Dr Rudolf Steiner's
PLANT GROWTH
In order of the date spoken

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THE GROUP SOULS OF ANIMALS, PLANTS AND MINERALS

A Lecture given by Rudolf Steiner
Frankfurt-on-Main
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Just as this describes what we begin to feel with regard to these unsuspected beings, so it is where the souls of the plants are concerned. The *plant* egos dwell in a higher world than the animal egos. The separate group egos of the plants live on what we call the devachanic plane. We can even state the place where they actually are — in the very centre of the earth, whereas the animal group souls circle round the earth like trade winds. All these *plant* egos at the centre point of the earth are mutually interpenetrating beings, for in the spiritual world a law of penetrability prevails and all beings pass through one another. We see the animal group souls moving over the earth like trade winds, and how in their wisdom they carry out what appears to be done by the animals. Studying the *plant* we see that its head — the root — is directed towards the center of the earth where its group ego is to be found. The earth itself is the outward expression of soul and spirit beings. From the spiritual point of view the plants seem like the nails of our fingers. The plants belong to the earth, and when we look at them singly we do not see a complete entity, for the single *plant* is just one among the whole number of beings constituting a group ego. In this way we can enter into what the plants themselves feel. The part of the *plant* that springs up out of the earth, what from within the earth strives up to the surface, is of a different nature from what is growing under the earth. There is a difference between the cutting off of blossoms, stalk, leaves, and the tearing up of a root. The former gives the *plant* soul a feeling of well-being, of pleasure, just as it gives pleasure to a cow, for example, when the calf sucks milk from her udder. There is actual similarity between the milk of animals, and that part of a *plant* which pushes its way out of the earth. When in late summer we go through fields where corn is being cut, where the blade is passing through the corn stems, then the whole fields breathe out a feeling of bliss. It is an intensely significant moment when we not only watch the reaping with our physical eyes, but perceive the feeling of contentment sweeping over the earth as the corn falls to the ground. But when the roots of the plants are pulled up, then that is painful for the *plant* souls. In the higher worlds the same laws do not hold good which are valid in the physical world. When we rise to the spiritual worlds our conceptions become different; even here on the physical plane there is sometimes opposition between the principle of beauty and that of pain or pleasure. It is possible that, impelled by a feeling for beauty, someone might pull out their white hairs, that indeed would be painful. And it is like that in the case of the plants. When the roots are pulled up this may make for neatness — yet the plants suffer.

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The Spirit in the Realm of Plants
Berlin, December 8, 1910

How spiritual science must recognize the living and weaving spirit in all beings surrounding us by proceeding from the principle that the knowing human being should understand himself in his knowing has been touched upon in the lectures about '**The Human Soul and the Animal Soul**' and '**The Human Spirit and the Animal Spirit**' [Berlin, November 10 and 17, 1910] It was said that the person knowing himself could never think of taking into his own spirit — as spiritual content — ideas, concepts, and mental images of things and beings if these concepts and ideas, this spiritual content through which the human being wants to make comprehensible what resides in the objects, were not first present in these objects, were not placed into them. All drawing forth of the spiritual from things and beings would be pure fantasy, would be a self-made fantasy, if we were not to presuppose that wherever we gaze and are able to discover the spirit, there this spirit is actually present.

Although still only in small circles, this general presupposition of the spiritual content of the world is made rather frequently. Even those who speak of the spirit in objects, however, usually remain with speaking about the spirit in general, i.e., they speak about the existence of spiritual weaving, of spiritual life lying at the basis of the mineral, plant, and animal realms, etc. To enter into the means by which the spirit individualizes itself for us, how it manifests itself particularly in this or that form of existence, is not yet given much thought in the wider circles of our educated contemporaries. Offense is usually taken to those who speak not only of the spirit generally but of its particular forms, its particular ways, how it makes itself felt behind this or that phenomenon. Nevertheless, in our spiritual science, we should not speak about the spirit in the vague and general way indicated today; rather, we should speak in such a way that we recognize how the spirit weaves behind the mineral or plant existence, how it is active in the animal and human existence. Our task today is to say some thing about the nature of the spirit in the realm of plants.

It must be admitted that if we do not begin with abstract philosophy, or with abstract theosophy, but if we begin with unbiased observations of reality and at the same time — as it must be on the healthy ground of spiritual science — we stand firm on the ground of natural science and then want to speak about 'the spirit in the realm of plants,' we not only collide with unjustified prejudices of our scientists or other educated contemporaries but also come into conflict with more-or-less justified concepts that have, and must have, the power of strong suggestion.

Especially in this contemplation, which is to concern itself with the spirit that finds its expression, its physiognomy, as it were, in the realm confronting us in the gigantic trees of the primeval forest, or those growing on Teneriffa thousands of years ago, as well as in the small, unassuming violet hiding in the quiet woods or elsewhere — especially in such a contemplation a person may feel himself in a rather difficult position, if the natural scientific concepts of the nineteenth century have been absorbed. Yes, a person feels himself in a rather difficult position if he has worked through to what should be said about the spirit in this area, for how could it be denied that great and wonderful discoveries in the realm of material research — even in the realm of the nature of plants — were made in the nineteenth century, thoroughly illuminating the nature of plants from a certain standpoint.

Again and again we should be reminded that in the second third of the nineteenth century the great botanist, Schleiden, discovered the plant cell. He was the first to place before humanity the truth that every plant body is built up out of small — they are called 'elementary organisms' — independent entities, 'cells,' which appear like the building blocks of this plant body. While previously plants were able to be considered only in relation to their crude parts and organs, now attention was directed to how every leaf of the higher plants consisted of innumerable, tiny microscopic formations — the plant cells. No wonder such a discovery had a powerful influence on all thinking and feeling in relation to the plant world! It is entirely natural that the person who first discerned how the plant is built up out of these building blocks would arrive at the thought that by investigating these small formations, these building blocks, the secret of the nature of plants could be revealed.

The ingenious Gustav Theodor Fechner must already have experienced this idea when, around the middle of the nineteenth century, he actually tried to take into his thought sequences something like a 'plant soul,' although it could be said that his excessively fantastic elaboration of the nature of plants may have appeared somewhat too early. Fechner spoke comprehensively about a soul of plants (e.g., in his book *Nanna*), and he spoke not only as one who merely fantasizes but as one thoroughly and deeply acquainted with the natural scientific advances of the nineteenth century. He was unable, however, to think that plants are merely built up out of cells; rather, when he looked at the forms, the structures, of individual plants, he was led to assume that sense reality is the expression of an underlying soul element.

Now, you must admit that in contrast to what spiritual science has to say today about the life of the spirit in the realm of plants, Fechner's explanations appear rather fantastic, but his thoughts were actually an advance. In spite of this, Fechner had to experience the resistance that can come especially through the thinking into which the human spirit had penetrated by the discoveries of the nineteenth century. It must simply be understood that even the greatest individuals were fascinated by what they beheld when, under the microscope, the plant body revealed itself as a structure of small cells. They could in no way conceive how someone could still come up with the idea of a 'plant soul' after the material aspects had shown themselves in such a grandiose way to the searching human spirit. It is therefore easy to understand that even the discoverer of the plant cell became the greatest and most vehement opponent of what Fechner wished to say concerning the soul nature of plants. And it is rather interesting to see the fine and subtle mind of Fechner in battle with Schleiden, who became famous through his epoch-making discovery for botany but who did away, in a materialistically crude way, with everything that Fechner wanted to say about plants out of his intimate contemplations.

In a battle such as the one between Fechner and Schleiden in the nineteenth century, something basically took place that must be experienced by every soul who penetrates into the science of our time, working through the doubts and riddles that arise nevertheless, especially when one enters into the achievements of natural science. He will have grave doubts if he is able to work himself out of the frequently quite compelling concepts in such a realm. Whoever is not acquainted with this compelling quality of the materialistic natural scientific concepts of the nineteenth century may find trivial, possibly even narrow-minded, what is said out of the world view that wishes to place itself on the firm ground of natural science. One who approaches matters with a healthy sense for truth and a serious concern for solving life's riddles, however, and is at the same time armed with the botanical concepts of the nineteenth century, can have quite tragic inner soul experiences. Something about this need only be suggested here.

Thus we can learn, for example, what the botany of the nineteenth century has brought. There is much in this botany that is actually magnificent and truly astounding. A person who approaches the natural scientific concepts with a healthy sense for truth reaches the point where these concepts affect him like suggestion, with a tremendous power; they do not let him loose but whisper in his ears again and again, 'You are doing something stupid if you leave the sure path on which one studies how cell relates to cell, how cell is nourished by cell,' and so on. Finally it becomes necessary to tear oneself loose from the materialistic concepts in this realm. There is no other choice, no matter how firmly one wishes to be held by the suggestive power of the world views that are merely a consequence of outer materialistic concepts. After a certain point it no longer works. Not many people today experience that point. The suggestive power is experienced by most people who feel fascinated by the natural scientific results, and they do not dare take even a single step beyond what the microscope shows. The next step is taken only by very few. It is clear, however, to whoever maintains a healthy sense for truth, especially regarding the natural sciences — and this is necessary if one wishes to approach the spirit in the realm of plants — that first a person must occupy himself with a certain mental image, for otherwise he will always succumb to error, will always enter a labyrinth such as happened to Fechner despite his serious attempts to examine the symbolic, the physiognomic aspects of individual plant forms and structures.

I would like to suggest to you what is significant here first by means of a comparison. Imagine that someone found a piece of matter, some kind of tissue, on a path. If he examines this piece of tissue, in certain cases it may happen that he doesn't get anywhere. Why not? If this piece of tissue is a piece of bone from a human arm, the examiner will not get anywhere if he wants to look merely at this piece of bone and to explain it out of itself, for it would be impossible for this piece of tissue to come into existence without the prior existence of a human arm.

One cannot speak about the tissue at all if it is not considered in connection with a complete human organism. It is impossible, therefore, to speak about such a formation other than in connection with an entire being. Consider the following comparison. We find an object somewhere, a human hair. If we wanted to explain how it may have originated there, we would be led completely astray, because we can explain this only by considering it in connection with an entire human organism. By itself it is nothing; by itself it cannot be explained.

This is something that the spiritual investigator must consider in relation to the whole scope of our observations, of our explanations. He must direct his attention to the question of whether any object confronting him can be considered by itself or whether it remains inexplicable by itself, whether it belongs to something else or can be examined better as an isolated entity.

Curiously enough, the spiritual investigator becomes aware that it is generally impossible to consider the world of plants, this wonderful covering of the earth, as something existing by itself. When confronted with the plant he feels just as he does regarding a finger, which he can consider only as belonging to a complete human organism. The plant world cannot be considered in isolation, because to the view of the spiritual investigator the plant world at once relates itself to the entire planet earth and forms a whole with the earth, just as the finger or piece of bone or the brain forms a whole with our organism. And whoever merely looks at plants by themselves, remaining with the particular, does the same as one who wishes to explain a hand or a piece of human bone by itself. The common nature of plants simply cannot be considered in any other way than as a member of our common planet earth.

Here, however, we come to a matter that may annoy many today, though it is valid nevertheless for the spiritual scientific view. We come to look differently at our whole planet earth than is done customarily by today's science, for our contemporary science — be it astronomy, geology, or mineralogy — basically speaks about the earth only in so far as this earthly sphere consists of rocks, of the mineral element, of lifeless matter. Spiritual science may not speak in this way. It can only speak in such a way that everything found on our earth — that which a being coming from outer space, as it were, would find in human beings, animals, plants, and stones — belongs to the whole of our earth, just as the stones themselves belong to our earth. **This means that we may not look at the earth planet as a dead rock formation but rather as something that is in itself a living whole, bringing forth the nature of plants out of itself, just as the human being brings forth the structures of his skin, of his sense organs, and the like. In other words, we may not consider the earth without the plant covering that belongs to it.**

An outer circumstance might already suggest to us that, just as every stone has a certain relationship to the earth, so also everything plant-like belongs to it. Just as every stone, every lifeless body, shows its relationship to the earth by being able to fall onto the earth, where it finds a resistance, so every plant shows its relationship to the earth by the direction of its stem, which is always such that it passes through the center of the earth. All stems of plants would cross at the earth's center if we extended them to that point. This means that the earth is able to draw out of its center all those force radiations that allow the plants to arise. If we look at the mineral realm without also adding the plant covering, we are looking only at an abstraction, at something thought out. We must also add that the natural science that proceeds purely out of the outer material likes to speak about how the origins of all life — including plant-life — must lie in the lifeless, the mineral element.

This issue does not exist at all for the spiritual investigator, because the lower is never a precondition for the higher; rather the higher, the living, is always the precondition for the lower, the nonliving. We will see later, in the lecture, 'What Has Geology to Say About the Origin of the World,' [Berlin, February 9, 1911.] that spiritual research shows how everything rock-like, mineral — from granite to the crumb of soil in the field — originated

in a manner similar to what natural science says today about the origin of coal. Today coal is a mineral, we dig it out of the earth. What was it millions of years ago according to natural scientific concepts? Extensive, mighty forests — so says natural science — covered large portions of the earth's surface at that time; later they sank into the earth during shifts of the earth's crust and were then transformed chemically in regard to their material composition, and what we dig up today out of the depths of the earth are the plants that have become stone. If this is admitted today in relation to coal, it should not be considered too ridiculous if spiritual science, by its methods, comes to the conclusion that all rocks found on our earth have in the final analysis originated from the plant. The plant first had to become stone, as it were. Thus the mineral is not the precondition for the plant-like, but rather the reverse is the case, the plant-like is the precondition for the mineral. Everything of a mineral nature is first something plant-like that hardens and then turns to stone.

Thus in the earth planet we have something before us concerning which we must presuppose the following: it was once, with respect to its densest quality, of a plant nature, was a structure of plant-like being, and only developed the lifeless out of what was living, progressively hardening, turning to wood, turning to stone. Just as our skeleton first separates itself out of the organism, so we have to look at the earth's rock formations as the great skeleton of the earth being, of the earth organism.

Now, if we are able to consider this earth organism from a spiritual scientific viewpoint, we can go still further. Today I can give only the first outlines of this, because this is a cycle of lectures in which one thing must lead to the next. We can ask ourselves, what is the situation with the earth organism as such?

In studying an organism we know that alternations of different conditions are revealed. The human and animal organ isms reveal a waking and a sleeping condition alternating in time. Can we, from a spiritual scientific viewpoint, find something similar regarding the body of the earth, the earth organism? To outer consideration, what follows may appear to be a mere comparison, but for spiritual research it is not a comparison but a fact. If we study the curious lawfulness of summer and winter, how it is summer on one half of the earth and winter on the other half, how this relationship alternates, and if we pay attention to how this lawfulness — as wintertime and summertime — is to be discerned in relation to all earthly life, then it will no longer appear absurd if spiritual science tells us that winter and summer in the earth organism correspond to waking and sleeping in the organisms around us. It is simply that the earth does not sleep in time in the same way as other organisms but is always awake somewhere and al ways asleep at some other portion of its being. Waking and sleeping move around spatially: the earth sleeps in the part where there is summer, and it is awake in the part of its being where there is winter. Thus the whole earth organism con fronts us spiritually with conditions like waking and sleeping in other organisms.

The summer condition of the earth organism consists of a very specific relationship of the earth to the sun, and because we are dealing with a living, spirit-filled organism we may say that it surrenders itself to an activity that proceeds spiritually from the sun. In the winter condition the earth organism closes itself off from this sun activity, drawing itself together into itself. Now let us compare this condition with human sleep. I will now speak of what appears to be a mere analogy; spiritual science, however, provides the evidence for these observations.

If we study the human being in the evening, when he is tired, as his consciousness is diminishing, we find that all thoughts and feelings that enter our soul during the day from the outside, all pleasure and suffering, joy and pain, sink into an indefinite darkness. During this time, the human spirit being — as we have shown in the lecture about the nature of sleep [Berlin, November 24, 1910.] — passes out of the human physical body and enters the spiritual world, surrendering itself to the spiritual world. In this sleep condition it is a curious fact that the human being becomes

unconscious. For the spiritual investigator (we will see how he comes to know this) it is revealed that the inner aspect of the human being, the astral body and ego, actually draw themselves out of the physical and etheric bodies, but they do not simply draw themselves out and float over him like a cloud formation; rather this whole inner aspect of the human being spreads itself out, pours itself out over the whole planetary world around us. As incredible as it may seem, it is nevertheless revealed that the human soul pours itself out in a unified way over the astral realm. The investigators who were acquainted with this realm knew well why they called what departs from the physical the 'astral body.' The reason was that this inner element draws out of heavenly space, with which it forms a unity, the forces it needs in order to replace what the day's efforts and work used up from the physical body. Thus the human being in sleep passes into the great world and in the morning draws himself back within the limits of his skin, into the small human world, into the microcosm. There, because his body offers him resistance, he again feels his ego, his self-consciousness.

This breathing out and breathing in of the soul is a wonderful alternation in human life. Of all those who have not spoken directly from an occult, spiritual scientific point of view, I have actually found only one individual who made so fitting a remark about the alternation of waking and sleeping that it can be taken directly over into spiritual science, be cause it corresponds with spiritual scientific facts. It was a thoroughly mathematical thinker, a deeply thoughtful man, who was able to encompass nature magnificently with his spirit: Novalis. He says in his *Fragments*:

> Sleep is a mixed condition of body and soul. In sleep, body and soul are chemically united. In sleep the soul is evenly distributed throughout the body — the human being is neutralized. Waking is a divided, a polar condition; in waking the soul is pointed, localized. Sleep is soul-digestion; the body digests the soul (removal of the soul stimulus). Waking is the condition of the soul stimulus influence: the body partakes of the soul. In sleep the bonds of this system are loosened; in waking they are tightened.

Thus sleep for Novalis means the digestion of the soul by the body. Novalis is always conscious that in sleep the soul becomes one with the universe and is digested, so that the human being can be further helped in the physical world.

With respect to his inner being, then, the human being alternates in such a way that in the daytime he draws himself together into the small world, into the limits of his skin, and then expands into the great world during the night, drawing forth through surrender forces from that world in which he is then imbedded. We will not understand the human being unless we understand him as formed out of the entire macrocosm.

For that part of the earth where it is summer, there is something similar to what goes on in the human being in the condition of sleep. The earth gives itself to everything that comes down from the sun and forms itself as it should form itself under the influence of the sun activity. In that part of the earth where it is winter, it closes itself off from the influence of the sun, lives within itself. There it is the same as when the human being has drawn together into the small, inner world, living in himself, while for the part of the earth where it is summer it is the same as when the human being is surrendered to the whole outer world.

There is a law in the spiritual world: if we direct our attention to spiritual entities far removed from one another — such as, for example, the human being here on one side and the earth organism on the other — the states of consciousness must be pictured as reversed in a certain sense. With the human being, stepping out into the great world is the sleep condition. For the earth, the summer (which one would be inclined to consider a waking condition) is something that can only be compared with the human being falling asleep. The human being steps out into the great world when he falls asleep; in summer the earth with all its forces enters the realm of sun activity, only we must be able to think of the earth and the sun as spirit-filled organisms.

In wintertime, when the earth rests within itself, we must be able to think of its condition as corresponding to the waking condition of the human being, although it may be tempting to consider winter as the earth's sleep. When we consider entities as different from one another as the human being and the earth, however, the states of consciousness appear re versed in a certain way. Now, what does the earth accomplish when it is under the influence of surrender to the sun being, to the sun spirit? To have an easier comparison, we would do well to turn the concepts around now. The earth's surrender to the sun being is simply something that may be compared spiritually with the condition of the human being when he awakens in the morning and emerges out of the dark womb of existence, out of the night, into his joys and sorrows. When the earth enters the realm of sun activity — although this could be compared with the sleep condition of the human being — all the forces that sprout forth from the earth allow the resting winter condition of the earth to pass over into the active, the living, summer condition.

What, then, are the plants in this whole web of existence? We could say that when spring approaches, the earth organ ism begins to think and to feel, because the sun with its being lures out the thoughts and feelings. The plants are nothing but a kind of sense organ for the earth organism, awakening anew every spring, so that the earth organism with its thinking and feeling can be in the realm of the sun activity. Just as in the human organism light creates the eye for itself in order to be able to manifest through the eye as ‘light,’ so every spring the sun organism creates for itself the plant covering in order to look at itself, to feel, to sense, to think by means of this plant covering. The plants cannot directly be considered the thoughts of the earth, but they are the organs through which the awakening organization of the earth in spring, together with the sun, develops its thoughts and feelings. Just as we can see our nerves emanating from the brain, developing our feeling and conceptual life through the eyes and ears together with the nerves, so the spiritual investigator sees in what transpires between earth and sun with the help of the plants the marvelous weaving of a cosmic world of thoughts, feelings, and sensations. The spiritual investigator finds that the earth is surrounded not merely by the mineral air of the earth, by the purely physical earth atmosphere, but by an aura of thoughts and feelings. For spiritual research the earth is a spiritual being whose thoughts and feelings awaken every spring, and throughout the summer they pass through the soul of our entire earth.

The plant world, however, which is a part of our entire earth organism, provides the organs through which our earth can think and feel. Woven into the spirit of the earth are the plants, just as our eyes and ears are woven into the activities of our spirit.

In spring a living, spirit-filled organism awakens, and in the plants we can see something that is pushed out of the countenance of our earth in some realm where it wants to begin to feel and think. Just as everything in the human being tends toward a self-conscious ego, so it is also in the realm of plants. The whole plant world belongs to the earth. I have already said that a person would be close to insanity if he did not think of how all feelings, sensations, and mental images are directed toward our ego. Similarly, everything the plants mediate during summertime is directed toward the earth's center, which is the earth ego. This should not be said merely symbolically! As the human being has his ego, so the earth has its self-conscious ego. That is why all plants strive toward the earth's center. That is why we may not consider plants by themselves but rather must consider them in interaction with the self-conscious ego of the earth. What unfolds itself as thoughts and sensations of the earth is similar to the thoughts and sensations that live in us, similar to whatever arises and disappears in us during our waking state, what lives in us astrally, if we speak from the viewpoint of spiritual science.

Thus we cannot picture the earth only as a physical structure, for the physical structure is for us something like our own physical body, which can be seen with the outer eyes and touched with the hands, and which is observed by outer science. This is the earth body that present-day astronomy or geology studies. Then we have to direct our attention to what in the human being we have come to know as the etheric body or life body. The earth also has such an etheric

body, and it also has an astral body. This is what awakens every spring as the thoughts and feelings of the earth, which recede when winter approaches so that the earth rests in its own ego, closed off within itself, retaining only what it needs in order, through memory, to carry over the preceding into the following, retaining in the plant's seed forces what it has conquered for itself. Just as the human being, when he falls asleep, does not lose his thoughts and sensations but finds them again the next morning, so the earth, awakening again from sleep in the spring, finds the seed forces of the plants in order to permit what has been conquered in an earlier time to emerge again from the living memory of the seed forces.

When regarded in this way, the plants can be compared with our eyes and ears. What our senses are for us, the plants are for the earth organism. But what perceives, what achieves consciousness, is the spiritual world streaming down from the sun to the earth. This spiritual world would not be able to achieve consciousness if it did not have its sense organs in the plants, mediating a self-consciousness just as our eyes and ears and nerves mediate our self-consciousness. This makes us aware that we speak correctly only if we say that those beings who stream from the sun down to the earth, unfolding their spiritual activity, encounter from spring through summertime the being that belongs to the earth itself. In this ex change the organs are formed through which the earth perceives those beings, for the plants do not perceive. It is a superstition, shared also by natural science, when it is said that the plant perceives. The spiritual entities that belong to the earth activity and the sun activity perceive through the plant organs, and these entities direct toward the center of the earth all organs they need in order to unite them with the center of the earth. Thus what we have to see behind the plant covering are the spiritual entities that weave around the earth and have their organs in the plants.

It is remarkable that in our time natural science is actually moving toward a recognition of such spiritual scientific findings, for it is nothing less than full recognition of the situation to say that our physical earth is only a part of the whole earth, that the gaseous sun ball is only a part of the whole sun, and that our sun, as it appears to us physically, is only a part of the soul-spiritual entities who interact with the soul-spiritual entities of the earth. Just as the human world is connected with its environment, and just as human beings have their organs in order to live and to develop themselves, so these entities, which are real, create for themselves in the plant covering an organ in order to perceive themselves. As I said, it is superstitious to believe that the plant as such perceives or that the single plant has a kind of soul. This is just as superstitious as speaking of the soul of an eye. Although a remark able linking of facts, self-evident to spiritual science, impelled outer science throughout the nineteenth century to recognize what has just been said, it is nevertheless a fact that outer science does not know its way around very well in this realm; this is still so today, for what science has brought together so far about the sense life of plants completely sup ports what I have just said about the spirit and its activity in the realm of plants, but in outer science it cannot be comprehended as such. We can see this in the following example. In 1804 Sydenham Edward discovered the unusual plant called the Venus fly-trap, which has bristles on its leaves. When an insect comes near this plant so that contact with the bristles occurs, the insect is trapped by the leaf and then seemingly devoured and digested. It was remarkable when man discovered that plants can eat, can even take in animals, are meat eaters! But it was not known quite what to do with this, and this is interesting, because this discovery has repeatedly been forgotten and then rediscovered, in 1818 by Nuttal, in 1834 by Curtis, in 1848 by Lindley, and in 1859 by Oudemans. Five people in succession discovered the same thing! And science could not do much more with this discovery than for Schleiden, who made such a contribution to research of the plant world, to say that one should be on guard and not succumb to all kinds of mystical speculations attributing a soul to plants! Today, however, science is again prepared to attribute a soul to the individual plant, for example the Venus fly trap. This would be as superstitious as attributing a soul to the eye, however. Especially people such as Raoul France, for example, have immediately interpreted these things in an outer sense, saying, ‘There the soul element is evident, manifesting in a way analogous to the soul element of the animal!’

This shows how necessary it is, especially in the realm of spiritual science, not to succumb to all kinds of fantasies, for here outer science has succumbed to the fantasy that by attributing a soul nature to the Venus fly-trap, it can be thrown together with the human or animal soul nature. If this is done, a soul should also be attributed to other entities that attract small animals and, when these animals have come near, surround them with their tentacles so that they remain caught within. If one speaks of a soul in the Venus fly-trap, a soul can also be attributed to a mouse trap! We should not speak like this, however. As soon as there is the wish to penetrate into the spirit, things must be understood accurately and exactly, and one must not conclude from apparently similar outer qualities that the inner qualities work in the same way.

I have already directed attention to the fact that some animals exhibit something similar to memory. When an elephant is led to the drinking trough and on the way there someone irritates him, it can happen that when the elephant returns he has retained water in his trunk and sprays the person who irritated him earlier. It is said that here we can see that the elephant has a memory, that he remembered the person who irritated him and resolved: 'On the way back I will spray him with water!' But this is not the case. With the soul life it is important for us to follow the inner process exactly and not immediately to speak of memory when a later event occurs as an effect of an earlier cause. Only when a being truly looks back to something that took place at an earlier time do we have to do with memory; in every other case we are dealing only with cause and effect. This means that we would have to look exactly into the structure of the elephant's soul if we wished to see how the stimulus applied results in something that calls forth an effect after a certain time.

Therefore we must not interpret things such as what we encounter in the Venus fly-trap by thinking that the entire arrangement of the plant is there in order to determine an inner soul nature of the plant, but rather that what goes on there is brought about from outside. The plant serves as organ of the entire earth organism even in such a case. How the plants on the one hand pertain to the ego of the earth and on the other hand to the aura of the earth — the astral body, the earth's world of sensations and feelings — was shown particularly by this research in the nineteenth century. One can actually be grateful to those natural scientists — such as Gottlieb Haberlandt — who simply presented the facts they discovered in their research, and did not — like Raoul France or others — draw from these results purely outer conclusions. If the natural scientist were to present things as they really are, then one could be grateful to him; if he draws from them conclusions regarding the soul life of a single plant, however, then he should also immediately conclude something about the soul life of the single hair or tooth.

If we now study grain-producing plants, we discover remarkable little organs present in all these plants**. Small structures in the starch cells are discovered. These cells are constructed in quite a remarkable way, so that within them there is something like a loose kernel. These structures have the unique property that the cell wall remains insensitive to the kernel at only one spot. If the kernel slips to another spot, it touches the cell wall, leading the plant to return to its earlier position. Such starch cells are found in all plants whose main orientation is toward the center of the earth, so that the plant has an organ within that always makes it possible for it to direct itself in its main orientation toward the center of the earth.** This discovery, made during the nineteenth century by various scientists, is certainly wonderful, and it is most remarkable if it is simply presented as it is. Even if Haberlandt, for example, believes that this is a matter of a kind of sense perception by plants, he nevertheless presents the facts so clearly that one must be especially grateful for his dry and sober presentation.

But now let us turn to something else. If the leaf of a plant is studied, it is discovered that the outer surface is actually always a composite of many small, lens-like structures, similar to the lens in our eye. These 'lenses' are arranged in such a way that the light is effective only if it falls onto the surface of the leaf from a very specific direction. If it falls from another direction, the leaf instinctively begins to turn in such a way that the light can fall into

the center of the lens, because when it falls to the side it works in another way. Thus there are organs for light on the surface of the leaves of plants. These light organs, which actually can be compared with a kind of eye, are spread out over the plants, but the plant does not see by means of them; rather the sun being looks through them to the earth being. These light organs bring it about that the leaves of the plant always have the tendency to place themselves perpendicularly to the sunlight.

In this — in the way the plant surrenders itself to the sun's activity in spring and summertime — we have the plant's second main orientation. **The first orientation is that of the stem, through which the plants reveal themselves as belonging to the earth's self-consciousness; the second orientation is the one through which the plants express the earth's surrender to the activity of the sun beings.**

If we now wished to go still further, we would have to find, if the previous considerations are correct, that through this surrender of the earth to the sun, the plants somehow ex press how the earth, through what it brings forth, really lives in the great macrocosm. We would have to perceive some thing in the plants, so to speak, which would indicate to us that something works into the plant world that is brought about outside especially by the sun being. Linnaeus pointed out that certain plants open their blossoms at 5 a.m. and at no other time. This means that the earth surrenders itself to the sun, which is expressed in the fact that certain plants are able to open their blossoms only at very specific times of the day; for example, *Hemerocallis fulva*, the day lily, blossoms only at 5 a.m.; *Nymphaea alba*, the water lily, only at 7 a.m., and *Calendula*, the marigold, only at 9 a.m. In this way we see a marvelous expression of the earth's relationship to the sun, a relationship that Linnaeus termed the ‘sun clock.’ The plant's falling asleep, the folding together of the petals, is also limited to very specific times of the day. A wonderful lawfulness and regularity is evident in the life of plants.

All of this shows us how the earth is surrendered — like the human being in sleep — to the great world, living within it. Just as it allows the plants to bloom and wilt, it shows us the spiritual weaving between sun and earth. Looking at matters in this way, however, we would have to say that we gaze there into deep, deep mysteries of our environment. For the serious seeker after truth, this puts a stop to the possibility — regardless of how fascinating the results of purely material research are — to think of the sun merely as a ball of gas racing through space; it puts a stop to the possibility that the earth can be considered as it is by astronomy and geology today. There are compelling reasons that must lead the conscientious natural scientist to admit the following: ‘In what natural science reveals, you may no longer see anything but an expression of the spiritual life lying at the foundation of everything!’ Then we regard the plants as a physiognomic expression of the earth, as the expression of the features of our earth. Thus what we call our aesthetic feeling in relation to the plant world deepens especially through spiritual science. We stand before the gigantic trees in the primeval forest, before the quiet violet or lily of the valley, and we look at them as single individualities, yes, but in such a way that we say, there the spirit that lives throughout space expresses it self to us — sun spirit! earth spirit! Just as we recognize in a human being the piety or impiety of his soul, so we can come to an impression, from what looks at us out of the plants, of what lives as earth spirit, as sun spirit, of how they battle with one another or are in harmony. There we feel ourselves as living and weaving within the spirit.

Just as an illustration of how spiritual science can be verified by the natural science of the nineteenth century, I will relate to you the following. Listeners who have heard lectures here in the past will recall how I have indicated that there are plants in the earthly world that are misplaced, that do not belong in our world. One such plant is mistletoe, which plays such a remarkable role in legends and myths, because it be longs to an earlier planetary condition of our earth and has remained behind as a remnant of a pre-earthly evolution. This is why it cannot grow on the earth but must take root in other plants. Natural science shows us that mistletoe does not have those curious starch cells that orient the plant toward the center of the earth. I could now begin briefly to take apart the entire botany of the nineteenth century

bit by bit, and you will find little by little how **the plant covering of our earth is the sense organ through which earth spirit and sun spirit behold each other.**

If we pay heed to this, we receive a science — as seems appropriate for the plant world that we love and that gives us so much joy — a science that can at the same time raise our soul, bring it close to this plant world. With our soul and spirit we feel ourselves belonging to the earth and to the sun; we feel as if we had to look up to the plant world, as it were, we feel that it belongs to our great mother earth. We must do this. Everything that as animal or human being seems to be independent of the immediate effect of the sun is actually, through the plant world and its dependence on the plant world, indirectly dependent on the sun. The human being does not undergo the kinds of transformations that plants go through in winter and summer, but it is the plant that gives him the possibility of having such a constancy within himself. The sub stances that the plant develops can be developed only under the influence of the sun, through the interrelationship of sun spirit and earth spirit**. The carbohydrates can arise only if the sun spirit and the earth spirit kiss through the plant being**. The substances developed here yield what the higher organisms must take into themselves in order to develop warmth. The higher organisms can only thrive through the warmth developed by taking up the substances prepared by the sun via the plants.

Thus we must look to mother earth as to our great nourishing mother. We have seen, however, that in the plant covering we have the physiognomy of the plant spirit, and through this we feel as though standing in soul and spirit. We gaze, as it were — just as we gaze into the eyes of another person — into the soul of the earth, if we understand how it manifests its soul in the blossoms and leaves of the plant world.

This is what led Goethe to occupy himself with the plant world, which led him to an activity that consisted fundamentally of showing how the spirit is active in the plant world and how in the plant the leaf is formed out of the spirit in the most diverse forms. Goethe was delighted that the spirit in the plant forms the leaves, rounds them, and also leads them to wind around the stem. And it was remarkable when a man who truly recognized the spirit — Schiller, who met Goethe after a botanical lecture in Jena — when Schiller, who was not satisfied by the lecture, said, “That was just an observation of plants as they are in isolation!” whereupon Goethe took out a sheet of paper and sketched in his way, with a few lines, how for him the spirit is active in the plant. Schiller, who was un able to understand such a concrete presentation of the spirit of the plant, said in reply, “What you are drawing there is only an idea!” to which Goethe could only say, “Isn't it nice that I can have ideas without knowing it and can even see them with my own eyes!”

Especially in the way in which a man like Goethe studied the plant world on his journey over the Brenner — when he looked at the coltsfoot with completely different eyes — the way in which he saw in this how the spirit is active on the earth and forms the leaves, shows us how we can speak of a common spirit of the earth that brings itself to expression only in the manifold plant being as in his own special organ. What is physical is spirit; we simply have the task of pursuing the spirit always in the right way. Whoever pursues the plant as it grows out of the common spirit of the earth will find the earth spirit that Goethe already had in view when he let his Faust address the spirit active in the earth, who says of him self:

In Lebensfluten, in Tatensturm
Wall' ich auf and ab,
Webe hin and her!
Geburt and Grab,
Ein ewiges Meer,
Ein wechselnd Weben,

Ein gluhend Leben,
So Schaff ich am sausenden Webstuhl der Zeit
Und wirke der Gottheit lebendiges Kleid.

In the tides of life, in action's storm,
Up and down I wave,
To and fro weave free,
Birth and the grave,
An infinite sea,
A varied weaving,
A radiant living,
Thus at Time's humming loom it's my hand that prepares
The robe ever-living the Deity wears.

The person who beholds in this way the spirit in the plant life of the earth feels himself strengthened by seeing what he must consider his inner being poured out over the whole environment he is allowed to inhabit. And he must say to himself, "If I study what encircles my space, I find it confirmed that the origin of all things is to be found in the domain of the spirit." And an expression of the relationship of human spirit and human soul, and also the relationship of plant soul and plant spirit, we can encompass in these words:

Die Dinge in den Raumesweiten,
Sie wandeln sich im Zeitenlauf.
Erkennend lebt die Menschenseele
Durch Raumesweiten unbegrenzt
Und unversehrt durch Zeitenlauf.
Sie findet in dem Geistgebiet
Des eignen Wesens tiefsten Grund.

To the sense of man there speak
The things in breadths of space
Transforming themselves in course of time.
Knowing lives the human soul
Unbounded by the breadths of space,
Unaltered by the course of time;
It finds in the realm of spirit
Its own being's deepest ground!

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Let us first consider the formative process of plants as such, in its relationship to the cosmos. We have already pointed out that in man the opposite process to that of *plant* formation is active in a functional sense. Therefore, in order to find the direct correspondence in man, we must at least indicate in outline the formative process of plants As is apparent, there are two distinct and quite opposite tendencies in this process. One tendency is earthwards, and I have already suggested that in trees the main stem forms a sort of excrescence of the earth, so that the flowers and leaves are rooted in the trunk, just as herbs and plants of lower types are rooted in the earth. There is this tendency of the *plant* towards

the earth; but on the other hand, the *plant* has an impulse upwards, away from the earth. The *plant* strives to escape from the earth, not merely mechanically by virtue of a force opposed to the pull of gravity but also in its whole formative process, internal as well. The processes in the flower become different from those in the root; they become far more dependent on extra-terrestrial or extra-telluric forces than the root. This dependence of the flower formation upon forces originating outside the earth must first be considered and we shall find that the same forces utilised by the *plant* to initiate the formation of flower and seed are also necessary to the human hypogastrium (digestion), because of the functional reversal of the *plant* process in man. They are utilised through the abdomen as well as in all functions of evacuation secretion and the physical base of sex. So if we examine the complementary relationship of man and the *plant*, we find special correspondences to the extra-telluric as well as to the telluric.

Please notice here that what I maintain has not been derived from the medical works of the past, but is based entirely on contemporary spiritual-scientific research. I only try to use sometimes the terms of the old literature of medicine, as modern literature contains no suitable vocabulary. But it would be a complete mistake to suppose that any item of my course here is simply derived from archaic sources.

Observe the growth of the *plant* as it rises upwards out of the earth. You must take note of the spiral sequence in the actual formation of the leaves and of the flower. You might say that the formative forces follow a spiral course around the central stalk. This spiral course cannot be explained by internal forces of tension in the *plant*. No; its origin is to be sought in the influence that works from the extra-telluric sphere, and chiefly in the influence of the sun's apparent path through the heavens. (Let us say “apparent,” for the respective motions of earth and sun can only be taken relatively.) There are indeed points of view better than the mathematics of Galileo, from which to study the paths of the heavenly bodies; they trace themselves in the sequence of formative processes in the *plant*. For what the stars do is faithfully copied by the *plant*.

It would be quite mistaken, however, to reckon only with the vertical upward impulse in plants, that depends upon the sun. The stars co-operate in a resultant with movements caused by the sun. If the sun's action were the sole operating force, it would take complete possession, so to speak, and the *plant* would be drawn upwards into the infinite. (See **Diagram 9**). The solar force is, however, counteracted to some degree by that of the outer planets, in their spiral courses. For planets as a matter of fact, do not move in an ellipse; their orbits are spiral. It is time today that the whole Copernican system was re-examined and superseded by another. The so-called outer planets are Mars, Jupiter and Saturn. (Uranus and Neptune are only members of the solar system in an astronomical sense; they do not really belong to it by origin; they are foreign bodies that have become attracted and attached to our system. They are guests, invited to our planetary system, and we are right to omit them.) The forces of the superior planets deflect the *plant*'s upward tendency, so as to bank up the formative forces which cause the formation of flower and seed. *So if you consider the plant's upward development, from the region of formation of the foliage, you must ascribe it to the combined action of the Sun's influence and that of Mars, Jupiter and Saturn.*

There are not only these two elements in co-operation. Marshalled against them are the influences from the Moon and the so-called inferior planets, Mercury, and Venus. The Moon, Mercury and Venus cause the earthward, downward tendency in the *plant*, which manifests itself most characteristically in the formation of the root. Thus all that seems essentially earthy is really a joint product of the action of the Moon, and that of the inferior planets. So I would say that the *plant* expresses and bears the imprint of our whole planetary system. Until we know this, and learn also how to recognise the planetary manifestations in man as well we cannot thoroughly understand the relationship between the *plant* structure and the human structure.

Now consider the fact that plants with a prevailing tendency towards root-formation leave much more ash when they are burnt than is left by plants that tend towards the formation of blossoms or even by mistletoe and, tree-plants. This difference is caused by the greater influence of the inner heavenly bodies, Moon, Mercury and Venus, on plants with great root development. And if you search in their ashes, iron, manganese, and silicon will be found, all of them substances with direct remedial qualities, as is shown when any portion of the *plant* is used.

But if plants of the opposite type are exposed to the action of fire, there is but little ash. And in these different results of the same process of incineration, we have something I would describe as an external document of the *plant*'s relation to the whole cosmic order, and not to forces ruling on earth alone.

Now consider the *plant* world more closely. In the case of annual plants, growth stops abruptly at a certain season of the year with the formation of seed. As we have seen, seed formation is mainly governed by extra-terrestrial forces. But its course is interrupted and it is given over to the earth again. It must, as it were, continue at a lower stage in the new year, what had reached a higher stage in the old year The course of *plant*life and growth is a remarkable one. Take the earth's surface; the *plant* emerges from the soil, reaching out to its fullest extent towards the extra-terrestrial spheres. But then what has developed extra-terrestrially is sown again in the soil, and the cycle begins anew. (See **Diagram 10**). Thus every year the heavenly forces sink into the ground, mingle with the forces of the earth, and again complete their course. Year by year the seed of the flower is returned again to the root region, to complete the rhythmic cycle to which all *plant* life is subject.

This rhythmic cycle is proof that what we term the flora of earth is in truth a manifestation of the whole earth's interaction with the extra-terrestrial cosmos. This interaction, therefore, is not restricted to the form of our planet, but extends to its internal chemistry and its whole system of organic life. Just as what is earthly in the mechanism in the form is overcome by the cosmic forces, so also is the terrestrial chemistry in plants overcome by the forces outside the earth; and when this overcoming has reached a certain point, the process must return again to earth and display earthly chemistry. From these facts it is not a farfetched conclusion that the specific chemistry of the earth is revealed in the ashes; it is represented in the refuse, the dross of the living sphere. This dross and ash is subject to gravity, whereas the upward urge and growth of the *plant* is a continual conquest of gravity, and of other earth-bound forces, so that we may properly speak of a polar opposition between gravity and light. Light is that which continually overcomes gravity. *And the plant is so to speak set into the tension of this combat between light and weight, between that which strives towards ashes and that which strives towards fire*. And this polar contrast between what becomes ashes and what is revealed in flame, is the opposition of ponderable and imponderable elements. There we have revealed the cosmic place and role of *plant* life.

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Spiritual Science and Medicine

Lecture V 25 March 1920

Let us suppose that you are consulted by a person suffering from some disease (we shall deal with particular diseases later) in which there are particularly vivid and frequent dreams. This means that the astral body likes to separate from the physical, does so with ease, and goes about its own business. Moreover the patient tells you that he has a constitutional tendency to inflammations affecting the periphery of the organism. This is a further symptom showing that the astral body and ego are not settled properly in the physical. If these symptoms are found, you will be able to employ the force where with phosphorus grips its imponderables to make the astral body and ego occupy themselves more with the physical body. In persons who have restless and disturbed sleep, even in very different cases of disease,

one can beneficially employ phosphorus, for it tends to restore and re-unite the astral body and ego to the physical and etheric bodies.

Thus we find phosphoric and saline substances, polar opposites in some measure. And I would ask you to bear in mind the cosmic *roles* played by these two groups, as of far more significance than — if I may say so — the individual names applied in modern chemistry to all the separate substances. In the course of our discussions we shall see how phosphorus can be used for healing purposes, in the form of related substances.

Here then you have, in external nature, two states which are polar to one another; that which acts in a *saline manner* and that which acts in a *phosphoric* manner. And between them, there is a third group: that which acts *Mercurially*. Just as man is a threefold being, a creature with nerves and senses, with a circulatory system, and with metabolism; and as circulation is the bridge linking nerves and senses to the metabolic functions: so also there is a mediatory function in external nature. It comprises everything that possesses, to a great degree, neither the saline character nor the character of interiorising the imponderables, but — so to speak — holds the equipoise between these two, by manifesting in the form of *drops*. For mercurial substances are essentially those which tend to assume the form of drops, by virtue of their inner combination of forces. This is the point which matters in all mercury substances, not whether they are known today under the name of quicksilver. The test of what is mercurial is the combination of forces whereby a substance is poised midway between the liquefying tendency of the saline, and the concentrating tendency in which imponderables are held together. So we must give special heed to the state of the forces that are the most evident in all mercurial substances. *You will find accordingly, that these mercurial substances are mainly linked up with all that is calculated to bring about a balance between the activities for which phosphorous and saline substances are best qualified*. We shall find that their effects upon the organism are not contradictory to the indications just given, when we deal specially with syphilitic and similar diseases.

In this sketch of the three groups: Saline. Mercurial. Phosphoric. I have presented to you the most conspicuous mineral types. But in dealing with the saline group, we have already had to refer to an organic activity, as manifested in the formation of the oyster's shell, which works behind the saline nature. Such an organic process is in a certain sense at work also when imponderables become concentrated in phosphorus. But as in that case, all depends on interiorisation, the process becomes less obvious externally. Now let us turn from the contemplation of these typical forms manifested in the external world, to other processes that have been segregated at a different epoch from man — viz., *plant* life.

As we have already recognised from a somewhat different point of view, the character of the *plant* represents the opposite of the activity proper to the human organism. But in the *plant* itself we can clearly differentiate between three kinds of manifestation. This threefold diversity strikes you very plainly, as you observe that which unfolds earthward to form the root and that which springs upward to send forth blossom, fruit and seed. The external direction in space as such indicates the contrast between the *plant* nature and Man (the animal must be left aside for the moment). This contrast in direction contains something of great significance and value. The *plant* sinks itself deep into the earth with its roots and stretches its blossom, its reproductive organs, upwards. Man is the direct opposite in his relation to the Cosmos. He sends his roots, so to speak, upwards, with his head, and he strives earthwards with his organs of reproduction. Thus it is not in the least unreasonable to picture our human frame as containing a *plant*, with its root sent upwards and its blossom opening downwards in the reproductive organs. For in a special way the *plant* nature is fitted, as it were, into the human. And again, there is a remarkable difference in Man and animal in that the *plant* hidden in the animal lies horizontally, that is at right angles to the direction of the growing plants, while Man has completely turned round and has executed a semicircle of 180 degrees when compared with the *plant*. This is one of the most instructive facts for the study [of] man's relationship to the external world.

If our students of medicine would investigate such macrocosmic matters more closely, they would learn more of the forces operative, even, for instance, in the living cells, than through the methods of microscopy. For the most important forces that work even in the cells — and quite differently in *plant*, animal or man — can be observed and studied macroscopically. The human soul can be studied to much better effect, by observing the co-operation of that which extends vertically upwards and downwards, and that which lies in the balance of the horizontal. These forces can be observed in the macrocosm and are operative even down into the cellular tissues. And what is active within the cells, is in fact nothing less than the image of this macrocosmic working.

Let us consider the vegetation of the Earth; but not in the usual fashion, by wandering on the Earth's surface to contemplate one *plant* beside another, examine it minutely in all its parts, invent a title of two or three separate names, and then list the *plant* in a system of classification. No: **you must bear in mind that the whole earth is one single entity, and that the whole vegetable world pertains to the Earth's organism just as your hair belongs to yours** — (although with this difference, that hairs resemble each other closely whereas plants are various and differ one from another). You can no more regard the single *plant* as an independent organism than you can so regard the single hair. The cause of the variety among plants is simply this; the Earth in its interaction with the rest of the Cosmos develops different forces towards the most diverse directions, and in this way gives a different organisation to the plants. But there is a certain basic unity in the constitution of the earth, from which all *plant* growth derives. The following consideration is therefore important. To give an example; suppose you are studying mushrooms and fungi: for these the earth itself is, so to speak, the support and matrix. Pass higher up the scale to herbs; here, too, the earth supports and nourishes, but forces from outside the earth have also influence in shaping their leaves and flowers: the force of light, for instance. And most interesting of all vegetable forms are the trees. Turn your attention to trees and you will recognise that the formation of their stems or trunks (by virtue of which trees become perennial) represents a continuation of what the whole earth is for the *plant* that nestles upon it. Please visualise this relationship of earth and *plant*. The herbal *plant* springs up out of the earth. This means that we must search in the earth itself for the forces fundamental to growth, which interact with the forces streaming on to our earth out of the Cosmos. But when a tree grows, do not, please, be too much shocked by what I say, for this is really the case — the earth rises up and grows, so to speak to cover over that which formally flowed directly out of the earth into the herb-like *plant*. That shoots up into the trunk — and all tree trunks are really outgrowths of the earth. If we have forgotten this, it is because of that gruesome materialistic concept of today, that the earth is merely composed of minerals. People do not realise how impossible is the concept of a mineral earth! The earth has other forces as well as those which segregate into the mineral kingdom; it has the forces that sprout into vegetation.

These forces rise up out of the soil and become trunks. And all that grows upon the trunks is in a relationship to them comparable with that of the lower *plant* forms and herbs to the earth itself.

Indeed I would say that the soil of earth is itself the trunk, or main stem, of those lesser vegetable growths, and that the trees formed an extra trunk to carry their essential organs — blossoms and seeds. Thus you will observe that there is a certain difference as to whether I take a blossom from a tree or from a herb-like *plant*. Consider further the formation of parasitic plants, more especially the mistletoe. In it you find the blossoms and seed organs which are normally united to the supporting *plant*, separated and stuck upon a stem like a process apart. Thus the formative process of the mistletoe represents an intensification of what is active in blossom and seed formation, and at the same time, in some sort, a separation from the terrestrial forces. What is non-terrestrial in the *plant* emancipates itself in the formation of the mistletoe. We see that upward urge away from the earth, which interacts with extra-terrestrial forces, gradually liberate and separate itself in the efflorescence of blossom and fruit, and arrive at a remarkable individualisation and emancipation, in the mistletoe.

Bearing this in mind, together with the varied forms of plants; you will admit that there must be considerable organic difference according as a *plant* tends most to root-development, its growth forces manifesting principally in the root, but its blossoms small or even atrophied. Such plants tend more towards the earth forces. Those plants which liberate themselves from the earth forces are those that give themselves up to the formation of blossom and seed, or, most of all, those that live as parasites upon others of the vegetable kingdom.

All plants tend to make some one organ particularly predominant. Take the pineapple, which tends to make its stem predominant, or indeed any other *plant*. Every principal organ of the *plant*, roots, stems, leaves, blossoms, fruit, becomes the chief and most conspicuous organ of this or that *plant* kind. Take for instance, Equisetum (the horse-tail), and observe the trend to become all stem. Other species, again, tend to become all leaves,

There is a certain parallelism between these divergent tendencies in the vegetable growth and those three types of mineral activity in the external world that I have enumerated today. Let us consider the emancipatory tendency in plants — that urge which culminates in the activity of the parasitic species; here is something which tends to the interiorisation of imponderables. That which streams earthward out of the cosmos as imponderables is as definitely collected and conserved in blossoms and fruit, if blossoms and fruit prevail, as in the phosphor substance. So we may maintain that, *in a certain sense, blossoms, seeds and all that tends towards mistletoe and other parasite development in plants are "phosphoric." And on the opposite pole we find that the root process which the plant develops by regarding the earth as its mother-ground is closely related to salt-formation.*

Thus both these polarities face us in the world of the *plant*. *And further: in the visible linkage between the blossom and fruit process that extends upwards and the downwards anchorage in the earth we have the mediating activity of the mercurial process*.

Now, take into account the opposite placing of organs, in man and in the *plant* respectively. You must conclude that all substances tending inwardly towards the formation of flowers and fruit must be closely related to the organs of the hypogastrium and all those organs directed and orientated by them. All phosphoric substance must therefore have close interaction with these lower human organs. We shall presently confirm this. On the other hand, all that tends towards root development will be intimately connected with all organs of the upper organisation. But of course you must bear in mind that we cannot make a simple and external threefold division of man's body. On the contrary, for instance, much that appertains to the lowest organic region, the digestive system, strives for its continuation as it were in the direction of the head. It is a complete, one might say a foolish error to suppose that the substrate substance of thought is mainly given in the grey matter of the brain. This is not so. The grey matter serves principally to conduct nourishment to the brain. It is essentially a colony of the digestive tract, surrounding the brain in order to feed it, whereas the white matter of the brain is of a great importance as substrate substance of thought. You will find something in the anatomical structure of the grey matter which is much more linked with a more general function of the whole body, than with the function usually attributed to it. As you see dealing with digestion, we cannot restrict ourselves to the lower abdominal regions. Nevertheless, in considering what is derived from or connected with roots, we shall find a definite affinity with what can be applied to the upper organic sphere in man. And all those portions of plants that achieve the equipoise between the blossom and fruit process, and the root process, and manifest in the common herbs through the leaves, will as a decoction have special influence on circulatory disturbances, that is on the rhythmic balance between the upper and lower spheres. Here then is the parallel between minerals that absorb and concentrate the imponderables, minerals that repel the imponderables, and the intermediate group, and the whole configuration of the *plant*.

This furnishes you with the first rational method (as indicated by the *plant* itself, in the respective development of this or that organ) of establishing a mutual relationship with the human organism. We shall see how this basic principle works in detail.

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Let me then remind you — after we have gained some more concrete concepts — of the nature of man's kinship to the environment. Consider once more, the whole earth's flora; the vegetation that thrusts upwards through the soil, disperses its forces so to speak in the blossom, and re-marshals them in the fruit and the manifold remarkable variations of this process. Variations such as the possible retention in the foliage of forces which would otherwise pour themselves forth into the seed, how the leaves thus become herbaceous and thick; how the seed husk may perhaps become pulpous by the retention of certain forces at the eleventh hour so to speak — all variations are to be found.

But the process of *plant* formation is not a process which can be regarded only as a result of the physical action of the earth or of the counteracting forces of light. It goes further than that: just as the *plant* in very truth contains both the physical and etheric bodies in itself so also in the upper region where the extra-telluric sphere and the earth sphere meet, there is, connected with that vegetable nature, a cosmic-astral principle. We might express it thus: *the plant grows and tends towards a formative animal process which it, however, does not attain*. The interior of the earth is so to speak saturated with the formative *plant* process, but where the atmosphere meets earth there is also a pervading formative animal process which is not carried to its end, a process which the *plant* grows towards but fails to reach. This process we may behold in action, weaving as it were above the blossoming vegetation, and we may be aware that it encircles the whole earth. This process is centralised in the animal itself, where it is interiorised. The process which takes place weaving above the flowering *plant* world and which forms a circle around the earth sphere is centred in the animal itself and is removed into its interior; and the organs which the animal possesses and the *plant* lacks are simply what they require in order to unfold from a centre an effect that is exercised from without towards the *plant*.

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Consider the stratum of *plant* life that covers the earth's soil, i.e. the entire content of vegetation. We must understand that this flora which grows outwards from the soil towards cosmic space, is not only sent out from the earth, but is also drawn outwards by forces that are in continuous operation, and as essential to the growth of plants as the forces working from the earth itself. There is a constant interaction between the forces passing into the *plant* from the earth, and those acting on the *plant* from the cosmos outside the earth. What is the essential factor in this interaction that permeates our whole environment? Should these cosmic forces attain their full expression and take full possession of the *plant*, and should the planets not ensure that these forces can withdraw again, then the *plant* in its growth from the stalk to the blossom and seed would have the perpetual tendency to become animal. There is a tendency towards animalisation. But this tendency, which expresses Cosmic forces passing into the *plant*, is counteracted and balanced by the opposite tendency towards suppression of the *plant*-nature in mineralisation.

I would thus emphasise the essential nature of plants: it holds the balance between the tendency to salification, to the deposit of mineral constituents within the vegetable substance, i.e., to mineralisation; and on the other hand to self-ignition, to animalisation. This is what is perpetually at work in external nature.

This same counteraction, however, goes on, interiorised and centralised, in the human organism itself. By virtue of its lungs the human organism is a genuine earth in miniature, and all the pulmonary processes work downwards in the same manner as the forces of earth work upwards into the *plant*, passing from the earth to the *plant*'s organisation. All that comes to meet the inner metabolism of the lungs, from the breathing and heart activity, has the same method of operation as the external cosmic forces.

Now there is a special requirement of the human organism: all that is focused from out of the organism, in the heart's action, must be held apart from the forces that organise and concentrate themselves in the internal metabolism of the lungs. These two sets of activities may only interact through the barrier — if I may so express myself — of an etheric or even an astral diaphragm. They must be kept separate from one another. And so we come to the question: Does this diaphragm — and I only use the term in order to give a picture — really exist? Is there such a diaphragm, which prevents the activities of head, throat and lungs from blending with those of abdomen and breast, except through the external rhythm of the breath? Yes — there is such a diaphragm, and it is nothing less than the rhythm of breathing itself. Here you find the attunement of the upper with the lower sphere in man. What is termed rhythmic activity in man, the rhythmic pulsation, whose external physical manifestation is in the rhythm of the breathing, continues into the etheric and astral activities and holds apart the telluric forces of the upper human being, which centre in the lung, and the cosmic forces of the lower human being. The latter forces, with their expression ultimately in the heart, work upwards from below, just as cosmically they work from the periphery inwards, towards the earth's centre.

Suppose now that this rhythm is disturbed and does not work normally. In that case, the symbolic diaphragm, to which I have referred — which has no physical existence, but which results from the interplay of the rhythms — is not in order. Then there may ensue a process analogous to excessive action of the earth on vegetation. If the earth's saline action on plants became excessive, the plants would become too mineral. And the result is that the etheric *plant* inserted into the lung, that grows out of the lung so to speak as the physical *plant* springs from the soil becomes the cause of pulmonary sclerosis. Thus we find that the trend of the *plant* towards mineralisation may become excessive even in the organism of man.

And the contrary trend towards animalisation may also exceed normality. When this happens, a region is created in the upper portion of the organism which should not exist. In this region the affected organs are embedded as in an etheric sphere, and this favours the multiplication of what should not multiply in our organism, namely the minute forms of life between animal and *plant*. We need not trouble to inquire whence they come. *We need only interest ourselves in the factors which create a favourable sphere of life for them*. This favourable sphere of life should not exist for them. It should not arise as a specially enclosed sphere; it should permeate and operate throughout the whole organism. If it does so, it sustains the life of the whole organism. If it works only within a small enclosure, it becomes the appropriate medium for the presence and multiplication of little *plant*-animals, of microscopic forms of life, which can be detected in much — if not in all — that causes illness in man's upper organic sphere.

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It is possible to arrive at a comprehensive view of this realm, however, only if one now extends what can be observed in the human being to the observation of all nature, if one is able to grasp all nature in a spiritual scientific sense. If you look at the *plant*-forming process, for example, you can see clearly and macroscopically the upward striving of *plant*-forming processes, a striving away from the center of the earth. You may make a stimulating study of this metamorphosing formative striving of the plants, at least in a rudimentary way, on the basis of the guidelines offered in Goethe's *Metamorphosis of the Plants*. In Goethe's *Metamorphosis of the Plants* there is a sketchy rendering of the first composition, the first elements that are to be studied about the nature of the *plant* in this direction, but the direction of such a study must be developed further. The initial guidelines must be pursued, for then we may obtain a living view of everything involved in *plant* growth: when rooting in the soil the *plant*'s upward-striving develops in a negative direction in the root; the *plant* begins to grow, then grows upward, overcoming the force of attraction of the earth prevailing in the root; then it wrestles through other forces in order to come ultimately to blossom, fruit, and seed formation. A great deal takes place upon this path.

On this path, for example, an opposing force once again intervenes. The opposing force that intervenes can be well observed if you study, simply to take an example, the common birch, *betula alba*. Pursue very precisely the process that takes place from the root formation through the trunk formation, particularly the bark formation. Consider how, on the basis of everything that works together in the trunk and bark formation, there develops what later comes into manifestation in the leaf formation. This can be studied particularly well in a spiritual scientific way if the still-brownish young birch leaves are studied in the spring.

If this is studied vividly, one also receives a view of forces self-metamorphosing, forces that are active there within the *plant*. One receives a view of how, on the one hand, there is a formative force active in the process of *plant* formation that works from below upward. On the other hand it is also possible to behold the force that retards, which in the root still, works strongly as the force of gravity but which, as the *plant* wrestles itself free from the earthly substance out into the air, is able to work together in another way with the upward-striving force. We then reach an interesting stage, a stage very helpful in understanding how in *plant* formation during this upward-striving process certain salts, potassium salts, are deposited in the birch bark; this is simply the result of the interaction of the forces working downward with the forces working upward, tending toward protein-formation, you could say, toward what I would like to designate as the albuminizing force formation.

In this way it is possible to penetrate into the *plant*-forming process. I can only indicate this here. By looking at how the potassium salts are deposited in the birch bark, how something wrestles itself free from this force drawing downward (a process somewhat comparable to what happens when a salt precipitates out of a solution), coming to the process that takes place when the solution rids itself of the salt, we come to see, to grasp in a living way, the process of protein formation, the process I would designate as the albuminizing process. We thus have a path to study what outwardly surrounds the human being, to study it vividly.

Then when we look back at the human being, we can see how, fundamentally speaking, the human being has the same form of forces in him — if we consider the breakdown process working from above downward — that work from below upward in the *plant*. We can see that in what is active in the forces working downward from the head system toward the metabolic-limb system there is something like an inverted *plant* element active within us. We can see that in fact those forces that we see sent upward in *plant* growth work in a downward direction in the human being. If the human being inappropriately holds back this process of *plant* formation active within him, so that he doesn't permeate the bodily life in the right way with what is active in the head — the astral, the ego-being — and if this then penetrates the bodily nature, this penetration expressing itself within the body, then something is held up there, something that should proceed into the human organism. We thus have to do with a pathological phenomenon like that which

confronts us, for example, in cases of rheumatism or gouty conditions. If we study what is brought about in the human organism when this breakdown process is dammed up in a certain way, we discover its effects in the process of rheumatism, in the process of gout-formation, and so on.

Let us now shift our gaze again from within the organism to a process of *plant* formation like the one we have in the *betula alba*. From this we can arrive at the following. We look on the one hand into what takes place in salt formation and on the other hand into protein formation. We find, if we understand this process of protein formation in the right way, that the opposite process is within it and is held up there. We find held up in the organism that process which should take place in a way similar to the correct process of albuminizing in the leaves of the birch. We are thus able to come to the relationship between those processes that take place in the birch leaves, for example, and the processes within the organism if we process what is in the birch leaves into remedies. We can then give these remedies to the human being, by means of which we can bring about a healing, because the remedy correctly opposes this damming-up process that occurs in rheumatism and gout. In this way we look both at what is taking place outside in nature and at what takes place within the organism, and then we arrive at an idea of how we should guide the healing forces.

On the other hand we can see instances when the breakdown processes proceed in such a way that the organism cannot restrain them so that they pour themselves downward, and the rhythmic system does not press them back in the right way; they thus reach the periphery of the body pressing outward, as it were, toward the skin. Then we get inflammatory conditions on the outer portion of the human being, we get skin eruptions and the like. If we now look hack again to our *plant*, to the *betula alba*, we find the opposing process in the disposition of the potassium salts in the birch bark: we thus become able to see how we can fight against the process of skin eruption, which is an excessive function of exudation within the human being, by preparing a remedy from the birch bark.

Therapeutic Insights: Earthly and Cosmic Laws

Lecture I *Dornach, June 24, 1921*

Now, the influence of the forces of other planetary bodies is less perceptible to our modern scientific consciousness. However, if one were to study more closely — as is to happen now in our scientific-physiological institute in Stuttgart — the line of growth followed on the stem by the leaves of plants, for example, one would find how each line is related to the movements of the planets, how these lines are, as it were, miniature pictures of the planetary movements. One thus would find that many things on the surface of the earth are comprehensible only when one knows the extraterrestrial and does not merely identify the extraterrestrial with the earthly, that is to say, when one presupposes that a lawfulness exists that is cosmic and not earthly.

We therefore can say that we have a second lawfulness within cosmic existence. Only when one begins to study these cosmic influences — and it is possible to do so quite empirically — will one have a true botany. Our *plant* world does not grow up out of the earth in the way conceived by a materialistic botany; rather it is *pulled* out by cosmic forces. What is pulled out in this way by cosmic forces in the process of growth is then permeated by the mineral forces that have saturated this cosmic *plant* structure so that it becomes visible to the senses. We thus can say firstly that the *plant* world is included in this cosmic lawfulness. Secondly, all that pertains to the inner movement of man — that

is, a definitely physical movement, but within man — is included in this cosmic lawfulness (this is not as easy to establish as in the case of the *plant* world, because it achieves a certain independence from the rhythm of the outer processes; nevertheless, it imitates this rhythm inwardly). The outwardly moved human being, therefore, is included in the earthly lawfulness, but when you look upon your digestion, upon the movement of the nourishing substances in the digestive organs, when you look beyond merely the rhythm to the actual movement of the blood through the blood vessels — and there are many other things that move inwardly in man — you have a picture of what moves inside of the human being regardless of whether he is standing still or walking about. This cannot be integrated into the earthly lawfulness without further consideration but rather must be integrated into the cosmic lawfulness in the same way as are the forms and also the movements of the plants; in the human being, however, these forms and movements proceed much more slowly than they do in the plants. We therefore can say that the inner movements of man are also included in the cosmic lawfulness.

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Human Questions and Cosmic Answers

Schmidt Number: S-4883 1 July 1922

If I am to sketch it diagrammatically, it will be somewhat like this (a drawing is made on the blackboard): Here is the earth, with some accumulation of slate-formation on it, and then the plants growing out of the earth towards the outer universe. Spatially, the plants need by no means coincide with the slate-formation, just as, for instance, a thought, which is based on the instrument of the brain, need not coincide with a movement of the big toe. We are not concerned here with spatial coincidence, but with apprehending the nature of the slate-formation when we try to do so not only through chemical and physical examination, but also through penetrating to the essence of this slaty formation by means of spiritual investigation. Then we shall come to the conclusion: If the forces inherent in slaty matter were to act upon the earth only by themselves, they would have to be connected with a condition of life which develops in precisely the same way as the *plant*-world.

The *plant*-world develops in such a way that it represents only physical corporeality, etheric corporeality; that is, in the actual plants themselves. But when we come to the astral element of the *plant*-world, we must imagine this astral element of the *plant*-world as an astral atmosphere which encompasses the earth. The plants themselves have no astral bodies, but the earth is enveloped in an astral atmosphere, and this astrality plays an important part, for instance, in the process of the unfolding of blossom and fruit. The terrestrial *plant*-world as a whole, therefore, has one uniform, common astral body which nowhere interpenetrates the *plant* itself, except at most in a very slight degree when fructification begins in the blossom. Generally speaking, it floats cloud-like over the vegetation and stimulates blossom and fruit formation.

What unfolds here would fall into decay but for the astral forces which emanate from the rock-material of the slate-formation. Thus we have in the slate-formation all that which tends to turn the whole earth into one organism. Indeed, we must see the relation of the plants to the earth as being similar to that of our hair to ourselves, as being of one and the same order. And what holds this whole organisation of the world together are the forces that radiate from the rock-material of the slate-formation.

Human Questions and Cosmic Answers

IV 2 July 1922

[The Countenance of the Earth
-or-
Man's Relation to the Surrounding World, Schist(slate), Lime, Carbon, etc.]

I have lately been describing to you man's relationships to the surrounding world, as they appear when we turn our attention away from the earth and more to the starry world, especially to the world of the planets. Today I should like to add, aphoristically at least, some of the observations and experiences gained by spiritual vision concerning man's relationship to his immediate earthly environment.

In the ordinary way man looks at things in his environment without discrimination and arrives at fallacious conceptions of being and reality. Let me remind you of what on various occasions I have already given as an illustration. When we look at a rock-crystal, we can say, from an earthly point of view: "This crystal is a self-contained entity." In its finished form we can always see something complete in itself.

This is not so, if, for instance, we pick a rose and take it into our room. As a rose with its stem, just by itself, it is altogether unthinkable within the compass of earthly existence. It is thinkable only while it is growing on its stem on the rose-bush with its branches and roots. In other words, to speak in accordance with reality, we must not call the rose an entity in the same sense as a rock-crystal. For in terms of reality we must speak in that way only of something which, relatively at least, can exist in itself. Certainly, from a different aspect, the rock-crystal cannot be regarded as something that has an independent existence either, but then it is seen from a different point of view. For simple observation, the rock-crystal as a conceptual entity is quite different from the rose.

Unfortunately, far too little attention is paid to such things, and this is why human thinking is so far from grasping reality and men find it so difficult to bring clear concepts to bear upon what spiritual observation has to say. Clear concepts could be attained easily enough if only people would pay the necessary attention to such simple matters.

When we reflect upon our immediate earthly environment, we find, to begin with, various kinds of soil on the surface. If you look round in our own neighbourhood, you find limy soil. Further south you find slaty kinds of soil. I will confine myself, first, to these two main kinds of earth: the limy kind, the lime-formation which, especially as Jura-limestone, you can observe here in our immediate surroundings, and the slate-formation, where the rock, the mineral, is not in such a compact form as in the limestone-formation, but where it is schistous. Just think of shale, even of gneiss, of mica-schist and the like, which you find in the central Alps. Here are two great and important opposites: slate-formation and lime-formation.

Judged by present-day conceptions, these mineral deposits represent something that can be explained only in terms of mineral-physical laws. No account is taken of the fact that the earth is one whole. Let us consider the science of geology as it is today.

The different kinds of earth, the deposits of ore, of metals, of minerals in general in the various earth-layers are observed. But the earth is not regarded as if it were also a dwelling-place for the living world of plants and human beings. To have such a conception of the earth is rather like regarding the human skeleton as having an independent existence. Taking a human skeleton by itself, you must, to be correct, say: that is not a self-contained entity. Nowhere in the world can such a thing as a human skeleton originate by itself. It exists as the remains of a

whole human body, but it could never materialize without the supplementary action of muscles, nerves, blood and so on. Therefore we must not look upon the human skeleton as an independent entity or attempt to explain it as such.

Nor is it possible for anyone who thinks in actualities, and not in abstractions, to apprehend the earth with its various rock-formations without reflecting that the earth is a totality; that the *plant*, animal and human kingdoms belong to it, just as muscles, blood and so on belong to the human skeleton.

We must therefore be clear in our mind what it means to study the earth in terms of geology. It means forgoing at once any chance of reaching realities. We do not arrive at anything real. We arrive at something that can be found within a planetary being only when this contains the *plant*-world, the animal world and the human world.

If, first of all, we observe what, as part of the earth-skeleton, pervades the earth as slate-formation, we see that its external appearance differs very considerably from that of the concentrated compactness of the lime-formation. And indeed, if we make use of the methods which have been applied to the broad outlines of earth-evolution in my book ***Occult Science***, we have to trace the difference between the slate and lime formations to the relation between one or other of these to man, to animal existence, to *plant*-existence. We must see how what belongs to the earth as soul-and-spirit is related to these rock-materials.

We cannot understand a human skeleton if we do not connect it ultimately with man's will-nature; and we cannot understand the slate-formation, or the lime-formation, unless we connect them with the tasks which these formations have to perform for what is also present in earth-existence as spirit-and-soul. And then we find an intimate connection between all that is slate-formation and *plant*-life; between all that is lime-formation and animal-life.

Certainly, as the earth is today, the mineral element contained in slaty matter can naturally be found also in the plants. The mineral substance to be found in animal matter has its origin in very diverse formations. But that is of less importance just now; the important thing is that to spiritual observation and to spiritual experience the particular way in which *plant*-life, the whole *plant*-world, belongs to the earth, reveals itself as having a certain special relationship to the slate-formation.

If I am to sketch it diagrammatically, it will be somewhat like this (a drawing is made on the blackboard): Here is the earth, with some accumulation of slate-formation on it, and then the plants growing out of the earth towards the outer universe. Spatially, the plants need by no means coincide with the slate-formation, just as, for instance, a thought, which is based on the instrument of the brain, need not coincide with a movement of the big toe. We are not concerned here with spatial coincidence, but with apprehending the nature of the slate-formation when we try to do so not only through chemical and physical examination, but also through penetrating to the essence of this slaty formation by means of spiritual investigation. Then we shall come to the conclusion: If the forces inherent in slaty matter were to act upon the earth only by themselves, they would have to be connected with a condition of life which develops in precisely the same way as the *plant*-world.

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has one uniform, common astral body which nowhere interpenetrates the *plant* itself, except at most in a very slight degree when fructification begins in the blossom. Generally speaking, it floats cloud-like over the vegetation and stimulates blossom and fruit formation.

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In due course these things will also be substantiated by natural science. It will, for instance, be said: Man has his physical body and his etheric body. His organisation as a whole is based on a *plant*-existence. Man can in fact be regarded as a *plant*-being on which has been superimposed what is animalistic and human.

When the human being in health or illness is treated with mineral substances deriving from slate-formations, it will be possible to perceive, even externally, the action of these particular minerals; and it will be of special importance to know which types of disease in the human organism are due, for example, to over-exuberance of the *plant*-element.

Over-exuberance of the *plant*-element must always be combated by treating the affected person with schistous mineral substance. For everything that belongs to this slate-substance keeps the *plant*-element in man — if I may put it that way — in a normal condition, in the same way as it perpetually normalizes *plant*-existence on earth. The *plant*-life of the earth would tend to spread with over-exuberance into outer cosmic space were it not kept in check by the radiations from the mineral-forces of the slate-formation. One day, people will have to study from this point of view a living geography and geology of the earth; it will be realised that a study of what constitutes the skeleton of the earth, as it were, must be pursued not only from the geological angle, but in relation to the being of the earth as a whole; in relation, also, to its organic life and its nature of soul-and-spirit.

Now the entire *plant*-world is intimately bound up with the sun-forces, with solar action. The effects produced by the sun are not confined to the emanations of warmth and light radiating from the etheric-physical rays of the sun, for the warmth and light are permeated through and through by spirit-and-soul. These forces of spirit-and-soul are allied with those pertaining to the slate-formation. That in a certain way everything of a slate-nature is spread all over the earth is connected with the fact that *plant*-life on the earth exists in manifold forms. The spatial aspect is — as I said — of no immediate importance; it must not be imagined, for example, that the slate-formation has to be here or there in order that plants may grow out of it. The radiations of the slate-formation stream out; they are carried all over the earth by all kinds of currents, especially magnetic currents, and on these earth-encircling radiations of the slate-formation, the plants live. Where, on the contrary, the slate-formation is in itself developed to the highest degree, *plant*-life cannot thrive today because there the life-forces of the plants are drawn too forcibly into the earthly element and therefore cannot unfold. There, the forces which fetter the *plant* to the earthly element are so overpowering that the unfolding of *plant*-life — in which the cosmic forces must also play their part — is prevented.

To account for the nature of the slaty element in the earth is possible, therefore, only if one can go back, in the sense in which it is described in my ***Occult Science***, to the time when the earth itself had a Sun-existence. It was then that the slaty element within the earth was being prepared. At that time, when the earth had a Sun-existence, the physical part of the earth had advanced only to a state of sprouting *plant*-life. The Sun-existence

was such that no definite plants or animal beings could develop there. Plants as they are today were non-existent, but the earth itself had a kind of *plant*-existence, and out of this *plant*-existence there emerged on one hand the *plant*-world, while on the other hand a hardening took place of what in the *plant*-world are also formative forces, a hardening into slate-formation.

When, however, we look at the lime-formation, it reveals itself to super-sensible vision as intimately connected with all that permeates animal existence on the earth with — shall I say — independence. The *plant* is tied to the ground, is connected with it, as our hair is connected with the skin on which it grows. The animal moves about. But the radiations of the lime-formation are connected less with this movement as such, which is a local movement, than with the independent build of the animal-form.

When you look at a *plant* you can see that with its root it turns earthwards; it grows into the earth — is, as it were, drawn towards the centre of the earth — and then unfolds outwards. The *plant*'s structure gives a clear indication of its complete adaptation to earth-existence. Naturally, a more complicated *plant* form calls for a more complicated description, but on the whole it remains essentially the same. The *plant* is not independent. Where it enters the soil it contracts, unites itself with the earth; where it rises up it spreads out and turns towards the light that radiates in all directions. This structure of the *plant* is best understood if studied in connection with its intimate relation to the *plant*'s position in respect of the earth.

It is true that in their basic design some features of the animal form — for instance the horizontal position of the spine, the functioning of the limbs in a downward direction — point to an adaptation to earth-existence. All the same, by its natural form the animal has detached itself and has become independent of the earthly. You can discern in every animal-shape not only its adaptation to the earthly element, like that of the *plant*, but something entirely independent, a form set in itself. The fact is that even in respect of its structure the animal has been released from the grip of the earth.

Now super-sensible observation has revealed that everything that radiates from the light of the moon, everything that streams as reflected sunlight from the moon on to the earth, and also streams into our thought-life as formative force — all this works, too, in the shaping of the animal forms. Essentially, all that is indeterminate, formless will-force in the animal is to be found within the sphere of the direct light from the sun. But all that gives the animal its independent form, which is not adapted to the earthly element, is, in the true sense of the word, woven out of the gleaming moonlight.

All forms on the earth are shaped by the moon-forces. That the animals have different forms is due to the fact that the moon passes through the signs of the Zodiac. According to whether the moon stands in the sign of the Ram or the Bull or the Twins, the lunar formative forces act in their different ways on the animal world. This also establishes an interesting connection between the Zodiac and the animal form itself, of which the ancient dream-like wisdom was dimly aware. What draws these forms down on to the earth — forms which would otherwise dissipate into a kind of fog enveloping the earth — are the forces streaming from the lime-formation. The mineral element on earth does not radiate from radium only. Thus on the one side we have in the slate-formation that which binds the *plant* to the earth, and in the lime-formation that which draws from the moon-forces all that lives in the specific build of animal-forms. And so spiritual perception tells us how the slate-formation on the earth is connected with the structural nature of the *plant*-world, how the lime-formation is connected with the structural nature of the animal-world.

We must realise that such attributes as we find, for instance, in the lime-formation are also to be found in every detail of organic life. It can be observed quite exactly, if one is properly equipped for such investigations, that there are, for example, people who show a marked tendency to skeleton-formation. I do not mean that they have a strong skeleton, but that they have many lime deposits in the rest of their organism as well. There are, if I may say so, people who are richer or poorer in lime content.

But you must not think of this in a grossly material sense; it should naturally be conceived as being present in a homeopathic form, but it is of great significance. People with a greater lime content are as a rule cleverer, capable of forming a combination of subtle ideas and of resolving them again under the scrutiny of searching analysis. You must not think that by saying this I am giving a materialistic explanation of the human being. I should naturally never dream of doing any such thing; for the fact that one person deposits more lime than another is connected with his karma. So it is that in both past and future everything has its connection with the spiritual. And a truly penetrating knowledge of the world is not based on any vague talk about the "spiritual" and the "material," but on a mental outlook which recognises how the spiritual works creatively by shaping out of itself the material world. A man who, as the result of his former earthly lives, has acquired a predisposition for becoming a particularly clever person in his next incarnation, for example a particularly good mathematician, develops between death and a new birth those forces of spirit-and-soul which later deposit the lime-substance in him.

We have to be dependent on lime deposits within us if we want to become clever. We have to rely more on deposits of clay-substance — which exists for instance in slate-formations — if it is primarily a matter of developing the will.

There can be no true conception of the material unless it is understood in its constant interrelation with the spiritual. We can say, therefore, that the lime-formation carries those radiations and currents which are concerned not only with building up animal life in all its forms on the earth, but also with providing the material foundation we need for the shaping of our thoughts. Outside in space are the manifold animal forms; within us, in our intellect, are the thought-forms. These are, in fact, the animal forms projected into the spiritual. The entire animal kingdom is at the same time intellect. And this whole animal kingdom projected into man's inner life, so that it appears there in mobile thought-forms, is the intellect. But as the animal kingdom needs the lime-formation to build up its forms in the outer world, so we need, as it were, a fine inner lime deposit, a lime formation, in order to become clever.

This must, of course, not be carried too far. If a man were to deposit lime in excess, he would forfeit his cleverness; it would not remain his own. He would, as it were, bring about an objective cleverness in which his own personality would have no part. Everything has its limits. And as we follow up these things further, we come to interesting discoveries about the extent to which the mineral element plays its part in the life of man, animal and *plant*. When we consider all that works in us as lime-forces we are led — as I have said — to what struggles for expression in the formative forces and helps us to develop inner firmness.

Man's connection with the forces of clay, of the clay-slaty element, on the other hand, leads him to fight against this inner firmness; to dissolve it, liquefy it and make it *plant*-like. Man is always in a sense the embodiment of a kind of interaction between the lime element and slate element — by which, of course, I mean the inner forces they contain.

Now we can look more closely at the slate element. In much of it we find flint and silicious substances, especially those to be found in the rock-crystal, in quartz. In their radiations and currents the forces of quartz are also fully active in man himself; and if he possessed only these quartz-like forces which he takes in with the harder slaty element, he would be in constant danger of his spirit and soul striving to return to what he was in his pre-earthly life. The quartz element always wants to draw man away from himself, to take him back again to his still unembodied being. To counteract this force, another force is needed, and this is the force of *carbon.*

Man has carbon working in his organism in manifold ways. Carbon is observed by natural science today only in its outer aspect, merely by physical and chemical means. In reality, carbon is the element which makes us always remain with ourselves. Carbon, in a sense, is our house; we dwell in it; while silica always wants to take us back in time to where we were before we took possession of our carbon-house.

This means that a constant struggle is waged in us between the forces of carbon and those of silica. And our life is woven into this battle. If we consisted only of carbon — for instance the physical *plant*-world has its foundation in carbon — we should be completely earth-bound. We could not have the slightest inkling of our extra-terrestrial existence. The fact that we can know about it we owe to the silica element in us.

If one has insight into all this, one also discovers the healing forces contained, for instance, in silica, in quartz or flint. Where an excessive inclination towards carbon causes a man to become ill — this applies, for example, to all cases of illness due to certain deposits of metabolic products — then silicious substances provide the remedy. Especially when the deposits are peripheral or in the head, the healing properties of the silica element are a strong antidote.

You can see that if one gets to the heart of these matters, with a comprehensive knowledge that combines nature-knowledge and spiritual knowledge, seeking the spiritual in all purely material things, and finding the material again in all that is spiritual, the spiritual being conceived as creative power — you can see that only such knowledge can furnish a clue not only to an understanding of human existence but also to the methods which must be applied when human existence suffers from functional disturbances.

A point of special importance is that attention should be paid to what lives as the nitrogen element in man, to nitrogen as such and to its combinations. The fact that man has nitrogen in his system enables him, as it were, to remain always open to cosmic influences. This again I can best illustrate by a diagram. — Let us assume that this represents the human organism. (A sketch is made on the blackboard.) The fact that man has nitrogen, or bodies containing nitrogen, in his organism, ensures that the laws governing the organism keep, as it were, within their confines everywhere; along these lines (in the diagram) indicating the nitrogen in the body, the latter ceases to impose its own laws. This allows the cosmic laws to enter freely everywhere. Along the nitrogen-line in the human body the cosmic element asserts itself in the body. You can say: As far as nitrogen is active in me, the cosmos, right to the most distant star, works in me. What there is of nitrogen-forces in me draws the forces of the whole cosmos into me. If my organism had no nitrogen-content, I should be shut off from everything that comes in from the cosmos." And when it is important that the cosmic forces should unfold in a special way, for example in human propagation when in the body of the mother the embryo develops — the embryo which as you know, is moulded from the cosmos — this is made possible only because the nitrogen-containing substances open the human being to the influences of the cosmos. But everything in the universe and in human existence is so ordered as not to go to extremes. Indeed, if one-sided action were allowed to prevail, everything would lead to extremes. If nitrogen, which impels man always to expand, spiritually, into cosmic space, could exert its full force on the

human organism, it would work together with the silica element — which induces man, I might say, to lose himself in the spiritual past — and the effect would be that man would constantly lapse into unconsciousness.

Now it is always interesting when observing anything in nature or in man to find that important things play a double role. Thus the lime element, which gives man the physical stamp for cleverness, also counteracts the effect of nitrogen. So that we can say: On the one hand, silica and carbon form polaric opposites in man; on the other hand, nitrogen and lime do the same:

Silica — Carbon.

Nitrogen — Lime.

The lime substances in man so regulate him that he always re-asserts his own organisation in face of the force which, through the medium of nitrogen, seeks to work into him from the cosmos. Through nitrogen, the cosmic forces enter; through lime-action, that which issues from the human organism opposes and balances it. So that in many different places in the human body an influx of cosmic forces and likewise an expulsion of cosmic influences takes place. It is a ceaseless pendulum-movement: nitrogen effect — lime effect, lime effect — nitrogen effect. Thus we can not only relate man to the starry world, but also give him his place in his immediate earthly environment.

In the last number of the periodical *Das Goetheanum*, I used an aphorism to emphasise that in reality materialism as a world-conception does not arise from the fact matter is too well known; on the contrary, too little is known about it. What is really known about carbon? That it is to be found in nature as coal, as graphite, as diamond. These bodies are then described according to their physical characteristics. But it is not known that carbon is the element which holds us firmly within ourselves, so that we are a self-contained human organism, and that this is constantly challenged by the silica element, which seeks to draw us away from ourselves.

We learn to understand matter only when we learn to know it also from its spiritual aspect there is matter it is penetrated by spirit. You get nowhere if you are content with a vague, nebulous play of fancy and declare: where there is matter there is spirit. It is not sufficient to know: lime, silica, carbon, nitrogen, contain spirit — that goes without saying, but it is not enough. One must also know how the different substances are, as it were, embodiments, "substantiations" of spiritual processes. One must also be able to see how the lime element acts on the inner organisation of man; how the nitrogen element always aims at permeating him with cosmic impulses.

The plants, which must always maintain a relationship to the cosmic element as they grow up from the earth out into the cosmos, need nitrogen-combinations for their growth; and it will be possible to study *plant*-growth, too, in the right way if proper attention is paid to the relevant connections just mentioned. These matters have, in the first place, their scientific side; we learn to know the world only when we understand the true nature of things; but they also have their practical side. And one really never gets beyond the most primitive aspects if one cannot assess things in their wider connections. One will then have to go into details and find out how the required nitrogen-combinations enter into *plant*-growth. As you know, this alone is a very important subject of study; but in agriculture, too, this study can be complete only if pursued by the methods of spiritual science. Spiritual science alone is the true science of reality.

You see, everything I have been describing has to be re-established through the methods of spiritual science as they are available today and as they will be more and more developed in the future. For an older science

received these things through a kind of dreamlike clairvoyance. We must attain a *fully conscious clairvoyance*. This, as you know, is a subject I have dealt with on very many occasions.

Today we cannot simply imbibe again the things that once became known to men with the aid of a quite different human make-up. It is, of course, folly for people to devote all their studies to ancient science, for that will not help them to understand things. The ancient things themselves cannot be understood either, unless they are illumined spiritually in the right way. And yet it is remarkable how practically everywhere today the scientific mind, through a kind of instinct, turns to what was once found through dreamlike clairvoyance.

Take a specific case. The old Initiates took for granted the presence of lead everywhere in earthly existence — because to the radiation of lead they attributed what works in the human form from the extreme top, from above downwards. In the widely distributed lead on earth they saw something that is connected with the inner structure of man, especially also with human self-consciousness. Naturally, the modern materialist would say: But lead has nothing to do with the human organism. In answer to that the old Initiate would have told him: It is certainly not, as you imagine, the gross lead-substance that we have in mind, but the forces emanating from exceedingly fine lead-constituents; and such lead is very widely distributed. That is what the ancient Initiate would have said.

What does the modern student of natural science say? He says: There are minerals which give off radiations, among them the so-called radioactive ones. The radiations of uranium are, of course, known; it is known that certain rays — alpha rays they are called — stream out; then, the remaining part, in the course of further radiation, undergoes certain changes, even comes to possess — as the chemists say — a different atomic weight. Briefly, in radioactive matter, transmutations take place. In fact there are people today who are already talking about a kind of revival of the old mystical metamorphoses of matter. But now, those who have investigated such matters say: These radiations give rise to something which appears as a terminal product, no longer radioactive, and this has the properties of lead. Thus you can learn strictly from the investigations of modern science that there are radioactive substances; within the source of these radioactive radiations there is something which, in accordance with its inherent forces, is in course of formation. There is always a lead-content at the bottom.

You see, the researches of modern natural science are getting critically near to ancient initiation-Science. And just as today modern scientists cannot help discovering the presence of lead right under their noses, as it were — or at least under the noses of their physical instruments — so they will also find out things about the other metals. Then it will gradually dawn upon them what was meant when it was said that lead is to be found everywhere in nature. You see, it is only through spiritual science that one can discern what is implicit in the discoveries of natural science — discoveries with which, in the context of ordinary general knowledge, one hardly knows what to do.

But now we still have to consider something important in this field: You know that the air which belongs to the immediate surroundings of our earth consists of oxygen and nitrogen, Nitrogen is, to begin with, of little use for our physical life. Oxygen we inhale; in the body it undergoes a change and carbon dioxide is formed, which we exhale. So the question might arise: Then what exactly is the main importance of nitrogen, which does not enter into chemical combination with oxygen, but lives out there in a kind of intimate mixture with oxygen? In nitrogen we cannot live; for that, we need oxygen. But without nitrogen our ego and our astral body when outside the physical body during sleep, could not exist. We should perish between going to sleep and waking if we could not immerse ourselves in nitrogen. Our physical body and our etheric body need the oxygen from the air; our ego and astral body need nitrogen.

The nitrogen is a substance which brings us into intimate connection with the spiritual world. It is the bridge to the spiritual world in the state in which our soul lives during sleep. Take what I said before, together with what I have now said about nitrogen. Nitrogen draws the cosmic element in from the circumference. From within us, it prepares us for the cosmic element. Outside, it allows those parts of us which are not properly of the earth to live in themselves, so to speak, as forces of spirit-and-soul. Hence it is not for nothing that there is a considerable admixture of nitrogen in the air, for nitrogen carries the physical death-forces and the spiritual life-forces of earthly existence. And when between falling asleep and waking we escape from the physical death-forces to another existence in our soul-life, we immerse ourselves in the nitrogen-element, which forms the bridge between our life of spirit-and-soul and the cosmos. With our earthly-personal existence we are rooted in carbon; with our life of soul-and-spirit, in nitrogen. In earthly existence, carbon and nitrogen are related to one another and to man as I have just described.

Look at carbon; it is contained in ordinary coal, in graphite, in the diamond. These are three different forms in which carbon can occur. What you see as carbon in the black, sooty coal and in the diamond and in graphite, we also carry within us in a different form. We are — not to a very great extent, it is true, but to a small extent — a little piece of diamond and this holds us firmly within our earthly house. That is where our spirit-and-soul are at home when within the body.

Nitrogen, which occurs in the various nitrogen-compounds, nitric acid, and in saltpeter and so on, is the element which always allows us to emerge from ourselves, as it were. As I said, it forms the bridge to the spirit-and-soul element in the cosmos. This too must be discovered again through the new spiritual science. It was once within the realm of earthly knowledge, but only in a dreamlike way. It was perceived with the old clairvoyance by the ancient Initiates.

As I have often said, true respect for an ancient Initiate begins when we rediscover things we cannot learn from tradition. Only when we can find them ourselves can we also value them as tradition. And as we proceed to rediscover them, we also feel a true reverence for what was once the primeval wisdom of mankind.

At the next opportunity I will speak about the connection between all these rediscoveries and the Mystery of Golgotha.* For this, I needed spiritual-scientific and natural-scientific premises; and after all, these deliberations will in themselves have helped to throw light on a number of questions concerning the world and human existence.

The attention of readers is called particularly to the following two Lecture-Courses given by Rudolf Steiner:

Man and the World of Stars (7 lectures, 26th Nov. – 26th Dec. *1922; The Spiritual Communion of Mankind* (5 lectures, 23rd – 31st Dec. *1922*.)

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I want you now to follow me in a brief line of thought. I give it merely by way of example, but it will show you the path that must be followed. Take the annual *plant* which grows out of the earth in spring and passes through its yearly cycle. And now relate the phenomena which you observe in the annual *plant* with other things — above all with the custom of peasants who, when they want to keep their potatoes through the winter, dig pits of a certain depth and put

the potatoes into them so that they may keep for the following year. If the potatoes were kept in an ordinary open cellar, they would not be fit to eat. Investigations have proved that the forces originating from the interplay between the sunshine and the earth are contained within the earth during the subsequent winter months. The dynamic forces of warmth and the forces of the light are at work *under* the surface of the earth during the winter, so that in winter the after-effects of summer are contained *within* the earth. The summer itself is around us, above the surface of the Earth. In winter, the after-effects of summer work under the earth's surface. And the consequence is that the *plant*, growing out of the earth in its yearly cycle, is impelled to grow, first and foremost, by the forces that have been poured into the earth by the sun of the previous year. The *plant* derives its dynamic force from the soil. This dynamic force that is drawn out of the soil can be traced up into the ovary and on into the developing seed. So you see, we arrive at a botany which really corresponds to the whole physiological process, only if we do *not* confine ourselves to a study of the dynamic forces of warmth and light during the year when the *plant* grows. We must take our start from the root, and so from the dynamic forces of light and warmth of at least the year before. These forces can be traced right up into the ovary, so that in the ovary we have something that really is brought into being by the forces of the previous year.

Now examine the *leaves* of a *plant*, and, still more, the *petals*. You will find that in the leaves there is a compromise between the dynamic forces of the previous year and those of the present year. The leaves contain the elements that are thrust out from the earth and those which work in from the environment. It is in the petals that the forces of the present year are represented in their purest form. The colouring and so forth of the petals represents nothing that is old — it all comes from the present year.

You cannot follow the processes in an annual *plant* if you take only the *immediate* conditions into consideration. Examine the structural formations which follow one another in two consecutive years — all that the sun imparts to the earth, however, has a much longer life. Make a series of experiments into the way in which the plants continue to be relished by creatures such as the grub of the cockchafer, and you will realise that what you first thought to be an element belonging to the present year must be related to the sun-forces of the previous year. — You know what a prolonged larval stage the cockchafer passes through, devouring the *plant* with relish all the time.

These matters must be the subject of exact research; only the guiding principles can be given from the spiritual world. Research will show that the nature of the substances in the petals and leaves, for instance, is essentially different from that of the substances in the root or even the seed. There is a great difference between a decoct ion prepared from the petals or leaves of plants and an extract of substances found in roots or seeds. The effect of a decoction prepared from petals or leaves upon the digestive system is quite different from that of an extract prepared from roots or seeds. In this way you relate the organisation of man to the surrounding world, and all that you discover can be verified in a purely material sense. You will find, for instance, that disturbances in the process of the transition of the chyle into the etheric organisation, which is brought about by the system of heart and lungs, will be influenced by a preparation decocted from the *petals* of plants. An extract of *roots* or *seeds* influences the wider activity that works on into the vascular system and even into the nervous system. Along these lines we shall discover the rational connection between what is going on within the human organism and the substances from which our store of remedies may be derived.
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How, then, can we approach therapeutically everything that radiates out in such a complicated way from the kidney system, from the liver system? We simply need to call forth changes by working on it from outside. We can approach it if we hold fast to what can be observed in the *plant* — I mean, the contrast between the principle of growth that is derived from the preceding year or years, and those principles of growth that stem from the immediate present. Let us return once more to the *plant*. In the root and up to the ovary and seed-forming process we have what is old in

the *plant*, belonging to the previous year. In everything that develops around the petals we have what belongs to the present. And in the formation of the green leaves the past and the present are working together. Past and present, as two component factors, have united to produce the leaves.

Now everything in nature is interrelated, just as everything is interrelated in the human organism, in the complex way I have described. The point is to understand the relationships. Everything in nature is related reciprocally, and by a simpler classification of these relationships revealed in the *plant* we come to the following.

In the terminology of an older, more instinctive medicine (which we by no means want to renew; I only mention it so that we can understand one another better), we find constant mention of the sulfurous or the phosphoric. These sulfurous or phosphoric elements exist in those parts of the *plant* that represent the forces of the present year — in the blossom, not in the ovary and stigma. When you therefore make a tea from these particular organs of the *plant* (thereby extracting also what is minerally active in them) you obtain the phosphoric or sulfurous aspect. It is totally incorrect to imagine that the doctors of ancient times thought of phosphorus and sulfur in the sense of modern chemistry. They conceived of them in the way I have indicated. According to ancient medicine, a tea prepared from the petals of the red poppy, for instance, would have been “phosphoric” or “sulfurous.” On the other hand, in a preparation derived from a treatment of a *plant*'s leaves (naturally you get totally different results depending on whether you use pine needles, for example, or cabbage leaves for your decoction) we get the mercurial element, as it was called in ancient terminology. This mercurial element is not the same as what is also called quicksilver. And everything that is connected with the root, the stem, and the seed was for ancient medicine connected with the salt-like element.

I am saying these things only for the sake of clarity, for with our modern natural scientific knowledge we cannot go back to older conceptions. A series of investigations should be made to show, let us say, the effects of an extract prepared from the roots of some *plant* on the head organization, and hence on certain diseases common to childhood.

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We must be clear from the outset that the *plant* covering of our earth is passing through the opposite process from that which takes its course within the human being. When we speak of a process of vitalization along the path taken by human nourishment through the organism, we have to do with an ascending curve, a curve ascending from the essentially inorganic, as it were, to the state of vitalization — to the living state — and from there to a condition that can be the bearer of sensation and finally to a condition that can be the bearer of the ego organization. When we speak of working through our nourishment up to the point where it is received into the astral organism, to the point where it is received into that which bears the world of sensation, we are speaking about a process of increasing enlivening of what is taken in through nourishment.

The reverse occurs in the *plant*. In all the peripheral organs of the *plant*, that is to say in the development of the *plant* from below upward, in the production of the leaf and blossom processes, we have a process of devitalization, fundamentally speaking. The vitality is preserved for the seed alone. If we are speaking about the initial *plant* — for the seed in the ovary really represents the next *plant* that will come into being, that which is stored up for the future *plant* — **if, as I say, we are speaking of the initial *plant*, vitalization does (not)? take place from below upward. The vitality is sucked up from what is stored by the earth out of the forces of the sun's warmth and light from the previous year. We find the strongest life force in the root nature, and there is a gradual process of devitalization from below upward.**

When we reach the flower petals of plants that contain strong ethereal oils in their blossoms, we have an expression of the most powerful devitalizing process of all. Such a process is often connected with an actual working through of sulfur, for instance. Sulfur is then contained, as substance, in the ethereal oil of the blossom, or it is at least near the ethereal oils of the blossom and is actually responsible for the process whereby the *plant* is led over into the realm of the most weightless inorganic substance — which is still, however, on the borderline of the organic, of the living. It is exceptionally important to realize what we are bringing into our organism when we introduce *plant* substances. **The *plant* is engaged in the opposite process from that which occurs in the human organism.**

If we proceed from this and turn to consider actual illness, we must say to ourselves that the *plant* element — and it is the same with other substances in the outer world, and to a much higher degree with the animal element — is really opposed to what unfolds in the human organism as a tendency to call forth this or that process. When we look into the process of nourishment in the human being without prejudice, therefore, we must admit that all food introduced into the human organism is something that this organism must utterly transform, reverse. Fundamentally speaking, therefore, all nourishment is the beginning of a kind of poisoning. We must be clear, then, that actual poisoning is only a radical metamorphosis of what arises in a mild form when any food is brought into contact, let us say, with the ptyalin. The further course of the digestion, particularly what is brought about by what I have described to you as **the kidney activity, is always a process of eliminating the poisoning**. Thus we pass through the rhythm of a mild poisoning and its elimination when we simply eat and digest our daily food. This represents the most mild metamorphosis of the process that arises in greater intensity when a remedy is introduced into the organism. That is why it is nonsense to be fanatical about medicine that is "free from poison." It is nonsense, because the only point at issue is this: in what way are (we intensifying what already happens in ordinary digestion by introducing something to the human organism that is more foreign to this organism than what we ordinarily digest?

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The Driving Force of Spiritual Powers in World History Lecture VI *22nd March 1923.*

Let us be clear in our minds about the basis of *plant*-life. I have often spoken about this. Let us picture the surface of the Earth and the plants growing out of it. We know that the physical organization of the *plant* is permeated by its ether body. But as I have often pointed out, the *plant* would not be able to unfold if the all-pervading astrality did not contact it from above by way of the blossom (lilac).

The *plant* has no astral body *within* it but the astrality touches it from above. As a rule the *plant* does not absorb the astrality but only allows itself to be touched by it. The *plant* does not assimilate the astrality but towards the blossom and the fruit there is interplay with the astrality which does not, as a rule, combine with the ether-body or physical body of the *plant*.

In a poisonous *plant*, however, it is different. In a poisonous *plant* the astrality penetrates into the actual substance of the *plant* and combines with it. A *plant* such as belladonna or, let us say, henbane, hyoscyamus, sucks in the astrality either strongly or more moderately and so bears astrality within itself — in an uncoordinated state, of course, for if it were coordinated the *plant* would have to become an animal. It does not become an animal; the astrality within it is in a compressed state.

As a result, interaction takes place between what is present in a *plant* saturated with astrality and the processes of assimilation in the animal and human organisms. If we eat plants that are not poisonous, we absorb not only those constituents of the *plant* which the chemist works up in the laboratory, not only the actual substance of the *plant* but also the etheric life forces ; but we must, as I have said here before, destroy the substance completely during the process of nutrition. In feeding an what is living, man must kill it within himself. That is to say, within his own organism he must expel the etheric from the *plant*-substance.

In the lower man, in the metabolic system, the following remarkable process takes place. When we eat plants, that is to say, vegetable substance — the same also applies to cooked foodstuffs but it is specially marked when we eat raw pears, or raw apples, or raw berries — we force out the etheric and absorb into our own ether-body the dynamic structure which underlies the *plant*. The *plant* has a definite form, a definite structure. It is revealed to clairvoyant consciousness that the structure we thus take into ourselves is not always identical with the form we see externally. It is something different. The *plant*-structure rises up within us and adapts itself to the organism in a remarkable way.

And now something very strange occurs. Just suppose — I must speak rather paradoxically here but it is exactly how things are — suppose you have eaten some cabbage. A definite form (blue in diagram) becomes visible in the lower man as a result, and activity is generated there.

To the extent to which this activity is generated in the lower man through the eating of cabbage, the actual negative of the process makes its appearance in the upper man, the head-man. So having sketched the form which appears in the lower part of the organism, I now sketch in the upper man a hollow form (blue, red).

It is actually the case that the eating of the cabbage produces in us a definite form or structure and that the negative of it appears in our head.

And into this negative we now receive the impressions of the external world. This is possible because we have the hollow space within us — I am of course speaking approximately — and all nutritive plants have this effect.

If we have eaten something that is usually known as a foodstuff, the cohesiveness of its form is only strong enough to persist for twenty-four hours, in the course of which we must continually be dissolving it; one period of waking and sleeping dissolves it and it must again and again be formed anew. This is what happens when we have eaten nutritive plants — plants which have a physical body and an etheric body in their natural growth and do not allow the astrality to do more than play around them.

But now let us suppose that we drink the juice of henbane. Henbane is a *plant* that has sucked astrality into itself and consequently has a much more strongly cohesive form. In the lower man, therefore, there is a much firmer form which cannot easily be dissolved and which actually asserts its independence! Consequently the corresponding negative is more pronounced. Now suppose some human being has a brain with a structure that is not properly maintained. He tends to lapse into clouded, somnolent states because his astral body is not established firmly enough in the physical body of his brain. He drinks the juice of henbane and that produces in him a firm *plant*-form which in turn gives rise to a strong negative. And so by energizing the etheric body of his lower body and bringing into it a firm form through the taking of henbane, clearly defined thoughts may arise in a person whose brain was, so to speak, too soft, and the clouded state may pass away. Then, if in the rest of his organism he is strong enough — he may often bc ordered this medicine for his condition — if he is strong enough to rouse the corresponding life-forces into activity and his brain is again in order, a poison such as this may help him to overcome his tendency to lapse into somnolent states.

Cosmic Workings In Earth and Man

On the Growth of Plants

V 31 October 1923 ON THE GROWTH OF PLANTS

Causes Of Infantile Paralysis

(Dr. Steiner asks if anyone has a question.)

Questioner: Dr. Steiner has spoken about epidemics and how they are to be fought. At the present time an epidemic has broken out — Infantile Paralysis — which attacks adults as well as children. Could Dr. Steiner say something about this?

Second Question: Is it harmful for people to keep plants in their bedrooms?

DR. STEINER: As for the question about plants in bedrooms, it is like this. In a general way it is quite correct that the plants give off oxygen which men then breathe in and that man himself breathes out carbonic acid gas. Thus man breathes out what the plant needs, and the plant what man needs. Now, if plants are kept in a room, the following must be remembered:

When one has plants in a room by day, things happen roughly as I have said; during the night the plant does indeed need rather more oxygen. During the night things are rather different. The plant does not need as much oxygen as man, but it needs oxygen. Thus in the darkness it makes demands on that which otherwise it gives to man. Naturally, man is not deprived altogether of oxygen, but he gets too little and that is harmful. Things balance themselves out in nature: every being has something that others need. So it is with plants, if one observes carefully. If the plants are put outside the bedroom when one sleeps, then there is no unhealthy effect. So much for this question.

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Now as to Infantile Paralysis which just recently has become so prevalent in Switzerland too. It is still rather difficult to speak about this illness, since it has only assumed its present form quite recently, and one must wait till it has taken on more definite symptoms. Still, from the picture one can form at present — we have had a serious case of Infantile Paralysis in the Stuttgart Clinic and one can only judge by the cases which have occurred so far — one can say now that Infantile Paralysis, like its origin, Influenza, which leads to so many other diseases, is an extraordinarily complicated thing and can only be fought if one deals with the *whole* body. Just recently there has been discussion in medical circles as to how Infantile Paralysis should be treated. There is great interest in this now, because every week there are fresh cases of the disease. It is called Infantile Paralysis because it is mostly children who are attacked. Yet just recently there was a case of a young doctor who certainly is no longer a child, who was, I believe, perfectly healthy on Saturday, on Sunday was taken with Infantile Paralysis and was dead on Monday. This Infantile Paralysis strikes sometimes in an extraordinarily sudden way and we may well be anxious lest it grow into a very serious epidemic.

Now Infantile Paralysis is certainly connected, like Influenza itself, with the serious conditions of our time. Since we in our Biological Institute in Stuttgart succeeded in proving the effects of the minutest quantities of substance, one must speak about these things, even in public, in a quite different way than formerly. We have in Stuttgart simply shown that when one has any substance, dissolves it, dilutes it greatly, one has a tiny amount in a glass of water. One obtains, say, a 1 per cent solution. A drop of this is taken, diluted to a hundredth of its

strength. It is now one ten-thousandth of its original strength. Again diluting this to one-hundredth of its strength, we have a solution one-millionth of the original strength. In Stuttgart we have succeeded in obtaining dilutions of one in a million, one in a billion — that is, with twelve zeros. You can imagine that there is now no more than a trace of the original substance left, and that it is a question, not of how much of the original substance is left, but of how the solution works: for it works quite differently from the original. These dilutions were made in Stuttgart and they are not so easily imitated. (Perhaps the German Exchange can do it, but nobody else!) This has been done with all sorts of substances. We then took a kind of flower pot, and poured into it in succession the various dilutions. First, ordinary water, then the 1 per cent dilution, then the .1 per cent, the .01 per cent and so on, up to one part in a trillion. Then we put a wheat seed in. This grows, and it grows better in the diluted liquid than in the non-diluted! And the higher the dilution the quicker the growth: one, two, three four, five dilutions — up to twelve. At the twelfth, the growth becomes slower again, then increases again, then decreases again. In this way one finds the effects of minute quantities of substances. It is very remarkable. The effect is rhythmic! If one dilutes, one comes to a certain dilution where the growth is greatest, then it gets less, then again greater — rhythmically. One sees, when the plant grows out of the ground, something works on it together with its substances, something which works rhythmically in its surroundings. The soil environment works into it. That is clearly to be seen.

Now when we are clear that very minute quantities of substance have an effect, we shall have no hesitation in recognising that in such times as the present, when so many men take incorrect nourishment and then rot as corpses in the ground, this works differently. Of course, for the earth as a whole, the effect is very diluted, but still it is different from what happens when men live healthily. And here again, the food which grows out of the earth is a factor.

Naturally, people with grossly materialistic scientific views do not understand this, because they say: What importance can the human corpse have for the whole earth? This effect is very diluted, naturally, but it works.

It will be well if we speak about the whole plant. The health of men is completely dependent on the growth of plants and therefore we must know what really is involved.

I have been greatly occupied with this point in connection with Infantile Paralysis, and it has turned out that one must really concern oneself with the *whole* man. Indications have appeared for all sorts of remedies for Infantile Paralysis. The subject is of great importance, since Infantile Paralysis may play a very grievous role in the future. It is naturally a question which occupies one greatly, and I have in fact given it a great deal of attention. There will probably have to be found a treatment made up of soda baths, iron arsenite ($Fe\ As_2\ O_3$) and of yet another substance which will be obtained from the cerebellum, from the back part of the brain of animals. It will have to be a very complicated remedy. You see, the disease of Infantile Paralysis arises from very complicated and obscure causes and so requires a complicated remedy. These things have become of urgent importance to-day, and it is well that you should understand the whole question of the growth of plants.

The plant grows out of the ground — I will represent it to-day with reference to the question which has been put. (*Dr. Steiner makes a sketch on the blackboard.*) The root grows out of the seed. Let us first take a tree; we can then pass to the ordinary plants. We take a tree: the stem grows up. This growth is very remarkable. This stem which grows there, is really only formed because it lets sap mount from the earth, and this sap in mounting carries up with it all kinds of salts and particles of earth; and so the stem becomes hard. When you look at the wood from the stem of a tree, you have a mounting sap, and this sap carries with it fine particles of earth, and all

sorts of salts too, for instance, carbonate of soda, iron, etc., into the plants and this makes hard wood. The essential thing is that the sap mounts.

What happens, in reality? The earthy, the solid, becomes fluid! And we have an earthy-fluid substance mounting there. Then the fluid evaporates and the solid remains behind: that is the wood.

You see, this sap which mounts up in the tree — let us call it wood-sap — is not created there but is already contained everywhere in the earth, so that the earth in this respect is really a great living Being. This sap which mounts in the tree, is really present in the whole earth: only in the earth it is something special. It *becomes* in the tree what we see there. In the earth it is in fact the sap which actually gives it life. For the earth is really a living Being; and that which mounts in the tree is in the whole earth and through it the earth *lives*. In the tree it loses its life-giving quality; it becomes merely a chemical; it has only chemical qualities.

So when you look at a tree, you must say to yourself: the earthy-fluidic in the tree — that has become chemical; underneath in the earth it was still alive. So the wood-sap has partly died, as it mounted up in the tree. Were this all, never would a plant come into existence, but only stumps, dying at the top, in which chemical processes are at work. But the stem, formed from this sap, rises into the air, and the air always contains moisture. It comes into the moist air, it comes with the sap which has created it, from the earthy-fluidic into the fluidic-airy and life springs up in it anew so that around it green leaves appear and finally *flowers*. ... Again there is *life*. You see, in the foliage, in the leaf, in the bud, in the blossom, there is once more the sap of life; the wood-sap is dead life-sap. In the stem, life is always dying; in the leaf it is always being resurrected. So that we must say: We have wood-sap, which mounts; then we have life-sap. And what does this do! It travels all round and brings forth the leaves everywhere: so that you can see the spirals in which the leaves are arranged. The living sap really circles round. It arises from the fluid-airy element into which the plant comes when it has grown out of the earthy-fluidic element.

The stem, the woody stem, is dead and only that which sprouts forth around the plant is alive. This you can easily prove in the following very simple way. Go to a tree: you have the stem, then the bark, and in the bark the leaves grow. Now cut the bark away at that point; the leaves come away too. At this point leave the leaves with the bark. The result is that there the tree remains fresh and living, and here it begins to die. The wood alone with its sap cannot keep the tree alive; what comes with the leaves must come from outside and that again contains *life*. We see in this way that the earth can certainly put forth the tree, but she would have to let it die if it did not get life from the damp air: for in the tree the sap is only a chemical, no giver of life. The living sap that circulates, *that* gives it life. And one can really say: When the sap rises in the spring, the tree is created anew; when the living sap again circulates in the spring, every year the tree's life is renewed. The earth produces the sap from the earthy-fluidic; the fluidic-airy produces the living sap.

But that is not all. While this is happening, between the bark, still full of living sap, and the woody stem, there is formed a new layer. Now I cannot say that a sap is formed. I have already spoken of wood-sap, living sap, but I cannot again say that a sap is formed: for what is formed is quite solid: it is called *cambium*. It is formed between the bark which still belongs to the leaves, and the wood. When I cut here (*see sketch*) no cambium is formed. But the plant needs cambium too, in a certain way. You see, the wood sap is formed in the earthy-fluidic, the life sap in the fluidic-airy, and the cambium in the warm air, in the warm damp, or the airy-warmth. The plant develops warmth while it takes up life from outside. This warmth goes inward and develops the cambium inside. Or if the cambium does not yet develop — the plant needs cambium and you will shortly hear why — before the cambium forms, there is first of all developed a thicker substance: the plant gum. Plants

form this plant gum in their inner warmth, and this, under certain conditions, is a powerful means of healing. Thus the sap carries the plant upwards, the leaves give the plant life, then the leaves by their warmth produce the gum which reacts on the warmth. And in old plants, this gum, running down to the ground, has become transparent. When the earth was less dense and damper, the gum became transparent and turned to Amber. You see, then, when you take up a piece of Amber, what from prehistoric plants ran down to the ground as resin and pitch. This the plant gives back to the earth: Pitch, Resin, Amber. And if the plant retains it, it becomes cambium. Through the sap the plant is connected with the earth; the life-sap brings the plant into connection with what circulates round the earth — with the airy-moist circumference of the earth. But the cambium brings the plant into connection with the stars, with what is above, and in such a way that within this cambium the form of the next plant develops. [See: ***Man as Symphony of the Creative Word***, Twelve lectures given by Rudolf Steiner in Dornach, 19th October to 11th November, 1923, Rudolf Steiner Publishing Company.]

This passes over to the seeds and in this way the next plant is born, so that the stars indirectly through the cambium create the next plant! So that the plant is not merely created from the seed — that is to say, naturally it is created from the seed, but the seed must first be worked on by the cambium, that is: by the whole heavens.

It is really wonderful — a seed, a humble, modest little seed could only come into existence because the cambium — now not in liquid but in solid form — imitates the whole plant; and this form which arises there in the cambium — a new plant form — this carries the power to the seed to develop through the forces of the earth into a new plant.

Through mere speculation, when one simply puts the seed under a microscope, nothing is gained. We must be clear what parts the sap, the life sap, the cambium, play in the whole matter. The wood sap is a relatively thin sap: it is peculiarly fitted to allow chemical changes to take place in it. The life sap is certainly much thicker, it separates off its gum. If you make the gum rather thick, you can make wonderful figures with it. Thus the life sap, more pliable than the wood sap, clings more to the plant-form. And then it gives this up entirely to the cambium. That is still thicker, indeed quite sticky, but still fluid enough to take the forms which are given it by the stars.

So it is with trees, and so, too, with the ordinary plants. When the rootlet is in the earth, the sprout shoots upward. But it does not separate off the solid matter, does not make wood; it remains like a cabbage stalk. The leaves come out directly on the circumference, in spirals, the cambium is formed directly in the interior, and the cambium takes everything back to the earth with it. So that in the annual plants the whole process occurs much more quickly. In the tree, only the hard parts are separated out, and not everything is destroyed.

The same process occurs in ordinary plants too, but is not carried so far as in trees. In the tree it is a fairly complicated matter. When you look at the tree from above, you have first the pith inside: this gives the direction. Then layers of wood form round the pith. Towards the autumn the gum appears from the other side, and fastens the layers together. So we have the gummy wood of one year. In the next year this is repeated. Wood forms somewhere else, is again gummed together in the autumn, and so the yearly rings are formed. So you see everything clearly if only you understand that there are three things: wood sap, life sap, and cambium. The wood sap is the most fluid, it is really a chemical; the life sap is the giver of life; it is really, if I may so express myself, a living thing. And as for the cambium, there the whole plant is sketched out from the stars. It is really so. The wood sap rises and dies, then life again arises; and now comes the influence of the stars, so that from the thick, sticky cambium the new plant is sketched out. In the cambium one has a sketch, a sculptural activity. The stars model in it from the whole universe the complete plant form. So you see, we come from Life into the Spirit. What is modelled there is modelled from out of the World-Spirit. The earth first gives up her life to the plant, the plant dies, the air environment along with its light once more gives it life, and the World Spirit implants the new plant form. This is preserved in the seed and grows again in the same way. So that one sees in the growing plant how the plant world rises out of the earth, through death, to the living Spirit.

Now other investigations have been made in Stuttgart. These things are extraordinarily instructive. For instance, one can do the following, instead of merely investigating growth — which is very important, especially when one is dealing with the higher potencies, say of one in a trillion — one can do the following. We take metals or metallic compounds highly diluted in the manner previously described, for example, a copper compound solution, and put it into a flowerpot with some earth in it: we put it in as a kind of manure. In another similar flowerpot we put only earth, the same earth without the manure. Now we take two plants, as similar as possible, put one in the pot with the copper manured earth, and the other in the pot without the copper manure. And the remarkable thing is: if the copper is highly diluted, the leaves develop wrinkles on the edges — the others get no wrinkles, if they are smooth and had previously none. One must take the same earth, because many specimens previously contain copper. One dilutes it with copper; the same kind of plants must be taken so that comparisons can be made.

Now we take a third plant, put it into a third pot with earth, but instead of copper, we add lead. The leaves do not wrinkle but they become hard at the top and wither when lead is added. You have now a remarkable sight. These experiments were made in Stuttgart, and you plainly see, when you look at the pots in turn, how the substances of the earth work on plants.

You will no longer be surprised when you see plants with wrinkled leaves somewhere. If you dig in the earth there, you will find traces of copper. Or if you have leaves which are dry and withered at the edge, and dig in the earth, you will find traces of lead. Look at a common plant, say mare's tail, with which people clean pots; it grows just where the ground contains silicon; hence the little thorns. In this way you can understand the form of plants from the nature of the ground.

Now you can see of what importance it is when quite tiny amounts of any substance are mixed in the earth. Naturally, there is a churchyard somewhere outside, but the earth is everywhere permeated with wood sap, and the tiny quantities penetrate everywhere into the ground. And having investigated how these tiny quantities work, of which I have told you, we say: That which disappeared into the earth, we eat it again in our food. It is so strong that it lives in the plant form. And what happens then? Imagine I had thus a plant form from a lead-containing soil. To-day it is said that lead does not arise in soil. But lead *does* arise in soil, if one puts decaying living matter in it. It simply does arise in soil. A plant grows out of it: one may say, a lead-plant. Well, this lead plant when we eat it, has a quite different effect from a lead-less plant. Actually, when we eat a lead plant, our cerebellum, which lies at the back of the head, becomes drier than usual. It becomes drier.

Now you have the connection between the earth and the cerebellum. There are plants which simply through the constitution of the earth, through what men put into the earth and what then spreads everywhere, can dry up the cerebellum. As soon as our cerebellum is not in full working order, we become clumsy. When something happens to the cerebellum we become awkward and cannot properly control our feet and arms; and when the effect is much stronger, we become paralysed.

Thus, you see, is the connection between the soil and paralysis. A man eats a plant. If it has something dying at the edge of the leaves, as I have described to you, his cerebellum will be dried up somewhat. In ordinary life this is not noticed, but the man cannot any longer rightly direct his movements. If the effect is much stronger, paralysis sets in. When this drying up of the cerebellum happens in the head, so that man cannot control his muscles, at first this affects all those muscles which are dependent on a little gland in the head, the so-called pineal gland. If that happens, a man gets influenza. If the evil goes further, influenza changes to a complete paralysis. So that in every paralysis there is something that is inwardly connected with the soil. And so you see knowledge must be brought together from many sides if one is to do anything useful for men. It is useless to make a lot of statements — one must do so and so! For if one does not know how a man has taken into his organism something dying, one may have ever such good apparatus and the man will not recover. For everything that works in the plant and passes over from the plant to the man, is of great importance.

Wood sap develops in man as the ordinary colourless mucus. Wood sap in plants is, in man, mucus. The life sap of the plant which circulates from the leaves, corresponds to the human blood. And the cambium of the

plant corresponds to the milk and the chyle in the human being. When a woman begins to nurse, certain glands in the breast cause a greater flow of milk. Here you have again something in human beings which is most strongly influenced by the stars, namely, *milk*. Milk is absolutely necessary for the development of the brain — the brain, one might almost say, is solidified milk. Decaying leaves create no proper cambium because they no longer have the power to work back into the proper warmth. They let the warmth escape outwards from the dying edges instead of sending it inwards. We eat these plants with an improperly developed cambium: they do not develop a proper milk; the women do not produce proper milk; the children get milk on which the stars cannot work strongly, and therefore they cannot develop properly.

Hence this Infantile Paralysis appears specially among children — but adults can also suffer from it, because men are all their lives influenced by the stars.

In these things Science and Medicine must work together: they must everywhere work together. But one should not isolate oneself in a single science. To-day there are men who specialise in animals — the zoologists; in men — the anthropologists; or in parts of men, with sick senses, or sick livers, or sick hearts — specialists of the inner organs. Then again there are the botanists, who study only plants; and the mineralogists, who study only stones; and the geologists who study the whole earth. Certainly this is very convenient. One has less to learn when one is merely a geologist or when one has only to learn about stones. Yes, but such knowledge is useless when one wants to *do* something for a man. When he is ill, one must understand the whole of Nature. It is useless merely to understand geology or botany or chemistry. One must understand chemistry and be able to follow its working right into the sap. It is really so. Students have a saying — there are in universities, as you perhaps know, both ordinary and extraordinary professors — and the students have a saying: the ordinary professors know nothing extraordinary, and the extraordinary professors know nothing ordinary! But one can go still further to-day. The geologist knows nothing of plants or animals or men; the anthropologist knows nothing of animals, or plants, or the earth. Neither knows really how the things upon which he works are connected. Just as man has specialised in work, he has specialised in knowledge. And that is much more dangerous. It is shocking when there are only geologists, botanists, etc., so that all knowledge is split up. This has been for men's convenience. People say to-day: a man can't know everything. Well, if one doesn't wish to take in all knowledge, one can despair of any really useful knowledge.

We live at a time when things have assumed a frightful aspect. It is as if a man who has to do with clocks wants to learn only how to file metals, another how to weld them. And there would be another, who knows how to put the clock together, but doesn't know how to work the single metals. Now one can get a certain distance in this way with machinery, although at the same time a certain amount of compulsion is necessary. But in Medicine nothing can be achieved if one does not take into account all branches of knowledge, even the knowledge of the earth. For in the tree trunk lives something which is carried up from the earth (which is the subject of geology) to the sap. There it dies. One must also know meteorology, the science of air, because from the surrounding air something is brought to the leaves which calls forth life in them again. And one must also know astrology, the science of the stars, if one wishes to understand the formation of cambium. And one must also know what enters with the cambium in the food. ... So that when one eats unsound cambium as a child, one gets an unsound brain. In this way diseases are caused by what is in the earth. This is what can be said about the causes of such apparently inexplicable diseases: the causes are in the soil.

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Man as Symphony of the Creative Word

Part Three

The Plant-World and the Elemental Nature-Spirits

The World-Word is not some combination of syllables gathered from here or there, but the World-Word is the harmony of what sounds forth from countless beings.

LECTURE VII

2nd November, 1923

To the outwardly perceptible, visible world there belongs the invisible world, and these, taken together, form a whole. The marked degree to which this is the case first appears in its full clarity when we turn our attention away from the animals to the plants.

Plant-life, as it sprouts and springs forth from the earth, immediately arouses our delight, but it also provides access to something which we must feel as full of mystery. In the case of the animal, though certainly its will and whole inner activity have something of the mysterious, we nevertheless recognize that this will is actually there, and is the cause of the animal's form and outer characteristics. But in the case of the plants, which appear on the face of the earth in such magnificent variety of form, which develop in such a mysterious way out of the seed with the help of the earth and the encircling air — in the case of the plant we feel that some other factor must be present in order that this plant-world may arise in the form it does.

When spiritual vision is directed to the plant-world, we are immediately led to a whole host of beings, which were known and recognized in the old times of instinctive clairvoyance, but which were afterwards forgotten and today remain only as names used by the poet, names to which modern man ascribes no reality. To the same degree, however, in which we deny reality to the beings which whirl and weave around the plants, to that degree do we lose the understanding of the plant-world. This understanding of the plant-world, which, for instance, would be so necessary for the art of healing, has been entirely lost to present-day humanity.

We have already recognized a very significant connection between the world of the plants and the world of the butterflies; but this too will only come rightly before our souls when we look yet more deeply into the whole weaving and working of plant-life.

Plants send down their roots into the ground. Anyone who can observe what they really send down and can perceive the roots with spiritual vision (for this he must have) sees how the root-nature is everywhere surrounded, woven around, by elemental nature spirits. And these elemental spirits, with an old clairvoyant perception designated as gnomes and which we may call the root-spirits, can actually be studied by an imaginative and inspirational world-conception, just as human life and animal life can be studied in the sphere of the physical. We can look into the soul-nature of these elemental spirits, into this world of the spirits of the roots.

These root-spirits, are, so to say, a quite special earth-folk, invisible at first to outer view, but in their effects so much the more visible; for no root could develop if it were not for what is mediated between the root and the earth-realm by these remarkable root-spirits, which bring the mineral element of the earth into flux in order to conduct it to the roots of the plants. Naturally I refer to the underlying spiritual process.

These root-spirits, which are everywhere present in the earth, get a quite particular sense of well-being from rocks and from ores (which may be more or less transparent). But they enjoy their greatest sense of well-being, because here they are really at home, when they are conveying what is mineral to the roots of the plants. And they are completely enfilled with an inner element of spirituality which we can only compare with the inner element

of spirituality in the human eye, in the human ear. For these root-spirits are in their spirit-nature entirely *sense*. Apart from this they are nothing at all; they consist only of sense. They are entirely sense, and it is a sense which is at the same time *understanding*, which does not only see and hear, but immediately understands what is seen and heard, which in receiving impressions, receives also ideas.

We can even indicate the way in which these root-spirits receive their ideas. We see a plant sprouting out of the earth. The plant comes, as I shall presently show you, into connection with the extraterrestrial universe; and, particularly at certain seasons of the year, spirit-currents flow from above, from the blossom and the fruit of the plant down into the roots below, streaming into the earth. And just as we turn our eyes towards the light and see, so do the root-spirits turn their faculty of perception towards what seeps downwards from above, through the plant into the earth. What seeps down towards the root-spirits, that is something which the light has sent into the blossoms, which the sun's warmth has sent into the plants, which the air has produced in the leaves, which the distant stars have brought about in the plant's structures. The plant gathers the secrets of the universe, sinks them into the ground, and the gnomes take these secrets into themselves from what seeps down spiritually to them through the plants. And because the gnomes, particularly from autumn on and through the winter, in their wanderings through ore and rock bear with them what has filtered down to them through the plants, they become those beings within the earth which, as they wander, carry the ideas of the whole universe streaming throughout the earth. We look forth into the wide world. The world is built from universal spirit; it is an embodiment of universal ideas, of universal spirit. The gnomes receive through the plants, which to them are the same as rays of light are to us, the ideas of the universe, and within the earth carry them in full consciousness from metal to metal, from rock to rock.

We gaze down into the depths of the earth not to seek there below for abstract ideas about some kind of mechanical laws of nature, but to behold the roving, wandering gnomes, which are the light-filled preservers of world-understanding within the earth.

Because these gnomes have immediate understanding of what they see, their knowledge is actually of a similar nature to that of man. They are the compendium of understanding, they are entirely understanding. Everything about them is understanding, an understanding however, which is universal, and which really looks down upon human understanding as something incomplete. The gnomes laugh us to scorn on account of the groping, struggling understanding with which we manage to grasp one thing or another, whereas they have no need at all to make use of thought. They have direct perception of what is comprehensible in the world; and they are particularly ironical when they notice the efforts people have to make to come to this or that conclusion. Why should they do this? say the gnomes — why ever should people give themselves so much trouble to think things over? We know everything we look at. People are so stupid — say the gnomes — for they must first think things over.

And I must say that the gnomes become ironical to the point of ill manners if one speaks to them of logic. For why ever should people need such a superfluous thing — a training in thinking? The thoughts are already there. The ideas flow through the plants. Why don't people stick their noses as deep into the earth as the plant's roots, and let what the sun says to the plants trickle down into their noses? Then they would know something! But with logic — so say the gnomes — there one can only have odd bits and pieces of knowledge.

Thus the gnomes, inside the earth, are actually the bearers of the ideas of the universe, of the world-all. But for the earth itself they have no liking at all. They bustle about in the earth with ideas of the universe, but they actually hate what is earthly. This is something from which the gnomes would best like to tear themselves free.

Nevertheless they remain with the earthly — you will soon see why this is — but they hate it, for the earthly threatens them with a continual danger. The earth continually holds over them the threat of forcing them to take on a particular form, the form of those creatures I described to you in the last lecture, the amphibians, and in particular of the frogs and the toads. The feeling of the gnomes within the earth is really this: If we grow too strongly together with the earth, we shall assume the form of frogs or toads. They are continually on the alert to avoid being caught in a too strong connection with the earth, to avoid taking on earthly form. They are always on the defensive against this earthly form, which threatens them as it does because of the element in which they exist. They have their home in the earthly-moist element; there they live under the constant threat of being forced into amphibian forms. From this they continually tear themselves free, by filling themselves entirely with ideas of the extra-terrestrial universe. The gnomes are really that element within the earth which represents the extra-terrestrial, because they must continually reject a growing together with the earthly; otherwise, as single beings, they would take on the forms of the amphibian world. And it is just from what I may call this feeling of hatred, this feeling of antipathy towards the earthly, that the gnomes gain the power of driving the plants up out of the earth. With the fundamental force of their being they unceasingly thrust away the earthly, and it is this thrusting that determines the upward direction of the plant's growth; they push the plants up with them. It accords with the nature of the gnomes in regard to the earthly to allow the plant to have only its roots in the earth, and then to grow upwards out of the earth-sphere; so that it is actually out of the force of their own original nature that the gnomes push the plants out of the earth and make them grow upwards.

Once the plant has grown upwards, once it has left the domain of the gnomes and has passed out of the sphere of the moist-earthly element into the sphere of the moist-airy, the plant develops what comes to outer physical formation in the leaves. But in all that is now active in the leaves other beings are at work, water-spirits, elemental spirits of the watery element, to which an earlier instinctive clairvoyance gave among others the name of undines. Just as we find the roots busied about, woven-about by the gnome-beings in the vicinity of the ground, and observe with pleasure the upward-striving direction which they give, we now see these water-beings, these elemental beings of the water, these undines in their connection with the leaves.

These undine beings differ in their inner nature from the gnomes. They cannot turn like a spiritual sense-organ outwards towards the universe. They can only yield themselves up to the weaving and working of the whole cosmos in the airy-moist element, and therefore they are not beings of such clarity as the gnomes. They dream incessantly, these undines, but their dream is at the same time their own form. They do not hate the earth as intensely as do the gnomes, but they have a sensitivity to what is earthly. They live in the etheric element of water, swimming and swaying through it, and in a very sensitive way they recoil from everything in the nature of a fish; for the fish-form is a threat to them, even if they do assume it from time to time, though only to forsake it immediately in order to take on another metamorphosis. They dream their own existence. And in dreaming their own existence they bind and release, they bind and disperse the substances of the air, which in a mysterious way they introduce into the leaves, as these are pushed upwards by the gnomes. For at this point the plants would wither if it were not for the undines, who approach from all sides, and show themselves, as they weave around the plants in their dream-like existence, to be what we can only call the world-chemists. The undines dream the uniting and dispersing of substances. And this dream, in which the plant has its existence, into which it grows when, developing upwards, it forsakes the ground, this undine-dream is the world-chemist which brings about in the plant-world the mysterious combining and separation of the substances which emanate from the leaf. We can therefore say that the undines are the chemists of plant-life. They dream of chemistry. They possess an exceptionally delicate spirituality which is really in its element just where water and air come into contact with each other. The undines live entirely in the element of moisture, but they develop their actual inner function when they come to the surface of something watery, be it only to the surface of a water-drop or something else of a

watery nature. For their whole endeavour lies in preserving themselves from getting the form of a fish, the permanent form of a fish. They wish to remain in a condition of metamorphosis, in a condition of eternal, endlessly changing transformation. But in this state of transformation in which they dream of the stars and of the sun, of light and of warmth, they become the chemists who now, starting from the leaf, carry the plant further in its formation, after it has been pushed upwards by the power of the gnomes. So the plant develops its leaf-growth, and this mystery is now revealed as the dream of the undines into which the plants grow.

To the same degree, however, in which the plant grows into the dream of the undines, does it now come into another domain, into the domain of those spirits which live in the airy-warmth element, just as the gnomes live in the moist-earthly, and the undines in the moist-airy element. Thus it is in the element which is of the nature of air and warmth that those beings live which an earlier clairvoyant art designated as the sylphs. Because air is everywhere imbued with light, these sylphs, which live in the airy-warmth element, press towards the light, relate themselves to it. They are particularly susceptible to the finer but larger movements within the atmosphere.

When in spring or autumn you see a flock of swallows, which produce as they fly vibrations in a body of air, setting an air-current in motion, then this moving air-current — and this holds good for every bird — is for the sylphs something audible. Cosmic music sounds from it to the sylphs. If, let us say, you are travelling somewhere by ship and the seagulls are flying around it, then in what is set in motion by the seagulls' flight there is a spiritual sounding, a spiritual music which accompanies the ship.

Again it is the sylphs which unfold and develop their being within this sounding music, finding their dwelling-place in the moving current of air. It is in this spiritually sounding, moving element of air that they find themselves at home; and at the same time they absorb what the power of light sends into these vibrations of the air. Because of this the sylphs, which experience their existence more or less in a state of sleep, feel most in their element, most at home, where birds are winging through the air. If a sylph is obliged to move and weave through air devoid of birds, it feels as though it had lost itself. But at the sight of a bird in the air something quite special comes over the sylph. I have often had to describe a certain event in man's life, that event which leads the human soul to address itself as “I”. And I have always drawn attention to a saying of Jean Paul, that, when for the first time a human being arrives at the conception of his “I”, it is as though he looks into the most deeply veiled Holy of Holies of his soul. A sylph does not look into any such veiled Holy of Holies of its own soul, but when it sees a bird an ego-feeling comes over it. It is in what the bird sets in motion as it flies through the air that the sylph feels its ego. And because this is so, because its ego is kindled in it from outside, the sylph becomes the bearer of cosmic love through the atmosphere. It is because the sylph embodies something like a human wish, but does not have its ego within itself but in the bird-kingdom, that it is at the same time the bearer of wishes of love through the universe.

Thus we behold the deepest sympathy between the sylphs and the bird-world. Whereas the gnome hates the amphibian world, whereas the undine is unpleasantly sensitive to fishes, is unwilling to approach them, tries to avoid them, feels a kind of horror for them, the sylph, on the other hand, is attracted towards birds, and has a sense of well-being when it can waft towards their plumage the swaying, love-filled waves of the air. And were you to ask a bird from whom it learns to sing, you would hear that its inspirer is the sylph. Sylphs feel a sense of pleasure in the bird's form. They are, however, prevented by the cosmic ordering from becoming birds, for they have another task. Their task is lovingly to convey light to the plant. And just as the undine is the chemist for the plant, so is the sylph the light-bearer. The sylph imbues the plant with light; it bears light into the plant.

Through the fact that the sylphs bear light into the plant, something quite remarkable is brought about in it. You see, the sylph is continually carrying light into the plant. The light, that is to say the power of the sylphs in the plant, works upon the chemical forces which were induced into the plant by the undines. Here occurs the inter-working of sylph-light and undine-chemistry. This is a remarkable plastic activity. With the help of the upstreaming substances which are worked upon by the undines, the sylphs weave out of the light an ideal plant-form. They actually weave the Archetypal Plant within the plant from light, and from the chemical working of the undines. And when towards autumn the plant withers and everything of physical substance disintegrates, then these plant-forms begin to seep downwards, and now the gnomes perceive them, perceive what the world — the sun through the sylphs, the air through the undines — has brought to pass in the plant. This the gnomes perceive, so that throughout the entire winter they are engaged in perceiving below what has seeped into the ground through the plants. Down there they grasp world-ideas in the plant-forms which have been plastically developed with the help of the sylphs, and which now in their spiritual ideal form enter into the ground.

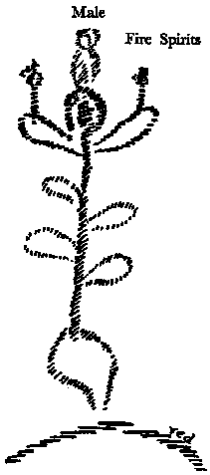
Naturally those people who regard the plant as something purely material know nothing of this spiritual ideal form. Thus at this point something appears which in the materialistic observation of the plant gives rise to what is nothing other than a colossal error, a terrible error. I will sketch this error for you.

Everywhere you will find that materialistic science describes matters as follows: The plant takes root in the ground, above the ground it develops its leaves, finally unfolding its blossoms, within the blossoms the stamens, then the seed-bud. Now — usually from another plant — the pollen from the anthers, from the pollen vessels, is carried over to the germ which is then fructified, and through this the seed of the new plant is produced. The germ is regarded as the female element and what comes from the stamens as the male — indeed matters cannot be regarded otherwise as long as people remain fixed in materialism, for then this process really does look like a fructification. This, however, it is not. In order to gain insight into the process of fructification, that is to say the process of reproduction, in the plant-world, we must be conscious that in the first place it is from what the great chemists, the undines, bring about in the plants, and from what the sylphs bring about, that the plant-form arises, the ideal plant-form which sinks into the ground and is preserved by the gnomes. It is there below, this plant-form. And there within the earth it is now guarded by the gnomes after they have seen it, after they have looked upon it. The earth becomes the mother-womb for what thus seeps downwards. This is something quite different from what is described by materialistic science.

After it has passed through the sphere of the sylphs, the plant comes into the sphere of the elemental fire-spirits. These fire-spirits are the inhabitants of the warmth-light element. When the warmth of the earth is at its height, or is otherwise suitable, they gather the warmth together. Just as the sylphs gather up the light, so do the fire-spirits gather up the warmth and carry it into the blossoms of the plants.

Undines carry the action of the chemical ether into the plants, sylphs the action of the light-ether into the plant's blossoms. And the pollen now provides what may be called little air-ships, to enable the fire-spirits to carry the warmth into the seed. Everywhere warmth is collected with the help of the stamens, and is carried by means of the pollen from the anthers to the seeds and the seed vessels. And what is formed here in the seed-bud is entirely the male element which comes from the cosmos. It is not a case of the seed-vessel being female and the anthers of the stamens being male. In no way does fructification occur in the blossom, but only the pre-forming of the male seed. The fructifying force is what the fire-spirits in the blossom take from the warmth of the world-all as the cosmic male seed, which is united with the female element. This element, drawn from the forming of the plant has, as I told you, already earlier seeped down into the ground as ideal form, and is resting there below. *For plants*

the earth is the mother, the heavens the father. And all that takes place outside the domain of the earth is not the mother-womb for the plant. It is a colossal error to believe that the mother-principle of the plant is in the seed-bud. The fact is that this is the male-principle, which is drawn forth from the universe with the aid of the fire-spirits. The mother comes from the cambium, which spreads from the bark to the wood, and is carried down from above as ideal form. And what now results from the combined working of gnome-activity and fire-spirit activity — this is fructification. The gnomes are, in fact, the spiritual midwives of plant-reproduction. Fructification takes place below in the earth during the winter, when the seed comes into the earth and meets with the forms which the gnomes have received from the activities of the sylphs and undines and now carry to where these forms can meet with the fructifying seeds.



You see, because people do not recognize what is spiritual, do not know how gnomes, undines, sylphs and fire-spirits — which were formerly called salamanders — weave and live together with plant-growth, there is complete lack of clarity about the process of fructification in the plant world. There, outside the earth nothing of fructification takes place, but the earth is the mother of the plant-world, the heavens the father. This is the case in a quite literal sense. Plant-fructification takes place through the fact that the gnomes take from the fire-spirits what the fire-spirits have carried into the seed bud as concentrated cosmic warmth on the little airships of the anther-pollen. Thus the fire-spirits are the bearers of warmth.

And now you will easily gain insight into the whole process of plant-growth. First, with the help of what comes from the fire-spirits, the gnomes down below instill life into the plant and push it upwards. They are the fosterers of life. They carry the life-ether to the root — the same life-ether in which they themselves live. The undines foster the chemical ether, the sylphs the light-ether, the fire-spirits the warmth ether. And then the fruit of the warmth-ether again unites with what is present below as life. Thus the plants can only be understood when they are considered in connection with all that is circling, weaving and living around them. And one only reaches the right interpretation of the most important process in the plant when one penetrates into these things in a spiritual way.

When once this has been understood, it is interesting to look again at that memorandum of Goethe's where, referring to another botanist, he is so terribly annoyed because people speak of the eternal marriage in the case of

the plants above the earth. Goethe is affronted by the idea that marriages should be taking place over every meadow. This seemed to him something unnatural. In this Goethe had an instinctive but very true feeling. He could not as yet know the real facts of the matter, nevertheless he instinctively felt that fructification should not take place above in the blossom. Only he did not as yet know what goes on down below under the ground, he did not know that the earth is the mother-womb of the plants. But, that the process which takes place above in the blossom is not what all botanists hold it to be, this is something which Goethe instinctively felt.

You are now aware of the inner connection between plant and earth. But there is something else which you must take into account.

You see, when up above the fire-spirits are circling around the plant and transmitting the anther-pollen, then they have only one feeling, which they have in an enhanced degree, compared to the feeling of the sylphs. The sylphs experience their self, their ego, when they see the birds flying about. The fire-spirits have this experience, but to an intensified degree, in regard to the butterfly-world, and indeed the insect-world as a whole. And it is these fire-spirits which take the utmost delight in following in the tracks of the insects' flight so that they may bring about the distribution of warmth for the seed buds. In order to carry the concentrated warmth, which must descend into the earth so that it may be united with the ideal form, in order to do this the fire-spirits feel themselves inwardly related to the butterfly-world, and to the insect-creation in general. Everywhere they follow in the tracks of the insects as they buzz from blossom to blossom. And so one really has the feeling, when following the flight of insects, that each of these insects as it buzzes from blossom to blossom, has a quite special aura which cannot be entirely explained from the insect itself. Particularly the luminous, wonderfully radiant, shimmering, aura of bees, as they buzz from blossom to blossom, is unusually difficult to explain. And why? It is because the bee is everywhere accompanied by a fire-spirit which feels so closely related to it that, for spiritual vision, the bee is surrounded by an aura which is actually a fire-spirit. When a bee flies through the air from plant to plant, from tree to tree, it flies with an aura which is actually given to it by a fire-spirit. The fire-spirit does not only gain a feeling of its ego in the presence of the insect, but it wishes to be completely united with the insect.

Through this, however, insects also obtain that power about which I have spoken to you, and which shows itself in a shimmering forth of light into the cosmos. They obtain the power completely to spiritualize the physical matter which unites itself with them, and to allow the spiritualized physical substance to ray out into cosmic space. But just as with a flame it is the warmth in the first place which causes the light to shine, so, above the surface of the earth, when the insects shimmer forth into cosmic space what attracts the human being to descend again into physical incarnation, it is the fire spirits which inspire the insects to this activity, the fire-spirits which are circling and weaving around them. But if the fire-spirits are active in promoting the outstreaming of spiritualized matter into the cosmos, they are no less actively engaged in seeing to it that the concentrated fiery element, the concentrated warmth, goes into the interior of the earth, so that, with the help of the gnomes, the spirit-form, which sylphs and undines cause to seep down into the earth, may be awakened.

This, you see, is the spiritual process of plant-growth. And it is because the subconscious in man divines something of a special nature in the blossoming, sprouting plant that he experiences the being of the plant as full of mystery. The wonder is not spoiled, the magic is not brushed from the dust on the butterfly's wing. Rather is the instinctive delight in the plant raised to a higher level when not only the physical plant is seen, but also that wonderful working of the gnome-world below, with its immediate understanding and formative intelligence, the gnome-world which first pushes the plant upwards. Thus, just as human understanding is not subjected to gravity, just as the head is carried without our feeling its weight, so the gnomes with their light-imbued intellectuality overcome what is of the earth and push the plant upwards. Down below they prepare the life. But the life would

die away were it not formed by chemical activity. This is brought to it by the undines. And this again must be imbued with light. And so we picture, from below upwards, in bluish, blackish shades the force of gravity, to which the impulse upwards is given by the gnomes; and weaving around the plant — indicated by the leaves — the undine-force blending and dispersing substances as the plant grows upwards. From above downwards, from the sylphs, light falls into the plants and shapes an idealized plastic form which descends, and is taken up by the mother-womb of the earth; moreover this form is circled around by the fire-spirits which concentrate the cosmic warmth into the tiny seed-points. This warmth is also sent downwards to the gnomes, so that from out of fire and life, they can cause the plants to arise.

And further we now see that essentially the earth is indebted for its power of resistance and its density to the antipathy of the gnomes and undines towards amphibians and fishes. If the earth is dense, this density is due to the antipathy by means of which the gnomes and undines maintain their form. When light and warmth sink down on to the earth, this is first due to that power of sympathy, that sustaining power of sylph-love, which is carried through the air, and then to the sustaining sacrificial power of the fire-spirits, which causes them to incline downwards to what is below themselves. So we may say that, over the face of the earth, earth-density, earth-magnetism and earth-gravity, in their upward-striving aspect, unite with the downward-striving power of love and sacrifice. And in this inter-working of the downwards streaming force of love and sacrifice and the upwards streaming force of density, gravity and magnetism, in this inter-working, where the two streams meet, plant-life develops over the earth's surface. Plant-life is an outer expression of the inter-working of world-love and world-sacrifice with world-gravity and world-magnetism.

From this you have seen with what we have to do when we direct our gaze to the plant-world, which so enchants, uplifts and inspires us. Here real insight can only be gained when our vision embraces the spiritual, the super-sensible, as well as what is accessible to the physical senses. This enables us to correct the capital error of materialistic botany, that fructification occurs above the earth. What occurs there is not the process of fructification, but the preparation of the male heavenly seed for what is being made ready as the future Plant in the mother-womb of the earth.

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The Kingdom of Childhood

LECTURE 3

14th August, 1924

Today we will characterise certain general principles of the art of education for the period between the change of teeth and puberty, passing on in the next lecture to more detailed treatment of single subjects and particular conditions which may arise.

When the child reaches his ninth or tenth year he begins to differentiate himself from his environment. For the first time there is a difference between subject and object; subject is what belongs to oneself, object is what belongs to the other person or other thing; and now we can begin to speak of external things as such, whereas

before this time we must treat them as though these external objects formed one whole together with the child's own body. I showed yesterday how we speak of animals and plants, for instance, as though they were human beings who speak and act. The child thereby has the feeling that the outside world is simply a continuation of his own being.

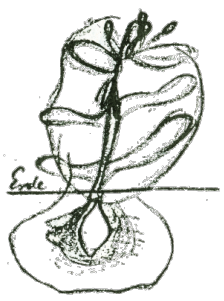
But now when the child has passed his ninth or tenth year we must introduce him to certain elementary facts of the outside world, the facts of the *plant* and animal kingdoms. Other subjects I shall speak of later. But it is particularly in this realm that we must be guided by what the child's own nature needs and asks of us.

The first thing we have to do is to dispense with all the textbooks. For textbooks as they are written at the present time contain nothing about the *plant* and animal kingdoms which one can use in teaching. They are good for instructing grown up people about plants and animals, but we shall ruin the individuality of the child if we use them at school. And indeed there are no textbooks or handbooks today which show one how these things should be taught. Now the important point is really this.

If you put single plants in front of the child and demonstrate different things from them, you are doing something which has no reality. A *plant* by itself is not a reality. If you pull out a hair and examine it as though it were a thing by itself, that would not be a reality either. In ordinary life we say of everything of which we can sec the outlines with our eyes that it is real. But if you look at a stone and form some opinion about it, that is one thing; if you look at a hair or a rose, it is another. In ten years' time the stone will be exactly as it is now, but in two days the rose will have changed. The rose is only a reality together with the whole rosebush. The hair is nothing in itself, but is only a reality when considered with the whole head, as part of the whole human being. Now if you go out into the fields and pull up plants, it is as though you had torn out the hair of the earth. For the plants belong to the earth just in the same way as the hair belongs to the organism of the human being. And it is nonsense to examine a hair by itself as though it could suddenly grow anywhere of its own accord.

It is just as foolish to take a botanical tin and bring home plants to be examined by themselves. This has no relation to reality, and such a method cannot lead one to a right knowledge of nature or of the human being.

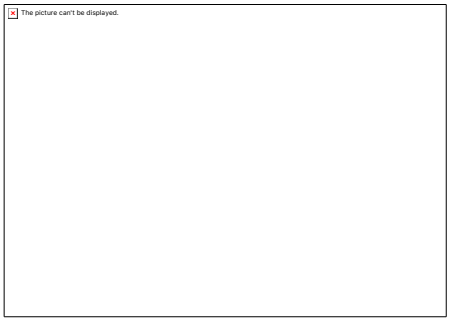
Here we have a *plant* (see drawing) but this alone is not the *plant*, for there also belongs to it the soil beneath it spread out on all sides, maybe a very long way. There are some plants which send out little roots a very long way. And when you realise that the small clod of earth containing the *plant* belongs to a much greater area of soil around it, then you will see how necessary it is to manure the earth in order to promote



healthy *plant* growth. Something else is living besides the actual *plant*; this part here (below the line in drawing) lives with it and belongs to the *plant*; the earth lives with the *plant*.

There are some plants which blossom in the spring, about May or June, and bear fruit in autumn. Then they wither and die and remain in the earth which belongs to them. But there are other plants which take the earth forces out of their environment. If this is the earth, then the root takes into itself the forces which are around it, and because it has done so these forces shoot upwards and a tree is formed.

For what is actually a tree? A tree is a colony of many plants. And it does not matter whether you are considering a hill which has less life in itself but which has many plants growing on it, or a tree trunk where the living earth itself has as it were withdrawn into the tree. Under no circumstances can you understand any *plant* properly if you examine it by itself.



If you go (preferably on foot) into a district in which there are definite geological formations, let us say red sand, and look at the plants there, you will find that most of them have reddish-yellow flowers. The flowers belong to the soil. Soil and *plant* make up a unity, just as your head and your hair also make a unity.

Therefore you must not teach Geography and Geology by themselves, and then Botany separately. That would be absurd. Geography must be taught together with a description of the country and observation of the plants, for the earth is an organism and the plants are like the hair of this organism. The child must be able to see that the earth and the plants belong together, and that each portion of soil bears those plants which belong to it.

Thus the only right way is to speak of the plants in connection with the earth, and to give the child a clear feeling that the earth is a living being that has hair growing on it. The plants are the hair of the earth. People speak of the earth as having the force of gravity. This is spoken of as belonging to the earth. But the plants with their force of growth belong to the earth just as much. The earth and the plants are no more separate entities than a man and his hair would be. They belong together just as the hair on the head belongs to the man.

If you show a child plants out of a botanical tin and tell him their names, you will be teaching something which is quite unreal. This will have consequences for his whole life, for this kind of *plant* knowledge will never give him an understanding, for example, of how the soil must be treated, and of how it must be manured, made living by the manure that is put into it. The child can only gain an understanding of how to cultivate the land if he knows how the soil is really part of the *plant*. The men of our time have less and less conception of reality, the so-called “practical” people least of all, for they are really all theoretical as I showed you in our first lecture, and it is just because men have no longer any idea of reality that they look at everything in a disintegrated, isolated way.

Thus it has come about that in many districts during the last fifty or sixty years all agricultural products have become decadent. Not long ago there was a Conference on Agriculture in Central Europe, on which occasion

the agriculturists themselves admitted that crops are now becoming so poor that there is no hope of their being suitable for human consumption in fifty years' time.

Why is this so? It is because people do not understand how to make the soil living by means of manure. It is impossible that they should understand it if they have been given conceptions of plants as being something in themselves apart from the earth. The *plant* is no more an object in itself than a hair is. For if this were so, you might expect it to grow just as well in a piece of wax or tallow as in the skin of the head. But it is only in the head that it will grow.

In order to understand how the earth is really a part of *plant* life you must find out what kind of soil each *plant* belongs to; the art of manuring can only be arrived at by considering earth and *plant* world as a unity, and by looking upon the earth as an organism and the *plant* as something that grows with this organism.

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Evolution Earth and Man and the Influence of the Stars - 9 Sep 1924 lec 10

Question: In one of your last lectures you said that the scents of flowers are related to the planets. Does this also apply to the colors of flowers and colors of stones?

Dr. Steiner: I will repeat very briefly what I said. It was also in answer to a question that had been asked. I said that flowers, and also other substances of the earth, have scent — something in them that exercises a corresponding influence upon man's organ of smell. I said that this is connected with the planets, that the plants and, similarly, certain substances, are “big noses,” noses that perceive the effects coming from the planets. The planets have an influence upon life in its finer, more delicate forms-here, once again, we must think of the finer forms of life. And it can be said that the plants really do come into being out of the scent of the universe, but this scent is so rarefied, so delicate, that we human beings with our coarse noses do not smell it.

But I reminded you that there can be a sense of smell quite different from that possessed by man. You need think only of police dogs. A thief has stolen something and the police dog is taken to the spot where the theft has been committed; it is conveyed to him in some way that a thief has been there and he picks up the scent; then he leads the police on the trail and the thief is often found. Police dogs are used in this way. All kinds of interesting things would come to light if one were to study how scents that are quite imperceptible to a human being are perceptible to a dog.

People have not always realized that dogs have such keen noses. If they had, dogs would have been used earlier to assist the police. It is only rather recently that this has been discovered. Likewise, people today still have no conception of what indescribably delicate noses are possessed by the plants. As a matter of fact, the entire *plant* is a nose; it takes in the scent of the universe, and if its structure is such that it gives back this cosmic aroma in the way that an echo gives back a sound, it becomes a fragrant *plant*. So we can say: The scents of flowers, of plants in general, and also other scents on the earth, do indeed relate to the planetary system.

It has been asked whether this also applies to the colors of plants and flowers. As I said, the *plant* takes shape out of the aroma of the universe and throughout the year it is exposed to the sun. While the form of the *plant* is shaped by the planets out of the cosmic fragrance, its color is due to the sun and also to some extent to the moon. The scent and the color of plants do not, therefore, come from the same source; the scent comes from the planets, the color from the sun

and moon. Things don't always have to come from the same source; just as one has a father and a mother, so the *plant* has its scent from the planets and its colors from the sun and moon.

You can see from the following that the colors of plants are connected with the sun and moon. If you take plants that have beautiful green leaves and put them in the cellar, they become white, they lose every trace of color because the sun has not been shining on them. They retain their structure, their form, because the cosmic fragrance penetrates everywhere, but they don't keep their color because no sunlight is reaching them. The colors of the plants, therefore, undeniably come from the sun and, as I have said, also from the moon, only this is more difficult to determine. Experiments would have to be made and could be made, by exposing plants in various ways to moonlight; then one would certainly discover it.

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