of violent delirium. The ordinary and extraordinary characters point to the provings and the poisonous symptoms respectively. In all other details, the new provings record symptoms in a comprehensive form and with a thoroughness surpassing the old records. The provings are the earnest endeavours of zealous men who had been placed in a difficult undertaking and the researches owe their success to the care and labour of the medical directors. In fact, if the other drugs are proved in this way, the whole work will facilitate our comprehension of the use of homœopathic medicines and the results are destined to be far better than what they are at present. We congratulate our colleagues of the American O. O. and L. Society for carrying the provings of Belladonna into successful conclusion and hope they will enhance the knowledge of other drugs of our materia medica by their new and progressive method.

The price of the book is fixed at five dollars and is available from Dr. P. Bellows, of Boston, Mass., America.

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## NEED OF AN INDIAN HOMŒOPATHIC PHARMACOLOGY.

(Continued from page 225.)

124. *Cauchalagua* or *Erythrea Chiliensis* is a native of tropical America.

125. *Canna* or *Canna Glauca* is an Indian plant. We call it *Canna Indica*. It is found "all over India and Ceylon, chiefly in garden where they are grown as ornamental and flowering plant; they are in flower all the year." The Bengali name of *Canna* is *Sarvajaya* (সর্বজয়া). Its Persian name is *Akulbar*, *Suroochjeea*.

126. *Cannabis Sativa* is considered by Watt that "*Cannabis Indica* has been reduced to *C. Sativa*. The Indian plant being viewed as but an Asiatic condition of that species. This extends the region of the hemp-plant very considerably. It has been

found wild to the South of the Caspian Sea, in Siberia, in the desert of Kirghiz, it is also referred to as wild in Central and Southern Russia and to the South of the Caucasus."

Clarke admits the difference in the properties between *Cannabis Sativa* and *Cannabis Indica*. He says: "*Cannabis Sativa* and *Cannabis Indica* are botanically identical; the difference in their properties is solely due to their difference of soil and climate in which they are grown." Clarke identifies *Cannabis Sativa* with the European and American Hemp.

127. *Cannabis Indica* has been called by Clarke *Hashis*, *Bhang* or *Ganja*. If we accept *Cannabis Sativa* being botanically equal to *Cannabis Indica*, no great difference in their property can exist. On the other hand it is plain that *Hashis* is not *Bhang* or *Ganja*. They are three different constituents obtained from the same plant. Watt writes: "There are primarily three forms of this (narcotic) substance, but under each there exist also local modifications, special preparations from these, and adulterants or imitations. The three forms are known as *Ganja*, *Charas*, and *Bhang*. *Ganja* is the female flowering tops with the resinous exudation on these; *Charas* the resinous substance found on the leaves, young twigs, bark of the stem, and even on the young fruits; *Bhang*, the mature leaves and in some parts of India the fruits also, but not the twigs." Further on, he says: "As already explained there are three forms of this poisonous drug: (a) *Ganja*, the agglutinated female flowering tops and resinous exudation on these; (b) *Charas*, a resinous substance found on the leaves, young twigs, and bark; and (c) *Bhang* or *Siddhi*, the mature leaves, and in some parts of India the fruits also, and even the very young twigs, but not the stems. *Ganja* and *Charas* are smoked, and *Bhang* is either used in the preparation of the green intoxicating beverage *hashis*, or in the manufacture of the sweetmeat known as *Majun*. *Bhang* is much weaker than *Ganja* or *Charas*, and by many supposed to be much less injurious.....*Bhang*, being collected largely from the wild plant is extensively used all over India, the bulk of the consumption entirely escaping

duity.....The greatest difficulty exists, therefore, in regulating the consumption of *Bhang*, but practically no such difficulty exists with regard to *Ganja* and *Charas*. The last mentioned narcotics can be produced only from the cultivated plant, and the consumption can, therefore, be regulated by law."

Practically in medicine, we make an arbitrary difference. We identify *Ganja* with *Cannabis Indica*, *Bhang* or *Siddhi* is taken to be *Cannabis Sativa*, *Charas* is incorporated with *Ganja* being both of them resinous exudation. The provings of the two substances *Ganja* and *Bhang* being unequal, there should be some specific names for them. The Sanskrit name of *Cannabis Sativa* is *Indrasana* (इन्द्राशन). The Persian is *Kunub* or *Bujee*.

128. *Capsicum Annum* is Red Pepper. Clarke calls it Cayenne Pepper. According to Watt *Capsicum Frutescens* is Spur Pepper, Cayenne Pepper, Goat Pepper and Chillies. It is also called the Shrubby Capsicum. Of *Capsicum Annum*, Watt writes: "A native of equinoctial America, most probably of Brazil. Commonly cultivated for its fruit throughout the plains of India, and on the lower hills such as in Kashmir, and in the Chenab valley upto altitude 6,500 feet. When grown on the hills it is said to be very pungent. There are seven varieties, differing chiefly in the length, shape, and colour of the fruit, some being round, other oblong, obtuse, pointed or bifid, smooth or rugose, and red, white, yellow, or variegated. It is probable that most Indian authors have confused this species with *C. minimum*."

*Capsicum Frutescens* is Cayenne Pepper. Watt has the following: "An annual cultivated throughout India, supposed to have been recently, comparatively speaking, introduced from South America. According to the best authorities, this and the other species of *Capsicum*, now cultivated in India, have no Sanskrit names. Of the Indian cultivated species this is perhaps the commonest, as it is also the largest, being sometimes cultivated in the hedges around fields. It is grown during the cold weather on light sandy soil in most parts of the country.

and especially so in Bengal, Orissa, and Madras. The fruit when ripe, is generally of a bright red colour; it is then picked and laid out on mats to dry in the sun."

C. Annum is our ordinary pepper commonly called *Patnaya lanka*, (পাটনাইয়া লঙ্কা) which is generally larger in size than the other varieties.

*Capsicum Grossum* is Bell Pepper. We call it *Kul lanka* (কুল লঙ্কা). It is also known as Kaffree Chilli. *Capsicum Minimum* is Bird's-eye Chilli. The Bengali name is *Dhani lanka* (ধানি লঙ্কা). It seems that *Capsicum* has been introduced from tropical America. The name Chilli indicates that it came from that country of Southern America. There is no Sanskrit word for red pepper. *Marich* (কাল মরিচ) is Piper Nigrum and not *Capsicum* mentioned in Sanskrit medical books. The differentiation into *Kala Marich* (Piper Nigrum) and *Lal Marich* (*Capsicum*) is a modern application.

The tincture for medical purpose comes from *Capsicum Annum* (পাটনাইয়া লঙ্কা), the largest of the capsicums. The fresh ripe fruits should be taken for tincture instead of the dried ones.

128. *Capsicum Jamaicum* is Pimenta Aromatica. It is the Jamaica capsicum, and differs little from *Capsicum Annum*.

129. *Carica Papaya* is the Papaw or our Penpe (পেঁপে).

130. *Carduus Benedictus* comes from Greece, Asia minor and Persia.

131. *Carduus Marianus* is an inhabitant of Europe.

132. *Carya Alba* or Shell bark or Shagbark Hickory is an American tree. The dried seeds are used for tincture.

133. *Cascara Sagrada* is Rhamnus Purshiana of California.

134. *Cascarilla* or Croton Eleuteria is a native of the Bahamas in America. The dried bark is imported.

135. *Castanea Vesca* is Chestnut. It is called by Watt *Castanea Vulgaris*, the sweet Chestnut or Spanish Chestnut. It was introduced in India and grows in the Panjab, the hills of the United Provinces, Darjiling and the Khasia hills. It is also known by the name of Indian chestnut. Its Bengali name

is Badam (बादाम). The Persian is Buloot, Nekaree, Kustul, Badamgootee.

136. *Caulophyllum Thalicteroidis* or Blue Cohosh, Squawroot is an American tree.

137. *Ceanothus Americanus* or the New Jersey Tree, Red root is an inhabitant of America. The dried leaves are used for tincture.

138. *Cedron* is Simaba Cedron. The dried seed comes from America for tincture.

139. *Centaurea Tagana* is an inhabitant of Mauritius. We have *Centaurea Behen* or the White Behen or White Rhapontis. In Hindi it is called Safaid Bahman and in Persian Bahman-i-Suffaid. There is another, *Centaurea Moschata* or Sweet Sultan. Its Persian name is Shah Pusand, or Azeez.

140. *Cerasus Virginiana* or *Prunus Virginiana* lives in America.

141. *Cereus Bonplandi* or *Opuntia Tuna* is a variety of *Cactus Grandiflorus*, comes from tropical America.

142. *Cereus Serpentinus* is its allied species.

143. *Cetraria Islandica* is Island moss. It is found in Europe, Asia and America. The dried lichen is taken for tincture.

144. *Cherophyllum Temulum* is a European plant.

145. *Chamædrys* is *Teucrium Chamædrys* and found in Europe and Asia.

146. *Chamomilla* is *Matricaria Chamomilla*. It is found in Europe, and Asia including India. The Persian name of *Chamomilla* is also Babuneh as in *Authemis Nobilis*.

147. *Chaparro Amargoso* is the Goat Bush and comes from America.

148. *Cheiranthus Cheiri* is the Common Wall flower of Europe and known also Yellow Violets. It is cultivated in the gardens of North India and known by the Hindi name of Todri-surkh.

149. *Chelidonium Majus* or the greater Celandine. It is a kind of poppy. It is found in Europe and Asia besides India.

150. *Oxalone glabra* comes from America.

151. *Chenopodium Ambrosioides* is the sweet-Pigweed, Mexican Tea. Watt writes: "An old world, widely-spread species, now introduced into America, common in many parts of India, such as Bengal (Voigt says it is completely domesticated about Serampore), Silhet, the Deccan, and Coimbatore, etc. It has a weaker and less offensive smell than *C. Anthelminticum*, from which it may be distinguished by having its flowers in leafy racemes." From this plant Mexican Tea is produced.

152. *Chenopodium Anthelminticum* is Wormseed and found in America. There are many other varieties of *Chenopodiums*.

153. *Chenopodium Album* or the White Goose-foot. It is common in most parts of India. Its Bengali name is Bethu sak (বেথু শাক) and the Hindi is Buthooa, Kulfee. It forms a dietary in India.

154. *Chenopodium Botrys* is the Jerusalem Oak. It is found in India.

155. *Chenopodium Obidum* grows in Europe, Africa and America.

156. *Chenopodium Vulvaria* is a plant of Europe and Africa.

157. *Chimaphila Maculata* is spotted Wintergreen not found in India.

158. *Chimaphila Umbellata* is Prince's Pine and observed in Europe, America, and Asia besides India.

159. *China Boliviana* is a variety of *Cinchona Calisaya*. It is essentially an American tree.

160. *China Officinalis* is *Cinchona Calisaya*. Dr. King, a former superintendent of the Botanical Gardens of Calcutta wrote: "The trees producing the medicinal barks are all natives of tropical South America, where they are found in the dense forests of the mountainous regions of the western parts of that continent at height of from 2,500 to 9,000 feet above the level of the sea, and in an equable but comparatively cool climate. The *Cinchona*-producing region forms a crescentic zone which follows the contour of the coast line, but nowhere actually touches it, beginning at 10° N. and extending to 20° S. latitude.

The crescentic belt is nowhere much above a hundred miles in width, but its length (following its curve) is more than two thousand. During its course, it passes through the territories of Venezuela, New Granada, Ecuador, Peru, and Bolivia." Cinchona was first introduced into Europe by the Countess of Chinchon, wife of a Spanish Viceroy of Peru, about the year 1639. But the use of the bark remained unknown till 1846 when a few of the Calisayas were grown at the Jardin des Plantes, Paris, from seeds collected by Dr. Weddell during his first journey to Bolivia. Dr. Royle, a Botanist to the Government of India, wrote in June 1852 a report on the subject. The efforts of Drs. Royle, Grant, Falconer, Thomson and Anderson proved ineffectual. At last the Secretary of State for India deputed Mr. C. R. Markham to undertake a survey of the Cinchona region in America. Mr. Markham undertook triple expeditions. The plants were first produced in the Kew garden. In 1861 the seeds of the grey and red barks came to India. Another fresh supply was brought by Dr. Anderson in the same year from Java. They were first grown at Ootacamund, Nilghiries. In 1861 the Sikkim plantation was also fortunate in producing the tree. It will be seen that the transplantation of the Calisaya or yellow bark cinchona did not reduce the intrinsic quality of the tree. In 1872, Dr. King wrote: "This plant yields the yellow bark of commerce, and is a sort second to none in value; it promises to do well in Sikkim."

There are several varieties of Cinchona Calisaya as *C. Ledgeriana*, *C. Cartbageno* and *C. Officialis* or *Loxa* or *Crown bark*. The last is called the *Pale Bark* of commerce.

161. *Cinchona Succirubra* is the *Red Bark*. It is cultivated on the Nilghiris and mountains of Sikkim.

The tincture of Cinchona is prepared from the dry bark. The way in which the barks are dried, makes it uncertain as to the quality and quantity of quinine and its other constituents. For this reason, the preparation of the tincture from the fresh bark seems preferable. The fresh bark may not be available in the market but an effort to procure it fresh may succeed.

(To be continued).



## REVIEW.

### *Thirty-eighth Annual Report of the Sanitary Commissioner for Bengal, 1905.*

The Sanitary Commissioner as usual begins with rainfall. No particular Sanitary condition was marked in any month or place with regard to the meteorological condition. His general conclusion is :

“The peculiar weather conditions during the first four months of the year, very low temperature, and unseasonable and frequent excessive rains were very favourable for the development of plague and malaria, which prevailed with greatly increased severity during this period, while the early cessation of the monsoon rendered the last quarter of the year very unhealthy.”

It seems that the Sanitary Commissioner creates a theory without showing his reasons. Is it really a fact that plague increases after the rains? What we observe in Calcutta is that the seizures of plague perceptibly cease after good and prolonged showers of rain. On the other hand, it is a notable fact that in Calcutta, plague gradually increases from January and diminishes from May.

With regard to births and deaths in Bengal, the sanitary reports of former years used to contain a table comparing the birth and death rates with the other provinces. In the year under review there are defective accounts which do not satisfy an enquiring mind. From them we frame the following tabular statement :

#### Birth and death rates in 1905.

	B.	D.
Central Provinces	54.02	37.21
Panjab	44.4	47.6
United Provinces	41.24	44.00
Bengal	39.55	38.58
Madras	32.0	21.4

**Bombay has received scanty notice.**

The tabular comparison shows in a clear light, the gain or loss during the year. The largest gain came from the Central Provinces which was 16·81. The next from Madras. It was 10·6. Bengal presented an increase of 1·02. So far with the gain. The greatest loss was in the Panjab which came to 3·2 and the United Provinces followed it having 2·76. The remarkable feature in the Punjab was the high rate of birth and the still higher proportion of deaths. Though Bengal was gainer to a slight extent, its heavy loss was mostly due to malaria than to other diseases as plague or cholera.

Firstly, we take into consideration the fever which is devastating the whole country, and for its ravages neither the Government nor the people are much concerned. During the year under review the loss was more than the average of the previous five years. The ratio was 24·34 against 21·14 the average. The detailed statement is as follows:—

	1905.	Average of 5 years.
Bihar ... ..	27·12	22·38
Bengal ... ..	24·58	22·64
Chota Nagpur ... ..	20·65	16·78
Orissa ... ..	11·84	12·94

The mortality from fever is significant in comparison to other diseases.

	Average of five years 1900-1904.
Fever ... ..	21·14
Cholera ... ..	2·77
Plague ... ..	2·52 (?)
All causes ... ..	33·42.

It will be seen that out of 33·42 from all causes, fever alone has taken 21·14 leaving 12·28 for the rest. In other words nearly seven-elevenths of the deaths in Bengal was from fever and four-elevenths from all other diseases combined. This is the consequence of a disease, the so-called malarious fever, which is considered a preventible malady.

The population of Bengal in the British territory according to the census of 1901 was 74,744,866, the average loss of the five years 1900-1904 was 1,055,108. The gain in ten years from 1891 to 1901 was only 4.76 per cent. The Feudatory States of Bengal in 1901 had 3,748,544 population, and there the increase in the ten years was 19.68 per cent. The insanitary condition of the British territory in Bengal requires that care and attention which have not been given by the Government. The Sanitary authorities should, therefore, be of the modern efficiency and the old style men of the Indian Medical service, who represent the effete materials of scientific progress should retire from the field.

Taking our average loss from fever ten lakhs every year, can it not be said what a horrible picture of mortality is presented by the scientific administration of the British Government? Add to this the figure of death from famine, then we have the brilliant prospect of an opening century.

## EDITOR'S NOTES.

**Zea Italica.***Ustilago Mäidis.*

Dr. Tessier, père, in the course of a discussion at the French Homœopathic Society, gave the following schema of the symptomatology of *Zea Italica* (which appears to be identical with *Ustilago Mäidis*, and, like it, is credited with being the exciting cause of pellagra).

After doses of six grains of the tincture per diem for several days, the action of the drug persisted from two to nine months.

*Fever.*—Abundant sweats; pulse at first accelerated, then weakened; palpitation.

*Moral.*—Mania for bathing; inclination to suicide, particularly by drowning; inclined to be irritable and to weep without cause.

*Head.*—Heat of head; confusion of ideas; somnolence during day; headache; vertigo (relieved by drinking wine).

*Skin.*—Pruritus; itching in various parts of the body; eruption of ecthyma; sunburn on arms and hands. Cure in cases of psoriasis, eczema and ecthyma.

*Eyes.*—Burning of the eyelids; dilation of pupil.

*Throat.*—Burning in gullet.

*Appetite.*—Distaste for food, following voracity; voracity increased.

*Stomach.*—Pyrosis; nausea; vomiting; all disappearing under the influence of wine.

*Abdomen.*—Enteralgia; soft stools; diarrhœa.

*Urine.*—Urine red; density increased.

*Menses.*—Metrorrhagia.

*Trunk and limbs.*—Muscular weakness; loss of weight; sensation of boiling water down the back; contraction of muscles, especially of lower extremities; pronounced clonic movements; tetanic contractions.

*Nervous system.*—Paralytic seizure, causing him to fall to one side.—(*Revue Homœop. Française*, March, 1906, p. 99.)—J. G. B. *The Journal of the British Homœopathic Society*, July, 1906.

## CLINICAL RECORD.

## Foreign.

## NEW, OLD, AND FORGOTTEN REMEDIES.

BY J. MURRAY MOORE, M.D., M.R.C.S.

*Honorary Medical Officer to the Hahnemann Hospital Liverpool.*

## I.—LATRODECTUS MACTANS.

This is a poisonous spider found in countries so widely distant from one another as South Europe, the Southern States of the Union, and New Zealand. Already the order *Arachnida* has furnished to us the remedies—*Aranea diadema*, useful in ague; *Mygale* and *Tarentula*, effective in chorea; and *Theridien*, useful in true migraine and inframammary neuralgia.

The records of the poisonous effects of this particular spider cover new ground, and are of great interest to us, because they indicate a new remedy for that variety of *Angina pectoris* which is termed *Vaso-motoria*, first defined by Professor Nothnagel in 1867. The well-known Dr. Samuel A. Jones, of Ann Arbor, Michigan, analysed and commented on the five cases of *latrodectus* poisoning reported by Dr. G. W. Semple, of Virginia, in the *Virginia Medical Monthly* for 1875. The symptoms are not unlike those of serpent-bite, but there are differences.

I give an abstract of these five cases, three men and two women.

*Case 1.*—Mr. D., at 12.30 noon, on September 4, 1853, was bitten by a small black spider on the prepuce, while seated on the w.c. In half an hour nausea, followed by severe abdominal pains, and within an hour violent pains in the heart, extending to the axilla, and down the left arm to the fingers, with numbness of the hands and arm, and difficulty of breathing. An army surgeon had been called in urgently before Dr. S. arrived, and ordered cupping over the heart. The blood that came was thin and florid, and did not coagulate when emptied into a basin. Oozing of blood went on for some hours afterwards. Dr. S. found his pulse at 2.30 p.m. 130 and very feeble, his skin cold, and his countenance expressive of the anxiety he felt and expressed. There was no local pain, inflammation, or swelling at the spot where the bite had been received. Treatment by whisky and "sal volatile" and hot pediluvia was adopted, but Mr. D. did not rally until 2.30 on the 5th, twenty-six hours after the bite, when he vomited black vomit copiously. A reaction set in, and he recovered after passing two black motions.

*Case 2.*—A man was bitten in the groin and almost immediately felt nausea, severe abdominal pain, and a sinking at the epigastrium; his pulse became quick and thready, and the skin very cold. This man soon recovered under ammonia and whisky, two quarts of the latter producing no symptoms of drunkenness. In fact, the same "toleration" of alcohol exists in these spider poisonings, as in snake-bites.

*Case 3.*—A lad, aged 18, was bitten on the back of the left hand. Violent pain began there, and in a short time extended up the whole arm to the shoulder, and thence to the præcordial region.

**Case 4.**—A coloured woman, aged 22 bitten on the right wrist, was found by Dr. S. *apparently moribund*; her skin cold; the pulse could not be felt in the left radial artery; the apnoea was extreme; the respiration only occasional, gasping; countenance full of anxiety; violent pain extended from the bite up the arm to the shoulder, and thence up the neck to the occiput on the right side; more violent pain in the præcordia, extending thence to the left shoulder and axilla, and down the arm to the ends of the fingers, the arm feeling partially paralysed. This patient was saved from death by the intravenous injection of thirteen minims of undiluted aqua ammonia.

**Case 5.**—A healthy girl, aged 13, was bitten on the right wrist. In half an hour a painful sensation began to be felt at the spot, which quickly extended up the arm to the shoulder, and in an hour along the neck to the occiput; "pain in the præcordial region, with apnoea coming on. I was sent for. When I arrived she was screaming with pain, and exclaiming she would lose her breath and die. The pulse had become thready and the surface cold."

Dr. Jones has analysed and classified the toxic symptoms produced by these *latrodectus* in these five sufferers, thus:—

In four out of the five cases these symptoms occurred: (1) præcordial pain; (2) pulse feeble and thready; (3) coldness of the whole surface of the skin. In three cases there were: (1) apnoea; (2) pain up the arm of the side affected to the shoulder, thence to the præcordial region; thence in two cases to the occiput and nucha; (3) sense of impending dissolution, with the corresponding anxiety and dread expressed by the countenance. In two cases the primary symptoms produced were (a) nausea, and (b) severe abdominal pain, the insect-bites having been inflicted upon the penis and the groin respectively, thus quickly affecting the splanchnic nerves through the solar plexus.

In two cases the *left* arm was partly paralysed, even when, as in Case 4, the patient had been bitten on the right wrist.

The isolated symptoms recorded were: black vomit and black stools (Case 1): sinking at the epigastrium (Case 2): respiration only occasional, and gasping (Case 4).

Cognate with the pathogenetic effects of *Latrodectus mactans* are those of *Latrodectus katipo* of New Zealand, of which I here exhibit three fine specimens, very rare and difficult to obtain, as the Maoris dread them. The bite of this *latrodectus* speedily inflames the skin, causes visible lymphangitis and nervous twitching, reminding us of Tarentula.

In one case of *katipo*-bite on the foot, a scarlet papular eruption, burning like fire came out on the leg. Another sufferer, a man, wasted away for three months, and took six months to recover. A man consulted me in Auckland, New Zealand, for a chronic inflammation of the septum narium, which he declared was solely caused by a *katipo*-bite on the face, inflicted eighteen months before. Fatal cases are rare. The only one recorded in "Clarke's Materia Medica" (s.v. *Latrodectus*) is that of a girl who died six weeks after a bite on the abdomen.

In the *Auckland Star* of September 27, 1901, is noted the death of George Twidle, jun., aged 47, who had been bitten by the spider while putting on his coat, which had been lying on the ground. This was on September 16. "In spite of all that medical aid could do, deceased died on the following Saturday, September 21, after severe suffering." No further particulars than these are given.

We are not able to ascertain whether angina symptoms are present or absent in poisoning by *L. katipo*.

Copland's definition of angina pectoris is, "Acute constricting pain at the lower part of the sternum, inclining to the left side, and extending to the arm, accompanied with great anxiety, difficulty of breathing, tendency to syncope, and feeling of approaching dissolution."

The exact resemblance to angina pectoris of *L. mactans* poisoning is evident. The symptoms of the poison bite even follow the order of those of "vaso-motor angina pectoris." Vaso-motor angina is caused by a sudden spasm of the peripheral systemic arterioles—in the cases I am discussing, caused by the toxin of the spider—a spasm which resists, by high tension in the arteries, the blood-pressure normally exerted by the ventricles in systole. As soon as the coronary arteries are reached by this spasm, intense pain and the temporary impediment, or half-suspension of the ventricular contraction, takes place. "The pain itself," writes Osler, "undoubtedly is in the cardiac plexus and radiates to adjacent nerves." Hence the immediate relief given in an attack by the inhalation of amyl-nitrite, which instantaneously relaxes the arterioles, and allows the ventricles to pump out the blood-stream. Of course the true angina that is sometimes fatal occurs in persons whose coronary arteries have been for some time in a state of degeneration. In this class of angina cases I do not advise iatrodoctus, but rather glonoin, hydrocyanic acid, or spigelia.

Dr. Linnell, in the *North American Journal* for December, 1890, reports two cases of the vaso-motor form of angina greatly relieved by iatrodoctus 3.

I think we are warranted in using this remedy in vaso-motor angina pectoris.

The whole spider immersed, alive, in alcohol, is the form in which the matrix tincture is prepared.

## II.—CEANOTHUS AMERICANUS.

This remedy has in practice amply justified Dr. Burnett's recommendation in diseases of the spleen, in 1887. It belongs to the natural order Rhamnaceæ, or the Buckthorns. It is indigenous to the Northern States, and is there known as New Jersey Tea, Red Root, and Wild Snowball. The tincture is prepared by maceration from the fresh leaves pounded into a pulp.

In the third edition of his "New Remedies," Dr. E. M. Hale first introduced ceanothus, citing testimony from old school and eclectic sources as to its value in inflammation and enlargement of the spleen, and adding the statement which suggested to Burnett

its homœopathicity to these morbid conditions, namely, that "in chronic cases, when the spleen is no longer tender, under the use of ceanothus tincture it soon becomes painful and tender [Hahnemann's medicinal aggravation], and then sinks rapidly to its normal size."

Dr. Burnett began to use ceanothus about the year 1874; has written several interesting papers upon it, both in the *Homœopathic World* and in the *Homœopathic Review*, and summed up his experience of it in his booklet, "The Spleen and its Diseases," published in 1888.

His contributions to the *pathogenetic* effects on those to whom it had been given are these:—

(1) Ceanothus frequently relaxes the bowels, even to the extent of diarrhœa.

(2) An intelligent young lady, aged 26, had been taking ceanothus, four drops thrice a day, with great benefit, when "one day I felt great nervous excitement, with chilliness, loss of appetite, and such a shaky condition of the nerves that I could scarcely hold knife and fork at dinner. I shivered with cold chills down the back." She discontinued the medicine, and all these symptoms ceased. Resuming ceanothus they reappeared. Some diarrhœa ensued.

(3) *The menses subsequently came on profusely, ten days too early, an unprecedented event in her experience.*

(4) Dr. Fabuestock, of the United States, proved ceanothus upon himself, and found that it caused a sticking pain in the spleen, followed by enlargement of that organ, worse on motion, and rendering him unable to lie upon his left side.

(5) Following these symptoms came similar symptoms in the liver.

(6) The urine was greenish, frothy, alkaline; specific gravity 1030, and showed the presence of bile, with traces of sugar.

Ceanothus not only relieves deep-seated pain the region of the spleen without affecting any other part of the body as a rule, but it actually reduces a chronically enlarged spleen, and seems to renovate a constitution which has broken down and has contracted pseudo-heart disease, chronic cough, leucorrhœa, dyspepsia, and attacks of dyspnœa. I now condense the reports of a few typical cases of cure:—

*Case 1* (Burnett).—Lady, suffering from acute splenitis. The symptoms were violent vomiting, cough with expectoration, pain all up the left side, profuse sweats and fever. For three weeks the patient was treated as for pleuro-pneumonia, the spleen not having been percussed by the orthodox remedies, but without effect. After a careful examination, the spleen being found large and tender, ceanothus 1x cured in ten days.

*Case 2* (Burnett).—A servant, aged 55, suffering from cardiac palpitation and violent attacks of dyspnœa, was found to have both spleen and liver greatly enlarged. She had been ill from ague in Northamptonshire thirty years before this (October, 1879). Splenic dulness extended to left mamma, and she could not bear even the pressure of her clothes. Five weeks of ceanothus 1x relieved all her symptoms, even the left side pain which had lasted twenty-five



years. Drinking anything cold brought on the dyspnoea. *Ceanothus* for two months more completed the cure.

*Case 3* (Burnett).—A lady, aged 55, complained of rigors at frequent intervals; distressing pain in the left side; and profuse thick yellow leucorrhœa, which had lasted for twenty years and resisted the best allopathic treatment obtainable in Chester. *Ceanothus* entirely cured the splenic pain and also the leucorrhœa in one month, but did not quite remove the "cold feelings," though these were very much diminished.

*Case 4* (Anon.).—From *The Clinique*, January, 1901, is quoted the following case in Vol. xlv. of the M. H. R. Mr. V., aged 31, came August 23, 1900, stating that he had contracted malarial fever eight months previously. Quinine controlled the ague, but continual pain in the left side and back remained. He is tired and exhausted all the time, losing flesh, perspiring easily, has a cough which increases the left side pain, this pain being worse in wet and in cold weather. Without distinct periodic rigors, there is still frequently a chilliness down the back, and slight feverishness at irregular intervals.

The spleen was found much enlarged and tender to pressure. *Ceanothus*  $\mathcal{Q}$ , three drops every three hours, improved him greatly in a week; in three weeks all enlargement and tenderness of the spleen had disappeared, and the patient was well.

It seems to me that we might profitably use *ceanothus* in cases of leucæmia in young anæmic girls, who, as we know, often complain of *pain in the left side through front the back of the waist to the front*, probably splenic, and often due to tightly-laced stays. In dispensary practice one is too often inclined to put these hastily down as ovarian. There should be, but I cannot detect it, some peculiar complexion of the skin which indicates enlarged, inflamed, or diseased spleen. Between the splenic, the slightly jaundiced, the anæmic, and the cancerous cutaneous tints, it is difficult to distinguish.

Perhaps some colleague will throw light in the discussion upon this point of external diagnosis. In the case of chronic recurrent splenic hæmorrhage, which I reported in my "Common-sense Homœopathy," 2nd Edition, p. 62, I found *ceanothus*  $\mathcal{Q}$  of the greatest possible value. Miss A. D. B. lives close to my house, and I have kept her under observation. She has had no hæmorrhage whatever since 1897, and is well in every respect, in fact, more stout, robust and active than before her long illness (1888 to 1897).

We certainly owe to Burnett the knowledge of how to apply *ceanothus* in diseases of the spleen; and even in deep-seated pain in the left hypochondrium *not* dependent upon splenic enlargement.

### III.—CRATEGUS OXYACANTHA

of the Natural Order Rosaceæ, sub-order Pomœ. This is the Common English Hawthorn Whitethorn. A tincture is made from the fresh berries, pounded to a pulp, and macerated in twice their weight of S. V. R. It is strange that we find in this ancient and hardy plant, as characteristically English as the daisy or the crab-

apple, a heart remedy as efficient as the delicate tropical *Cactus grandiflorus* or Night-blooming *Cereus* of Mexico and the West-Indies.

It was a new era of relief for heart sufferers when Dr. Rocco Rubini first introduced this latter (*Cactus*); which had been imported into Naples, to the profession, by his pamphlet written in 1864, and translated by Dr. Dudgeon in vol. xxi. of the *British Journal of Homœopathy*.

The introduction of the *new Cactus*, as I may call it, is due to the revelation of a secret cure used by Dr. Green, of Ennis, Ireland, by his widow, after his death in 1893. He had earned a national reputation for "curing heart disease," with or without dropsy, so extensive that his fame attracted patients from all parts of the United Kingdom.

Dr. M. C. Jennings reported his success with *cratægus* in forty-three cases of heart disease in the *New York Medical Journal*, October, 1896. Dr. Jennings is an old-school physician, so that his cases are somewhat "mixed" as to treatment, but as early experience of this new drug is of value I give two of his cases.

Case 1 was that of Mr. B., aged 73. I found him gasping for breath, with a pulse of 158; very feeble; he had great œdema of abdomen and legs. I gave him 15 drops of *cratægus* in water. In fifteen minutes the pulse beat was reduced to 126, and was stronger, and the breathing less laboured. In twenty-five minutes the pulse was 110, and still stronger, and the breathing much easier. A second dose of ten drops was given. An examination of the heart revealed mitral regurgitation from valvular deficiency, with great enlargement. In one hour from the first dose Mr. B. was for the first time in ten days able to lie horizontally in bed. For the œdema I prescribed *hyd. cum creta*, *squill* and *digitalis*, but also he received ten drops four times a day of the *cratægus* tincture. In three months he recovered, and said he felt as well as any man of his age in Chicago. He still takes *cratægus* whenever he feels shortness of breath, or pain in his heart, with quick and perfect relief. His father and a brother died of heart disease.

Case 2 was that of a young woman whom I was informed was already dead when I entered the house. I went in and found that she was not quite dead, though apparently so. Putting amyl nitrite to her nostrils and applying artificial respiration, I had the gratification of seeing her eyes open and consciousness return. In half an hour she was able to talk and describe her feelings. An examination revealed a painfully anæmic condition of the patient, but no discoverable lesion of the heart, only functional weakness. Her pulse had been restored by the hypodermic injection of ten minims of amyl nitrite.

It was a case of heart failure, following on a long exhausting illness—chronic dysentery and dyspepsia. She received ten drop doses of *cratægus* thrice daily after meals for one month, after that only occasionally, and made a good recovery. In ten weeks she was in a perfect state of health.

*Case 3* is that of Dr. Jos. Clements who thus relates his experience (condensed by me) in the *Kansas City Medical Journal*, 1898.

"About twelve years ago I was suddenly seized with terrible pain in the left breast, extending over the entire cardiac area and down the left arm as far as the wrist. I pressed my hands over my heart and seemed unable to move. My lips blanched and my eyes rolled in agony; the most fearful sense of impending calamity oppressed me; I expected death. The attack lasted a short time and then subsided, leaving me weak and excited. In two years, and again a year later, I had attacks. I took nitro-glycerine tablets and cactus pills without benefit. About fifteen months ago I was feeling very badly, having had several attacks within a few weeks. My pulse was at times very rapid and weak, also irregular and intermittent.

Hearing about *cratægus* I got some, and tried it, beginning with six drops, increasing to ten, before meals and at bed-time. In twenty-four hours my pulse showed marked improvement; in two or three weeks it became regular and strong. Palpitation and dyspnoea left me, I began to walk up and down hills without difficulty, and left a general sense of security and well-being. Yet I had several slight attacks of this "angina," and one rather hard seizure, which was promptly relieved by ten drops of *cratægus*. I consider it the most useful discovery of the 19th century."

*Case 4* is reported by Dr. Holbert in the *Medical Era*, 1901. A youth, aged 20, suffered from congenital (?) valvular heart disease, with dilatation brought on by cycling up-hill, and from imperfect compensatory hypertrophy. Dr. H. found him in a most critical condition in the summer of 1900. "The præcordium was bulging; the apex beat was down to the outer border of the sixth rib; the right heart was greatly enlarged; epigastric pulsation was pronounced; the dyspnoea was terrible to behold, both aortic and mitral regurgitation were extreme, and cyanosis was evident.

Strychnia, digitalis, and every remedy and adjuvant I could think of were used with only temporary effect. After several days I gave *cratægus*, five drops four times a day, gradually increased to eight drops. At the end of a fortnight the improvement was quite pronounced. The cardiac muscle was steadily strengthening, and affording the needed compensatory action. An unfortunate attack of pneumonia supervened, through which we nearly lost him, but he survived, and again *cratægus* was given, and persevered for some weeks. A few months after his return from the country I met him in town, and he said he was "all right and attending to business."

Dr. Halbert records two other cases of aortic and of mitral regurgitation respectively, where *cratægus* restored the heart to a workable and comfortable condition.

*Case 5* is interesting as that of an esteemed colleague, Dr. Bernard Arnulphy, of Nice, known to some of us, who records the effects of *cratægus* on himself in a paper to the *Revue Homœopathique Française* for December, 1900, which compares the action of *naja*. and of *cratægus* in diseases of the heart.

He writes: "I had an opportunity, at Chicago, of watching the action of *cratægus* on my own person during an attack of influenza, which had affected the heart to such an extent that my pulse was imperceptible, and I could not rise from a horizontal posture without being threatened with syncope. Its action here was on an acute myocarditis, well marked but quite painless, and unaccompanied by cough. I took *cratægus* for fifteen days, at the end of which time I could get up and attend to business. That the cure was thorough is proved by the fact that I have since been able to climb Alpine summits of 3,000 metres without trouble.

*Cratægus* is as yet unproved, except that Dr. T. C. Duncan, of Chicago, reports that it caused in him "a flurried feeling due to the rapid action of the stimulated heart," and in a lady prover, first "an unusual rush of blood to the head with confused feeling," followed by "a feeling of quiet and calmness mentally."

Dr. Arnulphy compares, in an interesting and concise way, *naja* with *cratægus*. "Whereas the latter does great service in every form of myocarditis, and exhibits an undeniably tonic action, quiet, moderate, and non-cumulative, on the muscular fibres of the heart, equally suiting both aortic and mitral cases, *naja* is especially curative of acute and of chronic endocarditis."

And he adds, "the insomnia of aortic sufferers is generally helped by *cratægus*."

I regret that I have no clinical experience of my own with this new remedy as yet.

It is well to note that some patients experience nausea if they take the above material dose of *cratægus* before a meal. It is not a suitable remedy for fatty degeneration of the heart. It is safer but slower than *digitalis* in "toning up" a weak heart. Compare *cratægus* with *cactus*, *naja*, *phaseolus*, and *amygdala amara*.

#### IV.—*IBERIS AMARA*,

of the Natural Order *Cruciferae*, is the "Bitter Candytuft," found in England and other parts of Europe, and named from Spain (Latin, *Iberia*) which was supposed to have been its original habitat.

The seeds are used in making the tincture.

The pathogenesis of *Iberis* begins with the provings by three of Dr. E. M. Hale's students, who reported 150 symptoms, eighteen of which related to the heart. They experienced "dull or stitching pains in the heart, with palpitation and breathlessness on the slightest exertion; pains down the left arm, tingling and numbness, commencing in the fingers of the left hand and gradually extending up the arm; rapid, irregular, and sometimes intermittent pulse; dyspnoea with stabbing pains through the heart. One peculiar symptom which may possibly be a "key-note": "On turning, in left side a sharp sticking pain is felt, as if a needle were cross-wise in the ventricles and pricked at each contraction."—Symptom 93 in Allen. The pulse was raised to 100 per minute as a maximum in two provers, but after most of the doses taken the pulse rose to 86 or 90; its quality varied, once being described as "accelerated, irregular and jerking, with a peculiar thrill under the finger." Again, as "100 per minute,

with peculiar double beats which seemed to run into each other, full, and easily compressed." There were produced important concomitant symptoms in the two male and one female students—vertigo, nausea, throbbing pain through temples, choking in the throat, excessive nervousness and frightened feeling, &c.

Symptoms worse on lying down and on lying on left side, while at the same time, tremblings, weakness and nervousness cause desire to lie down. One male prover passed two thin, clay-coloured stools, resembling those of digitalis. After each dose the ventricular contractions were powerfully increased for an hour or more in all three provers.

Dr. E. A. Gatchell's experiments on frogs in 1877 confirm this effect of iberis. As far back as 1847, Dr. Sylvester (allopath) related to the Provincial Medical Association a series of cases in which he and a colleague had given iberis in doses of one to three grains with excellent results, especially in cardiac hypertrophy, where "it does not diminish the heart's action, like digitalis, but controls its violence and sharp action, softening the pulse." The new drug "occasionally induced giddiness, sickness, or diarrhœa, but these subsided on discontinuing it."

The personal experience of my friend and neighbour, Dr. Proctor, of Birkenhead (who first called my attention to iberis), is valuable, and I am pleased to see it incorporated in his *Materia Medica* by Dr. Clarke, because Dr. Proctor's observations are accurate and matter of fact—therefore trustworthy.

*Case 1.*—Dr. P. Proctor, a blonde, aged about 50, after influenza in 1890 suffered from cardiac weakness for two years. Tobacco and all stimulants, except port wine, aggravated his symptoms so much that they had to be given up. All the ordinary heart remedies were tried, but without relief. Iberis amara was taken, and in ten days cured him.

*Case 2.*—Dr. Chakravarti, of India, reports the case of a railway clerk, aged 30, suffering from rheumatic endocarditis, and consecutive pericarditis with slight effusion, which, after the failure of cactus 3 and of arsen. 30, iberis 30 cured completely in the course of ten days. *Homœopathic World*, June 1905.

I have given iberis lx occasionally to patients suffering from functional palpitation attacks, and always with benefit. It deserves to be more employed than it has been; I find very few cases recorded, and I hope my colleagues will use it more freely. Dr. Clarke thinks that the symptom, "*conscious of the heart's action*," may be a keynote for iberis. I prefer the "pure" pathogenetic symptom, No. 93 of Allen quoted above, just as we have in the courageous provings by Dr. and Mrs. Rubini of cactus, the characteristic symptom "*sense of constriction round the chest (or heart region) of an iron band*," or, "*as if the heart was grasped by a hand*."

As crataegus needs to be proved schematically, and iberis needs reproving, I commend both to the notice of the Proving Committee of the British Homœopathic Association. I will now proceed to

V.—STELLARIA MEDIA,

the common chickweed, of the Natural Order *Caryophyllaceæ*, whose provings by Kopp of New South Wales, in 1893, and by Dr. A. E. Ibershoff's Class in the University of Michigan, in February and March, 1904, display a marked resemblance to the articular, and sometimes to the muscular, symptoms of acute and of subacute rheumatism, also to those of hepatic congestion and enlargement. Hence the interest to homœopaths of this smallest of all phanerogamous plants, hitherto considered only fit for small birds' food. Chickweed, though tiny, is a hardy plant, growing in shady places all over the world, even in Siberia; and it has successfully maintained itself in the "struggle for existence" since the earliest times.

Caged birds cannot maintain their health without it; it is even a tonic, as old Turner (1551) puts it (translated by Gerarde, 1597), "Little birds in cages are refreshed with chickweed when they loath their meate." Another mediæval herbalist writes: "The water of chickweed is given to children for their fits, and its juice is used for their gripes."

Doubtless the abundance of potassium-salts in the plant gives it some anti-scorbutic properties, and may give us an indication of its chemical as well as its dynamic action in rheumatism as a remedy.

Now the question is, to define the sphere of stellaria; for we have already many well-tested remedies both for rheumatism in all its forms, and for hepatic congestion, or rather inaction, for the provings scarcely reached the point of what I understand by "congestion." I will now condense the summary of Dr. Ibershoff's proving and add to it such symptoms as Mr. Kopp experienced on himself, in so far as they differ from the former series, distinguishing these by "K." The provings directed and superintended by Dr. Ibershoff were made upon twelve male and four female students of the "Homœopathic Department of the University of Michigan," beginning on February 17, 1904, and lasting for four weeks.

The scheme was projected in the very best way to obtain the pure effects of the drug. The whole plant in bloom was macerated in twice its weight of alcohol, and different doses were given to each of the sixteen provers, ranging from one drachm of the  $\text{Q}$  tinct. up to four doses of the 30x. For the details I refer you to the *Monthly Homœopathic Review* for July, 1904.

The definite symptomatology of stellaria presents the following facts of special interest:—

*General*.—Lassitude, constant sleepiness, awaking feeling tired and dizzy. Tired, sore, strained feeling as from over-exertion.

*Head*.—Dull, frontal headache, worse on left side, increased in the morning by motion; by warmth, passing off toward evening. Violent headache all over cranium.

*Vertigo*.—Dull supra-orbital headache, worse over the right eye, with faintness. Headache increased from sudden jar or motion. Stiffness and soreness of neck-muscles (2 provers). Rheumatic-like pains darting through the whole head, worse on right side, with the parts sore to touch (K). Ditto in the left half of forehead, over the [left] eye sore to the touch (K).

*Eyes.*—Smarting and burning, dry feeling, feeling as if the eyes protruded, eyelids feel swollen, and the eyes strained.

*Mouth.*—Dry, thirst for small drinks at frequent intervals.

*Stomach.*—Bad taste in mouth on awaking. Nausea, almost constant. Loss of appetite, flatulence, stomach sensitive to pressure.

*Chest.*—Severe left-side pains. Intermittent stitching pains, especially on left side.

*Back.*—Sharp pains in small of back over kidneys, coming on suddenly; they reach their maximum slowly and stop suddenly. Sharp, stitching pains in left side of back, in the region of the spleen, severe and intermittent. Rheumatic-like pains across the small of the back, increasing on bending or stooping (K). Stiffness with soreness in lumbar region (K).

*Abdomen.*—Flatulent distension with colic. Liver engorged, swollen, with stitching pains soreness and sensitiveness to pressure, increased by lying on right side. Pain in left hypochondrium. Pain in epigastrium.

*Stool.*—Constipation. Violent pain in rectum after stool.

*Extremities.*—Rheumatoid pains in different parts of body. Sciatic pains. Shooting (rheumatic-like, K) in ankle, hip and knee, below knee-cap (K). Dull ache in left arm and shoulder, increased by rest and warmth. Rheumatic pain in right shoulder, increased by lying on right side. Sharp, shooting pain in left knee, extending into ankle joint. Sharp, darting rheumatic pains in left knee, extending above along the thigh (K). Rheumatic pains darting down right arm and middle and index fingers of left hand (K). Rheumatic pains in calves of the legs, which are sensitive to touch (K). Hands warm, feet cold.

*Modalities.*—Worse in the morning, from warmth, tobacco, and at rest. Better in the evening, from motion, from fresh cold air; pressure (headache), eating. There are exceptions to these conditions however.

In none of the sixteen provers were there any abnormal symptoms of the generative organs, nor were there changes caused in the blood or in the urine, except in two cases where the alterations noted were due to other causes.

One prover who had been constipated previously, noted an aggravation of this during the first few days of the proving, followed by amelioration, going on to actual diarrhœa.

The "rheumatoid" pains, as Dr. Ibershoff styles them, were in all provers shifting and intermittent. In this, along with their relief from motion, and aggravation from warmth, we perceive a resemblance to *pulsatilla*, but the head, stomach, and liver and bowel symptoms, point to congestion or sluggishness of the functions, and with the morning aggravation, &c., remind us of *nux vomica*.

Perhaps the old vernacular name for this plant, "*stitch-wort*," indicates its characteristic, for "*stitching pains*" occur frequently in the provings. If we add to this the *shifting* character of the "rheumatic like" pains, we obtain as nearly as may be in our present limited knowledge of the plant a "keynote" for *stellaria media*.

Dr. Ibershoff believes it "to have a small but well-defined field of action."

The clinical use of *stellaria* in homœopathy began with the report by the late Rev. F. H. Brett of the cure of Mrs. Brett's gout (in the fingers), also of his own gout (in the feet), in the *Homœopathic World* of June, 1893. Mr. F. W. Kopp then proved the plant, and has been very industrious in reporting cases treated with it in New South Wales.

*Cases 1 and 2.*—Rev. F. H. B. and Mrs. B. were treated and cured by the local application of *stellaria*  $\varnothing$  tincture of uncertain strength. None was taken as a medicine.

*Case 3.*—A man suffering from rheumatism, in whom the pains shifted about, now in the ankles, then in the knees, then in arm, wrist or fingers.

The patient was cured. Mr. R. H. Bellairs reports the case in the *Homœopathic World* for January, 1896, but I cannot cite it in full, not having that volume.

*Case 4.*—A man, aged 27, who had previously suffered from rheumatism, came to Mr. Kopp to consult him about his inflamed left knee joint, which was so painful as to prevent him from walking. Mr. Kopp pronounced it to be rheumatic synovitis. *Stellaria media* 2x, three drops every two hours, was ordered, and the knee was wrapped in bandages saturated with a lotion of the  $\varnothing$  tincture—sixty drops to six ozs. of water. Relief was obtained in a few hours, and complete recovery in a week. (*Homœopathic World*, July, 1902.) I do not think *bry.* or *ledum* would have improved upon this result.

*Case 5.*—A woman, aged 36, had rheumatic sciatica in the left leg from the hip to the foot. The pain was not so severe in the daytime but at night, as soon as she got warm in bed, the pains were excruciating, darting from the hip down the thigh to the knee, and thence to the foot. *Rhus tox.* 1x was given internally by Mr. Kopp, and the lotion of *Rhus*  $\varnothing$  tincture, but without relief. Then *stellaria* 2x was prescribed in distilled water, in doses of three drops, every three hours, and a liniment was rubbed into the painful parts morning and night, consisting of *stellaria*  $\varnothing$ , one part in ten parts of methylated spirit. The patient quickly got well—in a week, in fact, and after some months, up to the date of the writing down the case, there had been no return. (*Homœopathic World*, July, 1905.)

I have just now an obstinate case of "flying rheumatism," chiefly affecting shoulders, lumbar muscles and hips, in an otherwise healthy, robust man of 56, who lives most of his time in the open air in Cumberland, and has contracted the disease from the constant exposure to cold and damp. After the failure of *rhus*, sulphur and puls. I found *stellaria*  $\varnothing$  succeed in relieving, but not curing them. I was led to choose it because of the shifting of the pains. He travels so constantly that I cannot get any local application used, so possibly the want of local *stellaria* lotion or liniment, may have lessened its curative effect. After fourteen days I had recourse to *rhus* again, under which he is slowly getting better.



I do not class this case as a *stellaria curæ*, but record it as my only personal experience, thus far. *Stellaria* has a future before it, and I recommend its trial by colleagues.

The last medicine I shall discuss this evening is

VI.—*THLASPI* (OR *CAPSELLA*) *BURSA-PASTORIS*, the common "Shepherd's Purse," or St. Jame's wort, of the Natural Order *Cruciferae*. Three parts of the fresh plant, in flower, are macerated in two parts of S.V.R. to make the  $\phi$  tincture. Also an effective fluid extract is made by chemists. Analysis proves that this plant contains tannic acid, 6 per cent. of a soft resin (alkaloid), and a sulphuretted volatile oil identical with that of mustard (*Sinapis nigra*), from which the white crystalline alkaloid, theosinamin, is derived by distillation with ammonia.

*Thlaspi*, which is *thlaspis* (*Thlaspis*) in correct Greek, is first mentioned by Dioscorides of the first century, A.D., as an emmenagogue, abortive, anti-hæmorrhagic and a remedy for sciatica. The seeds of this plant, in his days, were crushed and used for medicine, hence the name, *Thlaspis*, from the verb *Thlao*, "I crush."

The long and clumsy name might be shortened to the modern botanical appellation of "*Capsella*." This late-Latin diminutive of "*capsa*" a box, translates its vernacular name, "shepherd's purse," derived from the flattened, hollow, pouch-like seed vessels hanging at the end of each stem. In botanical lists its full name is *Capsella bursa-pastoris*.

To herbalists and to a few physicians this plant's properties have been known in mediæval times. It has not been systematically proved by the Hahnemannian method, although Fincke reports a trial of it in the *Trans. of the Hahnemannian Association* in 1895 and J. C. Fahnestock, in 1896, obtained the following definite results:—

- (1) Puffy or swollen eyelids.
- (2) Great increase in the quantity of urine passed.
- (3) Copious excretion of uric acid in the form of sand.

In the *Monthly Homœopathic Review* for October, 1888, our valued and lamented colleague, Dr. Dudgeon, wrote an able article upon *thlaspis*, calling attention to its therapeutic value, and giving cases cured by it, which I shall quote later.

Lejeune, in 1822, used it successfully in hæmophysis. Rademacher, who was born in 1772, and died in 1850, had a high opinion of it. I shall give two of his cases.

Both Dudgeon and Burnett, who notices *thlaspis* in his "Greater Diseases of the Liver" (1891), took up the plant from Rademacher's use of it.

From his clinical experience of *thlaspis* Dudgeon concludes that "this medicine deserves a thorough and complete proving. It is evidently a powerful anti-hæmorrhagic, and its influence on the urinary organs, more particularly in bringing away and in curing excess of uric acid in the urine, is very remarkable."

From the homœopathic journals accessible, I have compiled and tabulated nineteen cases, reported (sometimes imperfectly) by Rade-

macher, Kinil, Jousset, Dudgeon, Raffinesque, Burnett, Deschere, Waldo H. Stone, R. M. Lewis, A. Midgley Cash, J. P. Harper, and Clarke, and Millie J. Chapman. I hope the members present will add to the list.

*Cases cured by Thlaspis Bursa-pastoris.*

*Case 1*, female, age not stated, reported by Rademacher.—A poor woman who had suffered from uric acid sand ten years before, sent again for Dr. R., who found ascites and œdema of legs, and hæmaturia. Thirty drops of the tincture five times a day brought away great quantities of sand, increased the urine, completely removed the dropsy, and restored the patient to health.

*Case 2*, female, age 30, reported by Rademacher.—Patient came to me for a complication of diseases, no sand in the urine. Thlaspis tried, produced a quantity of it, and this continued until all her morbid symptoms disappeared.

*Case 3*, female, age not stated, reported by Kinil.—Three weeks after partus patient had "strangury" and pain in the urethra, the urine, which was turbid, and deposited deep red sediment, dribbled away, drop by drop. Thlaspis  $\Phi$ , thirty drops, five times daily, relieved all symptoms, and in eight days the urine was clear and without sediment.

*Case 4*, female, age not stated, reported by Jousset.—Obstinate hæmorrhage after miscarriage, unchecked by secale, crocus, perchloride of iron, tampons, &c., arrested by two doses of twenty drops of the tincture.

*Case 5*, female, age not stated, reported by Dudgeon.—A young French widow, after recovery from severe jaundice, had a brownish grumous blood-like discharge after the catamena for two months, with abdominal pains. Cervix uteri soft and swollen, but *not ulcerated*. The usual remedies failed to check this, nor did cocc. sulph. or conium succeed. Returning to Paris, she consulted Dr. Raffinesque, who discovered irritation of the right ovary, and post menstrual congestion of the liver. He gave bell., nux, sabina, creos., ferrum, &c., in the inter-catamenial periods, but no remedy checked or altered the "metrorrhagia," as Dudgeon terms it, until thlaspis 6, then  $\Phi$  and then 6 again, which cured in a month. This interesting case is detailed by Raffinesque in vol. xxxii., pp. 370-4, of the *British Journal of Homœopathy*.

*Case 6*, female, aged 76, reported by Dudgeon.—An old lady had rheumatic muscular pains in various parts, and constant profuse sweats, day and night, and passed uric acid sand with every micturition. Sometimes uric acid calculi, causing much pain in the ureter. After cessation of the sweats and pains, which lasted seven weeks, the sand continued to be passed. Puls., picric acid, lycop, &c., failed but under thlaspis 1 the sand disappeared altogether.

*Case 7*, male, aged 57, reported by Dudgeon.—A gentleman with dyspepsia, occasionally passed large discharges of coarse uric acid, coming away in masses the size of a big pin's head but without pain. Thlaspis 1 soon stopped this, and for a year afterwards always acted promptly upon any return of the symptom.

*Case 8*, female, aged 79, reported by Dudgeon.—A lady, nearly 80, was suffering from a calculus (uric acid) in the left ureter, urine very scanty and *not showing sand*. Several remedies failed, and even the copious drinking of *aq. destill.*, which powerfully disintegrates uric acid sometimes, had no effect. *Thlaspis 1* caused a great discharge of sand, with speedy relief to all the symptoms.

*Case 9*, female, age 32, reported by J. P. Harper.—For nineteen months Mrs.—had suffered from chronic diarrhoea and latterly from dysentery, when she came to me, January 12, 1888. Daily in the morning she passes, after the last of the dry dark stool, a teacupful or less of yellow muco-purulent discharge. Also blood was voided with some stools. She is pale, looks puffy, and has slight oedema of feet ankles. After the most careful dieting and strictly homoeopathic medication for two years, Dr. H. failed to give more than temporary relief, until on February 20, 1890, he gave *thlaspis Q mi* quater die, which in two days stopped the blood; in three weeks the muco-pus; and in five weeks *cured* permanently a dysentery which had lasted more than three years.

*Case 10*, female, aged 46, reported by J. P. Harper.—Miss A., suffering from a fibroid tumour of the uterus, had menorrhagia every fortnight, in which calc. carb. and sabina failed. She became very pale and anæmic. Given on October 15, 1888, *thlaspis Q* four times a day, which arrested the bleeding at once, and for many months there was no return, although the tumour, reduced in size, remained.

*Case 11*, female, aged 48, reported by J. P. Harper.—Mrs. C., very anæmic and exhausted from constant uterine hæmorrhage, caused by a polypus, was very greatly improved by *thlaspis Q*. It controlled and diminished the bleeding more promptly and for a longer time than even ergot, of which she had taken quantities. From March, 1889, to June, 1890, *thlaspis* gave her this benefit, but did not affect the growth of the polypus, which at last was removed by operation.

*Case 12*, male, reported by Deschere.—A man who "had an obstinate hæmoptysis of unaccountable origin," was cured by *thlaspis Q* in doses of ten to thirty drops.

*Case 13*, male, aged 63, reported by A. M. Cash.—Patient has been ill a long time with his kidneys. He has hæmaturia increased by the slightest movement, and passes also pus and large uric acid crystals in his urine. The sound reveals no calculus. Arnica, millefol., hamam., tereb., all failed, but two drop doses of *thlaspis Q* much diminished the blood in five days and eventually stopped it. Three months later he reported that there had only been one slight return, promptly arrested by *thlaspis*.

*Case 14*, female, age not stated, reported by Burnett.—A lady suffered from uterine troubles, and afterwards from gall stones. The later condition was removed by *thlaspis* (contrast Dr. Dudgeon's case, No. 5). Burnett thinks *thlaspis* affects the *uterus* in the same way as *chelidonium* influences the *liver*.

*Case 15*, female, age not stated, reported by Waldo Stone.—A lady, after a confinement, had suppression of urine, which caused

eclampsia. Thlaspis was given (dose and dilution not stated) with the effect of causing 115 ozs. of urine to be passed in twenty hours, and thus saving her life.

*Case 16, female, aged 34, reported by R. M. Lewis.*—Mrs.—— (mother of 4 healthy children), whose confinements had been normal, began to develop ascites six months before consulting Dr. Lewis. The whole body and limbs were anasarcaous, the urine scanty, only 20 ozs. in twenty-four hours; pulse 140, respiration 53. The urine deposited brick-dust sediment, and smelled like that of a horse. After the failure of arsen. and of apis, thlaspis  $\mathcal{Q}$  every three hours, began an immediate improvement, which went on to a complete cure within six weeks.

*Case 17, female, age not stated, reported by Millie Chapman.*—A lady had long suffered from disease of the bladder, aggravated by local treatment, and from persistent "rheumatic" pains. Thlaspis l, and, later, the  $\mathcal{Q}$  tinct. in five-drop doses, expelled a quantity of uric acid sand, and cured all the morbid symptoms.

*Case 18, female, reported by M. Chapman.*—Another case of similar bladder irritation, with marked evidences of gout also, was promptly relieved by thlaspis.

*Case 19, female, age not stated, reported by J. H. Clarke.*—A lady who had been curetted several times with but little success, to arrest uterine hæmorrhage, consulted Dr. Clarke to save herself from a further operation of the kind which was deemed essential to her recovery. Thlaspis lx stopped the hæmorrhage and restored the normal menses. She recovered her strength, and there has been no further return of the trouble. Dr. Millie J. Chapman also confirms this efficacy of thlaspis, in place of curetting.

These nineteen cases may be thus summarised:—

Uterine hæmorrhage, idiopathic, or symptomatic of tumour	4
Metrorrhagia, with peculiar discharge	1
Dysentery	1
Gallstones, subsequent to uterine complaint	1
General dropsy from renal congestion	2
Retention and suppression of urine	2
Hæmaturia from renal calculus	1
Calculus in ureter	1
Gout, rheumatism, and rheumatic gout	4
Excessive discharge of uric acid crystals	1
Hæmoptysis	1

Total, three males, sixteen females 19

The above cases demonstrate the leading diseases or ailments for which thlaspis is effective.

Dr. Heer, of Berlin, in 1857, found it cure the dysuria of the aged with painful micturition and spasmodic retention.

Dr. S. A. Jones reports, in the *Hom. Recorder* of January, 1892, a case of chronic hæmaturia cured, but I have not the journal before me.

Dr. D. H. Stone, in the *Medical Century* of December, 1898, makes this important observation: "In cases where retention of nitrogenous waste-matter was the principal difficulty, I have tried thlaspis and found it of no assistance in eliminating urea and allied substances where the kidney is diseased, as in acute and chronic nephritis, and in uræmia occurring during gestation. . . .

"It is of value as a diuretic, in washing out accumulations of nitrogenous waste-matter below the kidney. I have found it valuable in albuminuria occurring during gestation, where it both reduces the œdema and lessens the quantity of albumen."

Its action upon the secreting tubes and malpighian cells of the kidneys, in promoting the crystallising out of urea and of uric acid, whenever the elements composing these organic compounds are in excess of the normal, seems to me to be *the characteristic* of thlaspis (or capsella, as I prefer to name it) and to berberis vulgaris, and its hæmostatic power, especially in cases where the blood was poor in fibrine, is undoubted.

The suggestion of that shrewd clinician, Dr. Burnett, that "thlaspis acts upon the uterus much as chelidonium does upon the liver," should be put to the test in practice. For my own part I have always found Burnett's hints of practical value.

Altogether I can endorse Dudgeon's recommendation of thlaspis, and I trust my colleagues will use it freely in their practice. New provings must be made to correct, add to, or corroborate what has been already done by Fincke and Fahnestock.

I must now bring to a close this lengthy paper, thanking you for your patient attention. Next session, if spared, I propose to take up six more remedies, treating them as concisely as is possible, viz., lactic acid, lemna minor, lathyrus sativa, œnanthe crocata, passiflora incarnata, and spiritus glandium quercus.—*The Journal of the British Homœopathic Society*, July, 1906.

**Cleanings from Contemporary Literature.****THE ARTIFICIAL GENERATION OF LIFE.\***By **GEH. RATH** PROF. DR. W. ROUX.[With a note by *J. Butler Burke, M. A. (Camb. & Dubl.)*]

[Reprinted from the "Umschau," 1906, No. 8, the weekly journal of the work and progress of the combined departments of Science and Technical Knowledge (Frankfort a. M., H. Bechhold).]

THE political newspapers and popular science journals are publishing accounts of the artificial generation of life and exciting universal amazement amongst their readers. The element of amazement arises, however, mainly from the interpretation put upon the matter by the imagination of the writers of these accounts; the experimenters themselves speak with considerably greater caution.

According to a communication in the English periodical *Nature*, No. 1,856, May 25, 1905, Mr. John Butler Burke sterilised some gelatine and placed it in a small tube with radium salt. After twenty-four hours there appeared on the surface of the gelatine a peculiar culture-like growth which gradually made its way downwards into the gelatine. When examined under a microscope a distinct growth was apparent; this was followed by subdivision of the circular bodies when they had reached a certain size, viz., 0.0003 mm., and they often took a rosette-like arrangement. Mr. Burke thinks the name *Radiobes* (Radium organisms) might be given to these bodies. Professor Sims Woodhead asserted that their resemblance to bacteria is only an apparent one. He showed that the forms, when removed to fresh gelatine, increase still further in size, and that on heating the cultures till the gelatine dissolves they disappear, but become visible again after a few days.

Mr. Littlefield is stated to have obtained a similar result by quite a different process. To a 33 per cent. solution of common salt there was added the same volume of 90 per cent. alcohol. Small quantities of this mixture were placed in watch-glasses, a little ammonia was added, and the whole covered with a bell-glass. In half an hour drops were visible on a side with the aid of a microscope. Crystals of common salt settled out first, then crystals from which emerged small oval or round forms which are alleged to be living organisms, since they grow, and, like amœbæ, send out moving processes.

But, assuming that the account of the directly observed results of these two experiments is absolutely correct, the conclusion drawn from them, that forms corresponding to living organisms have been obtained, is by no means justified.

\* Translated by Miss E. Slater.

These unjustifiable conclusions arise from the want of a complete definition of life in its simplest form. A quarter of a century ago I formulated such a definition\* of living organisms on the ground of their peculiar property of self-preservation and the persistence of their species through the ages, notwithstanding alteration of material and environment, and I have recently more completely established this definition.†

It is impossible to make a purely chemical definition of life, such as has long been sought, because life is intimately bound up with those physical aspects which are not merely the result of the chemical constitution, but rest also on a special physical structure. The definition of life can at present only be made on the basis of the activities of the living organisms, so far as we know them. Such organisms, at their simplest, are natural bodies which (1) absorb foreign materials into themselves (*absorption*), and (2) convert them into substance resembling themselves, assimilate them (*assimilation*); (3) change themselves, by means of processes taking place within themselves ‡ (*Dissimilation*, e. g., consumption of albumen, fat, &c.,) or, on the other hand, may remain entirely or almost entirely unchanged (4) by spontaneous secretion of the altered material (secretion of carbonic acid, urea, &c., in animals, of oxygen, &c., in plants), and (5) by *spontaneous repair* through absorption and assimilation of food; and (6) may grow by over-compensation in the repair of the used-up material (*spontaneous growth*); further, (7) from causes lying chiefly in themselves they are able to move themselves (*spontaneous movement, reflex movement*), and are also able (8) to subdivide themselves (*spontaneous subdivision, spontaneous multiplication*), and (9) to transmit their characters entire to the organisms which spring from them (*transmission*). It remains to urge emphatically that *all* these long-known activities belong together, and that they are in their own way fixed, determined, in the organisms, even though their perfection is often dependent on external factors, and though their activities are somewhat modified by external influences. The *sum* of these activities is what determines the character of the living organism, as well as the *highly developed faculty of self-preservation*. Living organisms are primarily concerned with the renewal and preservation of their species, and when food is present they take what is necessary to maintain their own existence.

\* "The Struggle of the Parts in the Organism," Leipzig, 1881. Also in "Collected Treatises on the Mechanics of Development," Vol. I., p. 387, 1895.

† "Suggestions on the Mechanics of Development: I. The Mechanics of Development, a new Branch of Biological Science." p. 105. Leipzig, 1905.

‡ In the lower organisms dissimilation is not an absolute and continuous process as it is amongst warm-blooded animals, but it is essentially conditioned by the using up of energy and the wear and tear of the machinery through action. Many experiments made on cold-blooded animals, as for instance by drying and freezing, indicate complete suspension of metabolic changes. The continuous destructive decomposition of the warm-blooded animals, however, assists in self-preservation, since but for the maintenance of a higher temperature their machinery would not perform its functions and they would consequently be incapable of self-preservation.

Forms exhibiting the activities here enumerated would certainly be accepted as living organisms. But there is yet another essential property of all forms of life, even the lowest: (10) *the spontaneous regulation of the exercise of all specific activities*; the more, for instance, they are deprived of food, the greater is their desire for it; when a certain quantity has been absorbed the capacity for absorption is diminished; the more foreign materials have been formed, the more possible is it to secrete them, &c. By means of this power of regulating function, which of course, is not without its limits, the faculty of self-preservation, and with it the *persistences* of the organisms, is substantially increased; indeed, when changes occur in external relations, this power is indispensably necessary in order to prolong existence. We must, therefore, regard the *spontaneous regulation of function as a further "primary property"* of the living organism. With it is associated also the *power of adaptation* to changing external relations (for instance, to change of the accessible food supply) and, amongst higher forms, to changes of climate, to changes of habitat, to or from a flat or a mountainous region; that is, to the consequent alteration in the mode of life and in the various instinctive activities. It is only by means of this power of adaptation that self-preservation becomes possible in the face of changes in these relations.

Since all this adaptability (conformability), as it is called, in the activities of the organisms, serves only to prolong their existence, it is more appropriate to speak of the *persistences* than of the *adaptability of the organisms*, and to speak of their *recuperative and progressive activities* rather than of their adaptable activities, a suggestion (v. No. 1, p. 214) accepted by various authors (e.g., Ostwald) and attacked by others (e.g., Ed. v. Hartmann).

No form which does not exhibit *all* these activities can be described as even the lowest kind of living organism. But where these exist we need not concern ourselves with their origin or special chemical and physical nature. It is, however, essential that such forms should, in addition, possess special properties in order to continue their existence on the earth. They must, for instance, be insoluble in water, since they would otherwise be liable to be destroyed by the frequent rains, and so would not be able to persist through the centuries nor reach any further stage of development.

The higher organisms possess, in addition, many other properties, as for instance, the power of assuming various forms (the *spontaneous development* of all characteristics of class, genus, species, &c.), and the manifold psychological activities, all of which are determined according to the substance of the organisms, but do not now concern us. To emphasise once more the essential point; the organisms participate in the renewal and preservation of all their special "typical" mechanisms of self-determination and self-preservation, as well as in the production of the outer factors which are determined from within; that is, which depend on their own physico-chemical structure. "Typical" in this definition is a



more strictly limiting conception than "normal," which has hitherto been adopted.\*

Turning now from what is known to the experiments of which mention has been made, let us ask whether the forms produced in each of the two experiments present *all* these primary activities of life.

Of Burke's forms it is only asserted that they grow and subdivide. We must, in the first place, enquire whether this growth is "spontaneous growth"; in other words, whether it takes place in accordance with the characteristic growth of the organisms by means of new living substance formed in and by the organism itself, by assimilation of other materials *within* the organism, and not, like crystal growths, consisting of accretion of external materials surrounding it, even though these materials have been produced by the influence of the form itself, or whether it depends only on a propagation of this influence, like the propagation of warmth, or of diffusion.

In the second place we must ask whether the subdivision of the forms which has been observed is really *spontaneous subdivision*, and whether it takes place by means of influences which are determined *within* the organism in accordance with its nature. On this point nothing is said, but it may, perhaps, be the case. It may, however, be remarked that apparent subdivision takes place under many conditions. For instance, if we place a drop of alcohol on water, or a drop of oil on a solution of soda, the drop divides very quickly, and apparently spontaneously, into four parts; in reality, however, it is divided by the influence of the surface tension. Nor is the rosette-like arrangement peculiar to or characteristic only of living forms.

It will be seen at once that the main point is absent in the "observed" activities of Burke's forms; the proof, namely, that these activities correspond to the same activities in the lowest forms of life, that they are, in fact, "spontaneous activities" of the organisms. Besides, it is not probable that the mechanism of the two very different "organic" activities, assimilation and spontaneous subdivision, could be effected in so direct a manner; that is, by the direct energy of radium alone. But even if this were possible and had here taken place, these forms might still be considered as very interesting *preliminary stages* of life, as "pro-bionts" (*Probioten*), but not as representing even the lowest forms of life, for they are without the activities of spontaneous dissimilation, of spontaneous secretion of changed materials, and of the spontaneous movement which is characteristic of living organisms, as well as of the spontaneous regulation of the performance of all activities.

Although the results of Littlefield's experiments are said to be different from those of Burke's, they are yet less inconclusive as to the artificial production of living forms. I have repeated these experiments and obtained results which in many ways apparently correspond to those described, but I ascribe to them a wholly different significance.

\* See No. 2, p. 122.

On the saturated ammoniacal solution of common salt in alcohol many small separate forms appeared moving hither and thither. But scraps of filaments arising from the impurity of the liquid floated about in the same direction, thus showing that the movements of the individual forms are not active, but passive, depending on the motion of the liquid. This, however, is by the way.

On the evaporating circumference of the drop, crystals separate, many of which have an area of liquid which has either been left on them or has possibly caught on them or has run over them. Thus we have forms which closely resemble cells. The liquid area may also have processes which, in consequence of further drying or of the altered surface tension, change their form and so present the appearance of slow amoeboid movement. But in all these it is only a question of forms arising from unequal moistening capacity of the glass, or its unequal surface and unequal surface tension. Any one can produce similar forms to any extent by pouring water over a glass plate held obliquely; after most of the water has run away such forms are visible to the naked eye. If there are on the glass plate small unevennesses or dusty spots which are more easily moistened, the liquid collects on these parts, and on looking at it from above we again have the cell form with the nucleus in the middle and processes outwards, the latter of which change their form on further contraction or moistening. These well-known phenomena show that forms may be produced resembling amoebæ, but without their essential characteristics. Besides, the motion of amoebæ often depends on alteration of surface tension through external causes. But in the case of their spontaneously regulated movements the movement is produced from within and is definitely characterised.

Moreover, numerous pale yellow, very small and round, or oval and flat disc-like forms were noticed, sometimes near these liquid area crystals, sometimes at a distance from them; these are probably Littenfeld's organisms. To me they appeared to be residues left after evaporation, or deposits on dirty places on the plate. Perhaps they are partly produced like the flat drops which may be seen forming on the side of a vessel only partly filled with alcoholic liquid. Alcohol first rises invisibly, and gradually becomes visible on the sides; perhaps even a mist is deposited at a suitable temperature; in this way drops are formed which gradually increase in size; other drops are formed in the same way all about them, often appearing to issue from the earlier ones. These are well-known phenomena which, however, have nothing to do with specific organic "spontaneous growth." I have never seen any growth in the small pale forms which arise in great numbers as the evaporation proceeds, although I do not assert that such phenomena are impossible, for we know that instances of the kind may be found in similar artificial forms. The deposited drops just mentioned increase in size visibly; this, however, is not spontaneous growth, but passive growth, according to my definition. On large freshly-moistened glass surfaces division of the

liquid used for moistening is frequently seen. This division is caused by retraction of the layer of liquid at some points of closer adhesion. It is not, however, spontaneous division, but is division "effectuated," and determined from *without* and influenced by the exact degree of surface tension, and is not connected (through qualitative bisection) with transmission.

We often can produce no direct, but only indirect evidence of assimilation and of the spontaneous growth which depends upon it, as also of spontaneous division, in the actual lowest forms of life. In order to adduce direct proofs of assimilation it would be necessary to watch for days together to see that materials differing in appearance were taken into the organism, that these did not accumulate in large masses different from rest of the organism, but gradually disappeared. Even then assimilation is only indirectly proved by the fact that the vital force, instead of being reduced by taking in so much foreign material, is, on the contrary, increased, inasmuch as subdivision of the organisms goes on. If this subdivision has gone on through *several* generations, and has always resulted in forms resembling the original in shape and function, then we have a clear proof of spontaneous assimilation and of spontaneous division.

The actual lowest forms of life exist for the most part in aqueous fluid and prove by the fact of their remaining intact that they are not soluble in it. The artificial forms spoken of, on the contrary, are soluble in water; they are incapable of maintaining their existence in it, and in this respect also they are lower in the scale than living organisms.\*

We have recognised, then, on the one hand, that the artificially-produced forms are devoid of the primary activities essential to even the lowest forms of life; and on the other hand there is no proof that the activities observed depend on the power of spontaneous determination which is characteristic of living organisms, or that they are capable of that spontaneous regulation which alone would enable them to persist throughout many changes in external relations.

The *inadequacy of the definitions of the nature of life* formulated and promulgated by philosophers, naturalists, and even some physiologists,

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\* While this paper was in the press there appeared (in the Karlsruhe Journal) another communication on the same subject giving an account of some interesting observations made in the Physical Institute at Karlsruhe under the famous physicist O. Lehmann; it was also widely circulated under the misleading title of "A New Physical Wonder." It gave an account of drops which form buds and divide, then assume a worm-like shape and afterwards separate into many parts. They crawl about like the Batschi drops mentioned, but more quickly. These forms, which seem to be produced mainly by changes in surface-tension in a manner which makes them appear almost typically peculiar, must also be tested as to the degree of their resemblance to living forms by the analytic method of examining functions given above; and the nature of the forces in question must be narrowly scrutinised and compared with the influences which have produced organic phenomena of a similar kind. Perhaps here we shall come upon the beginning of that spontaneous division which is essentially determined from within.

is ultimately responsible for the unwarranted interpretation of these forms as being actual organisms of the lowest stage. They think that what is needed is something simpler, more universal, more direct, than what I have given above, *the sum of widely differing* individual activities and the spontaneous regulation of these. Even if we leave out of count those authors who take the supernatural view and would have a "purposeful agent" (conscious First Cause) in the processes which result in life, yet we cannot disregard those who believe there could be a "simple" chemical process or a simple physical agency which could produce all these activities. According to this view a "simple" experiment might happen to produce this direct agent and thus suddenly give rise to forms of life. But there is a fundamental error in this view. The sum of the different activities described above alone indicates the minimum of actual life, and only those forms which possess this sum of activities reproduce similar forms; nor does this reproduction depend on the aid of a purposeful agent, but, the forms once in existence, reproduction depends only on the pre-determining tendencies inherent in their material basis.

Admitting all this, however, it would be vain to assert that in principle we could never artificially create the lowest forms of life, perhaps with very slightly developed spontaneous regulation. This however, cannot be done by a single experiment, but only by a *methodical series of experiments* in which we must first endeavour to produce forms with one or a few primary individual activities. The insight which has been gained can be turned to account by combining the successful results already secured. Only thus shall we be able gradually to produce bodies which will combine all the *activities* indicated above *which are necessary for self-preservation by the processes of change in material corresponding to change in external circumstances*, and which will then continue and multiply. Forms possessing certain of these activities, spontaneous movement, spontaneous absorption, and spontaneous secretion of material, have already been artificially produced by Bütschli, Quincke, Rhumbler, and others. Spontaneous chemical assimilation, spontaneous growth, spontaneous secretion of altered material, and a certain amount of spontaneous regulation in assimilation and secretion are typically represented in the processes of assimilation by heat. Since, however, the other activities of self-preservation are absent in bodies thus produced, their power of persistence is inadequate. As soon as cold assimilation processes of a suitable nature (according to Pflüger, cyanide compounds) are employed, it is possible that high preliminary stages of life might be produced artificially by combining these with the processes for the last-named forms. Spontaneous division, spontaneous regulation, and "morphological assimilation," which presents special difficulties, would then follow. We shall then, perhaps, attain in the laboratory by observation and study in a relatively short time to what in nature has only arisen in the course of vast periods of time as the result of a fortuitous concurrence of

circumstances and of a spontaneous storing up the forms capable of self-preservation through changes in material and thereby of "persistence."

If, then, it is certain that the above-mentioned experimenters \* have produced no actual forms of life, even of the lowest order, and have not solved the problem of the artificial creation of life, and if this problem cannot be solved by one kind of experiment alone by reason of the number or primary life-activities necessary even to the lowest organism, we must assume that further research will be necessary in order to ascertain how far the various experiments of these writers are a new and valuable contribution towards the solving of this problem by the slow method insisted upon above, namely, the combining of artificially produced individual activities †.—*Knowledge*, July, 1906.

\* Including Charlton, Bastian, Stadelmann. (MS. note.)

† This is practically the argument used in *The Origin of Life* which has just been published. I do not think however it is likely that we shall succeed in producing artificial forms of life which would correspond to the organic types existing naturally in nature. The probability of hitting on the exact conditions would be infinitesimally small. The most we can hope to do, as I have tried to show, is to imitate these by approximation. The artificial types, of course, do not satisfy all the conditions of *natural* life, it all depends, therefore, upon what we understand by life. If a scale of gradually increasing complexity can be established, from the supposed inanimate to admittedly animate nature, there should be no reason why we should confine the definition of the life to natural types which have survived on account of their fitness for their surroundings. As a curve may approximate to its asymptote, so may artificial life approximate to natural life. But as the latter is the survival of countless generations, it is likewise to be expected that it should be more perfect than anything that by artificial means we should ever hope to obtain. I believe the subdivision of the radio organism proceeds from the interior, as I have tried to show, and that the growth is not by accretion, but by assimilation, as in the case of most organic crystals. They appear to assimilate sulphur and other substances from the medium in which they grow.

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