

THE CACTACEAE

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This plant family has very characteristic features. Two form-giving principles are fighting for supremacy. The watery principle wants to swell out into a sphere, to form the closed shape of a drop filled with life. The forces of air and the warmth principle try in vain to give more detailed structure to this drop, to dissolve it, and entice it into their own particular sphere. They move in the sphere around the plant, but all they are able to do is to dry it out at the periphery, to cause it to harden into spines, thorns and stiff bristles. Where in the "normal" plant we have the leaf, the side shoot, where we see branching, and a dissolving into the sphere of air and warmth, the Cactaceae show only a hint of this, developing warts, areoles, ribs, and spines, but nothing which goes beyond this. Tremendous potential vitality is held in, congested, and does not come to full expression in exteriorized form. Thus we have the enormous vitality of these plants. They will put out shoots and may be propagated from sections of jointed stems or branches, warts and damaged tissue. They produce new vegetative shoots from the tubercles of developing fruits, start new fruit on these shoots, and again proliferate from this; all before the first fruit has dropped. The life burgeoning in these plants may lack form, but it is irrepressible, and this is the reason why the Cactaceae are able to grow in some of the most inhospitable regions. (There is the story of how the wife of a British diplomat in Australia threw away a single specimen of a cactus she had brought with her from Cuba. The plant took root on the rubbish heap and became the starting point for a veritable deluge of cacti. Unnoticed at first, the plant proliferated until it overran a whole province, defeating all efforts, fire and poison, to eradicate or even just to contain it. It finally proved possible to keep it in bounds by importing from Cuba the insect pests which control it there.)

Disk, sphere and column are the basic shapes seen in the most typical of the Cactaceae. Growth is slow with these plants. The living metamorphosis of form which is such an essential feature of true plant life, is very much brought to a halt. There may perhaps be branching at an early stage, so that the column turns into candelabra, or an arrangement of organ pipes. Leaf growth, the very essence of plant life, is wholly suppressed; the rhythmic principle of the middle seems to have been extinguished. Stem-structure may still develop, extending the sphere to a column or to a snake-like

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form. The "leaf cacti" broaden their stem sections, flatten them out, and thus betray something of the leaf-nature which they have swallowed. There are only a very few species in this family which permit normal leaves to emerge into the open; this makes them normal plants but abnormal cacti. The spiral sequence of leaf growth here takes the form of rib and channel structures on the spheres and columns; it has attained geometrical permanence and has taken up something of the formative laws belonging to the mineral world. In the shape and form of the cactus, plant nature appears as though under a spell. If the spell could be broken, the bulky shape would expand, warts would turn into stems and branches, thorns into structures branching over and over, spines and bristles into rich green foliage. The thick stem would of course have to lose its greenness, its tremendous vitality would harden into wood.

The spines of cacti present a rich variety of form. This can be no surprise. Inherent in them is the whole wide range of form which any plant family presents in its differentiation into species. In the cacti, this has been held back at inception, and become frozen.

For a long time, life continues to be held in closely in the spherical or columnar form of the plant. Growth is slow. And that might be all there is to it, in the cacti, if just this one pole were active in the plant, the pole which finds expression in watery, swelling growth. But another pole is at work as well, one which gathers its forces over an equally long period. At first its gains on the plant form are limited to wholly peripheral elements, to the warts and spines. Yet finally it has gathered sufficient strength, and its hour has come. From the innermost heart it suddenly calls forth the flowering process which bursts out abruptly, rapidly, and in great abundance. Often there is a wait of many years; but then the unexpected does happen. From the tips of warts, from the axils, the flowers push out. They tend to be handsome, white, yellow, or, in most cases, red. They have long funnels, with plenty of nectar; the calyx tends to continue straight on into the petals, without a dividing line. Above the inferior ovary crowd numerous stamens. Bright, often rather loud, colours go hand in hand with strong scents reminiscent of jasmine, orange flowers, vanilla, gum benjamin, orchids, or violets. As one would expect with a flowering process of such general vehemence, the individual flower is short-lived, sometimes lasting only a few hours.

In the floral region, the watery element appears only in form of nectar. In the fruit, it is allowed to swell out again; most of the fruits are berries and juicy edible fruits. Many are enjoyable to eat, and the Cactaceae are one of the major fruit-producing families in the plant kingdom. In some species, the whole cactus may be eaten like a fruit, and is bottled with sugar. Flavour, sugar and acid make the stem into something of a fruit.

The phenomenon of aqueous congestion, of succulence, normally represents a passing phase during two stages in the development of a plant. It is soon overcome. During germination, a plant is intensively taking up the

watery element. In many plants, the cotyledons and the piece of stem between them and the radicle, the hypocotyl, do swell up to a greater or lesser degree. Soon afterwards the plant connects with the element of air, and in the leaf broadens out into a plane. What otherwise might well swell up into a sphere, is taken up by the forces of the periphery and opens out to infinity as a plane.

When plant growth is coming to an end, and once again moving from plane to point, from leaf to seed (existence in leaf-form is now given up), the sphere may develop, as an intermediary form between plane and point. Around the developing fruit flow the ripening forces of the periphery. The fluid principle may then be drawn into the developing fruit, and in a juicy fruit swell mightily, into a sphere or sphere-like structure. Thus one phase of swelling growth comes at the beginning, the other at the end of sprouting, shooting growth; between them lies the stretching of the stem, the unfolding of the leaf. In the cactus, the intermediate stage is suppressed; In this plant, pole immediately follows pole, and the leaf principle exists only as a time-form, not as a spatial element. The green cactus sphere performs the functions of the leaf in its green cortical layer. It will go on for a long time, often for years, behaving as a leaf and assimilating, although no actual leaves are allowed to develop.

Succulent forms similar to cacti are found in quite a number of plant families, for instance the stonecrops, Mesembryanthemum species, Liliaceae, Euphorbiaceae, species of Fouquieria, Stapelia and certain Compositae (Kleinias). All are based on congestion of etheric forces resulting in watery swelling tendencies. This gives them great vitality, so that they are able to hold their own even in extremely barren country.

The bodies of cacti show little lignification. The wood-forming process has "turned soft" in these plants, and they produce plenty of mucilage instead. The mucilaginous compounds derive from cellulose. They also contain a considerable amount of plant acid which arises because exhalation is held back. In the process of life, sugar is normally broken down in the process of respiration into carbon dioxide and water. In the succulents, this process of degradation comes to a halt half-way through, and plant acids such as malic, tartaric, oxalic and citric acid are formed. This type of acid makes unripe fruit taste sour. Ripening results not so much in an increase in sugar content, but rather in the combustion of fruit acids.

Plant mucilage has the property that it holds on very strongly to the water taken up by the plant. It thus plays a role in making the stage of watery swelling growth into a permanent form of life.

Much plant wax is produced at the surface of the body in a cactus; elsewhere in the plant kingdom we find such wax as a coating on fruit. Some cacti also produce resins.

The two Americas, from Canada down to the Straits of Magellan, are the home of this family. 1,500 species produce every possible variation on

the type, making this one of the great families in the plant kingdom. The occurrence is significant. Because of the direction of their mountain ranges, always strictly from north to south, in the east as well as the west, the two Americas allow the polarities of the earth organism to interact freely. Tropical forces interact with polar forces. The contrast between them may be epitomized as proliferative swelling on the one hand, and the imposition of rigid form on the other. There are no mountain ranges running from east to west, as in Europe and Asia, to create a middle region, and thus no areas where a middle element, a balancing, rhythmical principle, may develop strongly.

Dry regions at some height, in the deserts and semi-deserts of Mexico, in the south-western states of the Union, and on the slopes of the Andes, provide the habitat for giant cacti shaped like columns, candelabra and organ-pipes. High up in the mountains one finds the *Mamillaria* species. These may form small spheres the size of a hazelnut, and spread to form a turf of such spheres. Other species climb up the chalk cliffs of the West Indian islands, their bodies elongated into long cylindrical forms or flattened stem-like structures. On entering into more humid and shady environments, the type produces epiphytes; sections of the body are elongated, jointed, hanging down in long strings, or widened into leaf-shape. Finally there are the *Pereskia* species. These grow in damp and shady places. They drop the spiny carapace and appear as perfectly normal plants, with wide thin leaves. Only the strong spines growing from the leaf axils, and the typical shape of the flowers, betray the fact that these are Cactaceae.

Rudolf Steiner gave a clue to help us perceive the essential nature of the strongly characteristic shapes seen in these plants. He pointed out that in the Cactaceae, a sun principle is struggling with a moon principle, whereas in the Ranunculaceae, sun forces and moon forces are linked in harmony.

To the moon belongs the fluid element, and particularly all enlivened fluid. This is obvious in the phenomena of the tides, where we see it on the large scale, and on a smaller scale in the rhythms of plant growth, where most impressive evidence is given in the process of germination. The ancients, whose knowledge of nature was based on clairvoyant experience, had must to say on this. L. Kolisko¹ has carried out modern scientific studies, involving a great number of experiments, to demonstrate influence of the moon on plant growth. Hypertrophy of the watery principle, and a reproductive power maintained in full through all stages of growth—these indicate the moon-nature of the cacti.

The moon thus acts on the fluid element. Air and warmth are open above all to the action of the sun. Air bearing light and warmth is woven into all plant life, taking it from the spheres of water and earth, from the germinative stage, through the development of leaf and flower, into the region of fruiting. Plant metamorphosis, changing form according to specific laws, is set in motion by the combined action of moon and sun forces. One can see this very clearly in the Ranunculaceae. In that family, the laws of

metamorphosis "have become visible and tangible". But it is exactly this which is lacking in the Cactaceae. Metamorphosis does not get going. The watery element contracts to a sphere, the vital powers do not unfold, but become congested; air, light and warmth move around the compacted structure and are able to act on it only at the periphery, where they cause everything to turn hard and spiny. The cactus acts towards these cosmic powers as though it were a fruit, and yet in reality it has so far managed only to become a huge spherical cotyledon. Moon and sun forces are indeed in combat. For a long time, the moon forces keep the upper hand, but at last the sun forces wrest a flowering from the mucilage-filled sphere (or column, etc.). The fruits developing from the flowers present the appearance of cactus bodies which have merely moved one stage higher; they are spiny, vital, and able to reproduce, as it were, from every single cell.

Thus we have a high degree of etheric congestion which at a later point relaxes to permit a brief, vehement flowering, and in this yields to the astral sphere. After the explosion into flower it is immediately restored to the previous state. It is not only the struggle between moon and sun forces which is so characteristic of the cacti, but also the enormous tension between etheric and astral principles. These dynamics can be utilized for medicinal purposes. Two genera in the family have attained some significance in this respect, and we shall consider them in more detail.

Lophophora lewinii (*Anhalonium lewinii*), mescal buttons, peyotl.

Reko² describes the area where this cactus may be gathered: In northern Mexico, in a region of unspeakably arid, brownish-grey mounds of earth, with just a few, sparse blades of grass, grows this cactus which is about the size of a small apple. On a beet-like root sits a grey-green sphere, not bearing spines, but just some woolly hairs at the top. The reddish or yellow flower breaks forth at its centre. This plant is classed among the sub-tribe of *Echinocactanae*. Slices of it, cut from the middle zone and dried, provide a narcotic with a peculiar action. Specific alkaloids, mescaline and related compounds have been found in it. Nowadays synthetic mescaline is produced and propagated—from the West—as an allegedly harmless stimulant. The truth is that it evokes states of consciousness approaching that of an artificially induced schizophrenia, and this makes it highly dangerous. With ergot and the night shade alkaloids, it ranks among the hallucinogens, producing visionary and hallucinatory experiences. Under the influence of mescaline, the sensory qualities separate from objects of perception and begin to lead a life of their own. The "soberness" of everyday moods, of everyday consciousness, seems swept away. Everything suddenly appears morning-fresh, in magnificent colours, crystal clear and incredibly plastic and mobile. When the eyes are closed, colours, freed from the fetters holding them to objects, continue to live a life of their own; colourful Catherine wheels are turning, rivers of coloured light pour in cascades; sparks, as clear as jewels of the first water, seem to leap about and float in the air. It seems as if one

has acquired a sense that is of higher quality. At the same time these enhanced and object-liberated quality-experiences are combined with considerable emotional stirrings. The emotional powers are intensified. The colour images are at the same time experienced in symbolic form; they attain mystic significance. The experience of time and space is largely laid aside, whilst the faculties of thinking and memory are retained. Every single experience "means" something, for example a picture not hanging straight that the world will perish in three days' time. The life of the will is completely paralysed, and a person under the influence of mescaline sees no reason why he should do or heed his will to anything in particular.

Experiences like these appear like caricatures of the stages of initiation *into supersensible worlds*. They arise because the supersensible members of man's being become free, in part and to an abnormal degree, of the body. In a properly conducted initiation, the process of meditation is used to form organs of supersensible perception out of activities of the soul and spirit; in fully thought-through exercises for the soul and spirit, undertaken in conscious awareness, these are then freed from the bonds holding them to the body, in a thoroughly healthy manner. The line of development in this is the one which in man's evolution quite generally led to the development of higher faculties, for example the development of thought in man. Thinking, as we know it, has become possible because part of the etheric body, of the formative-forces organization, was freed from the bonds holding it to the brain and made available to the ego. According to Rudolf Steiner, we think with the same forces as we grow with. The brain relinquishes growth and intensive vitality; the formative forces thus liberated are at the disposal of thought. This process attained a certain maturity around the time of the early Greek period, and we may say that from around this time the art to form concepts (philosophy) developed.

That, in a way, was only the beginning of the tremendous process of liberating the spirit and soul of man from the body. Rudolf Steiner indicated that a second process of that type has been in progress for some centuries, but this time involving the heart, not the brain. Certain etheric forces relating to the heart are gradually coming away from the bonds which hold them to the body. They will give power to feel freely, just as the liberation of part of the etheric body in the region of the head provided man with the ability to think freely. It is the will which now determines whether we are thinkers or thoughtless. We must, no, we may, freely evolve our thoughts. And in future, the same will apply to our feelings. We shall have rich emotional experiences—if the will creates them, out of the force of ego. We shall have to create those experiences, let them grow, and cherish them; otherwise we shall be wholly deprived of feeling. A desolation of the centre is in preparation; it is already making itself felt. A hole, an abyss, will open. To fill it, we are being offered a surrogate, a chemical crutch for emotional cripples. The eagerness with which we reach for it even at this stage indicates the

extent to which the abyss has already opened. The world of the warm, expansive emotions felt by our grandparents and great-grandparents, a world that "simply was there" because, after all, people do have a heart, has by now considerably shrunk. In future we shall have to form our emotions as actively as today we do our thoughts.

The cacti are plants which prevent their etheric organization from acting into the physical and there effecting the release of growth. What in other plants we see unfold as they sprout in freshness and vitality, is in them shrivelled up. This applies particularly to the rhythmic organization of the cactus, and that is why, as an offprint of those abnormal vital processes, they produce poisons which take effect in the rhythmic system of man, forcing out the higher members of being which are active in that system. Those members are not only the astral body, but also, in part, the etheric body. That part will then "vitalize" the sensations of the astral body, distorting the images of imagination which—because they are not produced by the ego in full awareness—forcibly drag along those who experience them. The results are states resembling certain mental diseases. As a remedy, the mescal button cactus may well be indicated in conditions due to the loosening of the higher members of man's being in the rhythmic system.

Selenicereus grandiflorus (Cactus grandiflorus), queen of the night.

The genus *Cereus* has about 400 species. These have gone in for length rather; the most typical form among them is an upright column, but some are creeping, or push their way up rock cliffs, against the pull of gravity. The etheric forces are acting into the physical somewhat more strongly than in the spherical cacti, getting movement into the form, though this is linear only. Stem section follows stem section in rhythmical sequence. *Cereus grandiflorus* belongs to the species which climb the chalky cliffs of the West Indian islands. The leaf element appears only as an angular rib on the elongated stem sections. The spines have disappeared; instead, aerial roots emerge everywhere from the ribs, and the branching stems give the impression of a root stock growing above instead of below the earth. In the tropics, elements belonging to the earth do quite generally tend to push upwards, and earth forces make themselves felt also above ground level. Many of the herbaceous species of our latitudes have huge tree forms as their relatives in the tropics. The moisture-laden air of the tropics is more earthy than the air of our regions and particularly that of high altitudes in mountain areas; there, only the air-related organs, the leaf and flower, are permitted to exist. The tropical air causes roots to emerge from trunks and branches above the ground. In the West Indian island home of the queen of the night, this air is furthermore filled with subtle salt processes. To begin with, therefore, *Cereus grandiflorus* cannot get away from the earth; it has to raise itself, painfully, and needs to fight against gravity.

When the much branched, thickened stalk has reached a certain age, a fat bud will project here and there among the green branches. It swells

into roundness and has lost growth into length, as if a small spherical cactus wanted to grow on the stalky cactus. Growth into length not being possible, those forces cause a dense cover of spines to emerge. This spherical structure is in fact the inferior gynoecium of a developing flower. This flower now grows to the length of a hand and then horizontally, seeking the balance between levity and gravity, uncertainly trying to determine the direction of the sun's path. It is the *sinking* sun, however, which brings the moment of flowering; for the length of one night, the huge flower opens, reaching a diameter of close on 20 cm. The long, fleshy tube consists of cream-coloured sepals, with a tinge of red. These merge without clear division into the petals, forming a bell-shape, gleaming white inside, with a satiny sheen. The lower part of the flower holds numerous stamens and a star-shaped pistil. Waves of strong scent come from the flower, reminding of jasmine, benzoin, vanilla and the leaves of violets. The flowering force (the astral principle) takes hold of the plant so strongly that in a few hours the whole has withered. In the morning, a flaccid sac hangs down where the night before we were enchanted by a truly marvellous form.

A struggle between levity and gravity; a struggle also between etheric form-giving forces and astral spheres of being—that is the signature of this cactus, with an astral principle which comes to manifestation *at night*. Dynamics like these must obviously also find expression in the development of certain alkaloid-type principles in the plant. *Cereus grandiflorus* is poisonous. Suitably prepared, it will act on an organic region where the rhythmical interaction of etheric and astral impulses is a keynote, a region which furthermore has its place, in the living "topography" of the human body, at a point mid-way between levity and gravity. This is the heart, the organ which Rudolf Steiner described so marvellously, giving new insight into its essential nature, as placed between levity and gravity, between the upper organization of man which is withdrawn from the forces of earth, and the lower organization which is particularly involved with those forces of earth. Dynamics like these belong to all plants with cardiac action, and this will be discussed in detail in a later chapter. Man's rhythmic system is altogether living in the rhythmical encounter of etheric and astral modes of action; here processes of the airy and of the fluid sphere are rhythmically combined and also separated from each other.

Loosening of the etheric, so that everything becomes too physical, in the heart region, and on the other hand astral clenching, the cramped grip of the astral (angina pectoris), can find a remedy in preparations made from the flower and young stem shoots of *Cereus grandiflorus*.

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