

LECTURE III.

June 11th, 1924,

The earthly and cosmic forces of which I have spoken work in the processes of agriculture through the substances of the Earth. And we shall only be able to pass on to the difficult practical applications during the next few days if we occupy ourselves rather more closely with the question of how these forces work through the Earth's substances. But first we must make a digression and enquire into the activity of Nature in general.

One of the most important questions that can be raised in discussing production in the sphere of Agriculture is that concerning the significance and influence of nitrogen. But this question concerning the fundamental nature of the action of nitrogen is at present in a state of the greatest confusion. When one observes nitrogen today in the ordinary way one is only looking at the last offshoots as it were, of its activities, its most superficial manifestations. We overlook the natural interconnections within which nitrogen is at work: nor indeed can we help so doing if we remain enclosed within one section of Nature. To gain a proper insight into these connections we must bring within our survey the whole realm of Nature and concern ourselves with the activity of nitrogen in the Universe. Indeed - and this will emerge clearly from my exposition - while nitrogen as such does not play the primary part in plant-life it is nevertheless supremely necessary for us to know what this part is, if we wish to understand plant-life.

In its activities in Nature nitrogen has, one might say, four sister-substances which we must learn to know if we wish to understand the functions and significance of nitrogen in the so-called economy of Nature. These four sister substances are the four substances which in albumen (protein), both animal and vegetable, combine with nitrogen in a way which is still a mystery for present-day science. The four sister-substances are carbon, oxygen, hydrogen and sulphur. If we wish to understand the full significance of albumen, it is not enough to mention the ingredients hydrogen, oxygen, nitrogen, carbon; we must also bring in sulphur, that substance the activities of which are of profound importance for albumen. For it is sulphur which acts within the albumen as the **mediator between the spiritual formative element diffused throughout the Universe and the physical element**. Indeed, if we want to follow the path taken by the spirit in the material world, we shall have to look for the activity of sulphur. Even if this activity is not so visible as those of other substances it is still of the utmost importance **because spirit works its way into physical nature by means of sulphur; sulphur is actually the bearer of spirit**. The ancient name "sulphur" is connected with the word "phosphor" (which means bearer of the light) because in the old days man saw spirit spreading out through space in the out-streaming the light of the Sun. Hence they called the substances which are linked up with the working of light into matter like sulphur and phosphorus the "light bearers" . And once we have realised how fine (delicate) is the activity of sulphur in the economy of nature we shall more easily understand its fundamental nature when we consider the four sister-substances - carbon, hydrogen, nitrogen and oxygen and the part they play in the workings of the Universe. The modern chemist knows very little about these substances. He knows what they look like in a laboratory, but is ignorant of their

This lecture is again a source of continual confusion in its interpretation. While I do not believe anything said here is wrong, it can certainly do with some clarification.

RS medical lectures present similar information, as presented here but in a much more straightforward manner, especially in lectures given in October 1920. In these lectures RS says in "Fundamentals of Anthroposophical Medicine", Lecture 2 Pg 39

"You will see that the Ego organisation is connected with the Hydrogen in the same way that the physical organisation is connected with Carbon, the etheric organisation with oxygen and the Astral organisation with Nitrogen"

I suggest we read this lecture with these statements clearly in mind. It can be read at the following address.

http://wn.elib.com/Steiner/Lectures/FundAnthro/FunAnt_index.html

Sulphur

"mediator between the spiritual formative element diffused throughout the Universe and the physical element."

In the lectures "Curative Education" RS spent the first three lectures telling of how Sulphur acts as a lubricant between the four 'spiritual' bodies. Much the same as oil works as a lubricant between the parts of a motor, so Sulphur provides the way for the physical, etheric, astral and spiritual elements to all work together. Even from a physical chemical perspective sulphur works as a catalyst between many elements to facilitate reactions.

This paragraph tells of how sulphur smoothes the way for the interaction of hydrogen - the formative element diffused throughout the Universe - and Carbon - the physical element.

"because spirit works its way into physical nature by means of sulphur; sulphur is actually the bearer of spirit."

"bearer" here should be read as facilitator as it allows the spirit carried by Hydrogen

inner significance for cosmic activities as a whole. The knowledge which modern chemistry has of these substances is not much greater than the knowledge we might have of a man whose external appearance we had noticed as he passed us in the street, and of whom we had perhaps taken a snapshot, whom we call to mind with the help of the snap-shot. For what science does with these substances is little more than to take snapshots of them, and the books and lectures of to-day about them contain little more than this. We must learn to know the deeper essence of these substances.

Let us therefore start with carbon, The bearing which these things have upon plants will soon be made clear. Carbon, like so many beings in modern times has fallen from a very aristocratic position to one that is extremely plebeian. All that people see in carbon now days is something with which to heat their ovens (coal) or something with which to write, graphite, Its aristocratic nature still survives in one of its modifications, the diamond. But it is hardly of very great value to us today, in this form, because we cannot buy it. Thus what we know of carbon is very little in comparison with the enormous importance which this substance possesses in the Universe. And yet, until a relatively recent date a few hundred years ago, this black-fellow - let us call him so - was regarded as worthy to bear the noble name of "Philosophers Stone".

A great deal of nonsense has been spoken about what was really meant by this name. For when the old Alchemists and their kind spoke of the Philosopher's Stone they meant carbon in whatever form it occurs. And they only kept their name secret because if they had not done so, all and sundry would have found themselves in possession of the Philosopher's Stone. For it was simply carbon. But why should it have been carbon?

A view held in former days will supply us with the answer, which we must come to know again. If we disregard the crumbled form to which certain processes in nature have reduced carbon (as in coal and graphite) and grasp it in its vital activity in the course of serving the bodies of men and animals and as it builds up the body of the plant from its own inherent possibilities, the amorphous and formless substance which we generally think of as carbon will appear as the final outcome, the mere corpse of what carbon really is in the economy of Nature. **Carbon is really the bearer of all formative processes in Nature.** It is the great sculptor of form, whether we are dealing with the plant whose form persists for a certain time or with the ever-changing form of the animal organism. It bears within it not only its black substantiality, but in full activity and inner mobility **it bears within it the formative cosmic prototypes**, the great world-imaginings from which living form in nature must proceed. A **hidden sculptor** is at work in carbon and in building up the most diverse forms in Nature, this hidden sculptor makes use of sulphur. If, therefore, we regard the activities of carbon in Nature in the right way, we shall see that the cosmic spirit (hydrogen) which is active as a sculptor "moistens" itself as it were, with sulphur and with the help of carbon builds up the relatively permanent plant form and also the human form which is dissolved at the moment it is created. For what makes the human body human and not plant-like is precisely the fact that at each moment through the elimination of carbon the form it has taken on can be immediately destroyed and replaced by another, the carbon being united to oxygen and exhaled as carbon dioxide. As carbon would make our bodies firm and stiff like a palm tree, the breathing process wrenches it out of its stiffness unites it with oxygen and drives it outwards. Thus we gain a mobility which as human beings we must have. In plants however (and even in annuals) carbon is held fast within a fixed form.

Carbon is really the bearer of all formative processes in Nature.

Carbon is the substance that acts as the basis for all other substances. This is the basis of organic chemistry, substances built upon carbon chemistry.

it bears within it the formative cosmic prototypes

The formative cosmic prototypes we met in the earlier lectures as those impulses coming from the fixed stars and carried into form on the backs of Saturn. Astronomy tells us that space is a vacuum with the only significant element present being, Hydrogen. This is the element that exists in the spiritlands of the Galaxy and beyond. So it is the impulses that Hydrogen carries on its back that have come via Saturn.

hidden sculptor

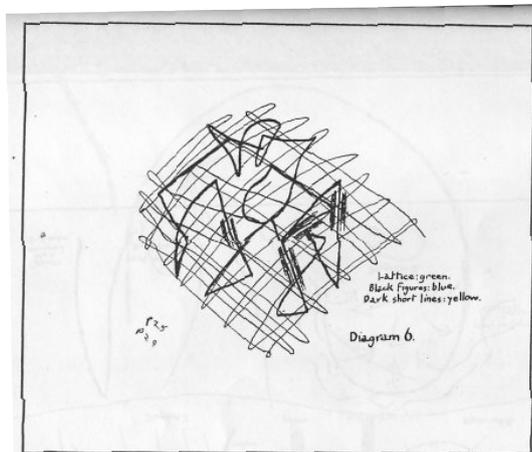
This is hydrogen .

"it is along the tracks"

Carbon here is again acting as the

There is an old saying that "Blood is a very special fluid". We are right in saying that the human ego pulsates in the blood and manifests itself physically in doing so; or speaking more strictly **it is along the tracks** provided by the carbon, in its weaving and working, forming and unforming of itself that the spiritual principle in man called the ego, moves within the blood, moistening itself with sulphur. And just as the human ego, the essential spirit of man, lives in carbon, so also does the world-ego **live** (through the mediation of sulphur) in that substance that is ever forming and unforming itself - carbon. The fact is that in the early stages of the Earth's development it was carbon alone which was deposited or precipitated. It was not until later that, for example, limestone came into existence, supplying man with the foundation for the creation of a more solid bony structure. In order that the organism which lives in the carbon might be moved about, man and the higher animals provided a supporting structure in the skeleton which is made of lime. In this way, by making mobile the carbon form within him, man raises himself from the merely immobile mineral lime formation which the earth possesses and which he incorporates in order to have solid earth-matter within his body. The bony lime structure represents the solid earth within the human body

Let me put it in this way: Underlying every living being there is a scaffolding of carbon, more or less either relatively permanent or continually fluctuating, in the tracks of which the



spiritual principle (*carried by hydrogen*) moves through the world. Let us make a schematic drawing of this so that you can see the matter quite clearly before you. (drawing No. 6) Here is such a scaffolding which the spirit (*hydrogen*) builds up somehow or other with the help of sulphur. Here we have either the continuously changing carbon which moves in the sulphur in highly diluted form or else we have, as in the plants a more or less solidified carbon structure which is united with other ingredients. Now as I have often pointed out, a human or any other living being must be penetrated by an etheric element which is the actual bearer of life. The carbon structure of a living being must therefore be penetrated by an etheric element which will either remain stationary about the timbers of this

scaffolding or retain a certain mobility. But the main thing is that the etheric element is in both cases distributed along the scaffolding.

This etheric element could not abide our physical earth world, if it remained alone. It would slide through instead of gripping what it has to grip in the physical earthly world if it were without a physical bearer, (For it is a peculiarity of earth conditions that the spiritual must always have physical bearers. The materialists regard the physical bearer only and overlook the spiritual. To an extent they are right, because it is indeed the physical bearer which is first met with. But they overlook the fact that it is the spiritual which makes necessary everywhere the existence of a physical bearer). The physical bearer of the spiritual which works in the Etheric element (we may say that the lowest level of the spiritual works in the etheric); this physical bearer which is permeated by the etheric element and "moistened" as it were with sulphur, introduces into physical existence not the form, not the structure, but a continuous mobility and vitality. This physical carrier which, with help of sulphur, brings the vital activities out of the universal ether into the body is oxygen.

Thus the part which I have coloured green in my sketch can be regarded, from the physical point of view as oxygen, and also as the brooding vibrating etheric element which permeates it. It is in the track of oxygen that the etheric element moves with the help of sulphur.

It is this that gives meaning to the breathing process. When we breathe we take in oxygen. When the present day materialist talks of oxygen all he means is the stuff in his test-tube

when he has decomposed water through electrolysis. But in oxygen there lives the lowest order of the supersensible, the etheric element: it lives there and will not be killed, as e.g. in the air around us. In the atmosphere around us the living principle in the oxygen has been killed in order that it may not cause us to faint. For any excess of the ordinary growth forces within us, if it appears where it should not be, will cause us to faint or worse. If therefore we were surrounded by an atmosphere which contained living oxygen, we should reel about as though completely stunned by it. The oxygen around us has to be killed. And yet oxygen is from its birth the bearer of life, of the etheric element. It becomes the bearer of life as soon as it leaves the sphere in which it has the task of providing a surrounding for our human external senses, once it has entered into us through breathing it comes alive again. The oxygen which circulates inside us is not the same as that which surrounds us externally. In us it is living oxygen just as it also becomes living oxygen immediate it penetrates into the soil, although in this case the life in it is lower in degree than it is in our bodies. The oxygen under the earth is not the same as the oxygen above the earth. It is very difficult to come to any understanding with physicists and chemists on this subject, for according to the methods they employ the oxygen must always be separated with its connection with the soil. The oxygen they are dealing with is dead, nor can it be anything else. But every science which limits itself to the physical is liable to this error. It can only understand dead corpses. In reality oxygen is the bearer of the living ether and this living ether takes hold of the oxygen through the mediation of sulphur.

We now have pointed out two extreme polarities: On the one hand the scaffolding of carbon within which the human ego (**hydrogen**) - the highest form of the spiritual given to us here on earth, displays its forces or with the case of plants the world-spiritual which is active in them. On the other hand we have the human process of breathing, represented in man by the living oxygen which carries the ether. And beneath it we have the scaffolding of carbon which in man permits of his movement. These two polarities must be brought together. The oxygen must be enabled to move along the paths marked out for it by the scaffolding: it must move along every track that may be marked out for it by the carbon, by the spirit of carbon; and throughout Nature the oxygen bearing the etheric life must find the way to the carbon bearing the spiritual principle. How does it do this? What here acts as the mediator?

The mediator is nitrogen. Nitrogen (**Astral**) directs the life (**Etheric**) into the form (**Physical**) which is embodied into the carbon. Wherever nitrogen occurs its function is to mediate between life (**oxygen**) and the spiritual element (**hydrogen**) which has first been incorporated in the carbon substance. It supplies the bridge between oxygen and carbon - whether it be the animal and vegetable kingdoms, or in the soil. That spirituality which with the help of the sulphur busies itself within the nitrogen is the same as we usually refer to as astral. This spirituality, which also forms the human astral body is also active in the earths surroundings

Spirit Astral Etheric Physical 'Oil'	Hydrogen Nitrogen Oxygen Carbon Sulphur
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Spiritual Bodies and their physical Carriers

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                graph TD
                    O(Oxygen) --> N(Nitrogen)
                    N --> H(Hydrogen)
                    H --> C(Carbon)
                    C --> H
                
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The third lecture is where we are introduced to the spiritual bodies activity and their relationship to the elements of protein. In many of RS other lectures he refers to the spiritual bodies and it is clear that he wishes us to use the spiritual bodies as the basis for understanding and working with matter.

We see this in the Steiner medical work as it has moved forward to this day, however this trend has not been continued within Biodynamic horticulture.

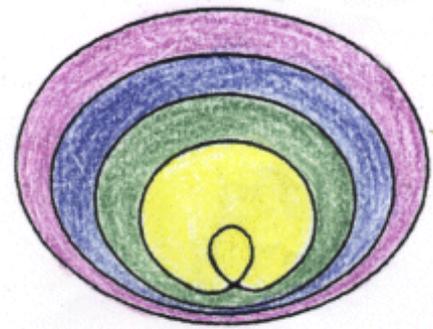
This link RS gives us between the spiritual bodies and chemistry is a significant gift to humanity as it provides us the physical basis of spirit. He goes so far as to say that the chemical constitution of an environment indicates the spiritual activity of that environment. This links spirit and matter in a manner as never before, and offers us an avenue for working with spirit in a very practical manner.

This lecture gives us the challenge to use the spiritual bodies as the basis for agricultural endeavor.

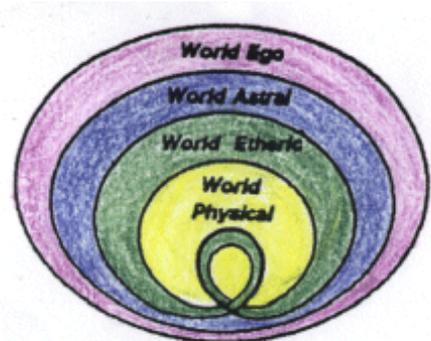
from which it works in the life of plants, animals and so on. Thus spiritually speaking we find the astral element or principle placed in between oxygen and carbon; but the astral element uses nitrogen for the purpose of revealing itself in the physical world. Wherever there is nitrogen there the astral spreads forth in activity. The etheric life-element would float about in every direction like clouds and ignore the framework provided by the carbon were it not for the powerful attraction which this framework possesses for nitrogen; wherever the lines and paths have been laid down in the carbon there nitrogen drags the oxygen along; or more strictly speaking, the astral in the nitrogen drags the etheric element along these paths. Nitrogen is the great "dragger" of the principle towards the spiritual. Nitrogen is therefore essential to the soul of man since the soul is the mediator between life. i.e. without consciousness and spirit. There is indeed something very wonderful about nitrogen. If we trace its path as it goes through the human organism we find a complete double of the human being, such a "nitrogen man" actually exists. If we could separate it from the physical we should have the most beautiful ghost imaginable for it copies in exact detail the solid shape of man. On the other hand, nitrogen flows straight back into life.

Now we have an insight into the breathing process. When he breathes man takes in oxygen, i.e. etheric life. Then comes the internal nitrogen and drags the oxygen along to wherever there is carbon i.e. to wherever there is weaving and changing form. The nitrogen brings the oxygen along with it in order that the latter may hold on the carbon and set it free. The nitrogen is thus the mediator whereby carbon becomes carbon-dioxide and as such is breathed out. Only a small part, really of our surroundings consists of nitrogen, the bearer of astral spirituality. It is of immense importance to us to have oxygen in our immediate surroundings, both by day and by night. We pay less respect to the nitrogen around us in the air which we breathe because we think we have less need of it, and yet nitrogen stands in a spiritual relation to us.

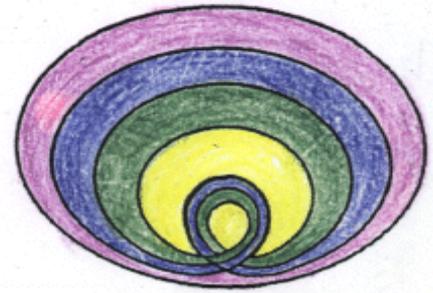
The following experiment might be made: One could enclose a man in a gas-chamber containing a given volume of air and then remove a small quantity of nitrogen, so the air would be slightly poorer in nitrogen than it normally is. If this experiment could be carefully carried out it would convince you that the necessary quantity of nitrogen is at once restored, not from outside, but from inside the man's body. Man has to give up some of his own supply of nitrogen in order to restore the quantitative condition to which the nitrogen is accustomed. As human beings it is necessary that we should maintain the right quantitative relation between our whole inner being and the nitrogen around us; the



Mineral Kingdom
Internalised Physical



Plant Kingdom
Internalised Physical & Etheric bodies



Animal Kingdom
Internalised Physical, Etheric, Astral bodies



Human Kingdom
All bodies internalised

The four kingdoms of nature manifest due to an increasing incarnation of the spiritual bodies.

right quantity of nitrogen outside us is never allowed to become less. For the merely vegetative life of man a less quantity than the normal will do, because we do not need nitrogen for the purpose of breathing. But it would not be adequate to the part it plays spiritually. For that the normal quantity of nitrogen is necessary.

This shows you how strongly nitrogen plays into the spiritual and will give you some idea of how necessary this substance is to the life of the plants. The plant growing on the ground has at first only its physical body and etheric body but no astral body; but the astral element must surround it on all sides. The plant would not flower if it were not touched from the outside by the astral element. It does not take in the astral element as do men and the animals but it needs to be touched by it from outside. The astral element is everywhere and nitrogen, the bearer of the astral, is everywhere; it hovers in the air as a dead element, the moment it enters into the soil it comes to life again. Just as oxygen comes to life when drawn into the soil, so does nitrogen. This nitrogen in the earth not only comes to life but becomes something which has a very special importance for agriculture because—paradoxical as it may seem to a mind distorted by materialism - it not only comes to life but becomes sensitive inside the earth. It literally becomes the carrier of a mysterious sensitiveness which is poured out over the whole life of the earth. Nitrogen is that which senses whether the right quantity of water is present in any given soil and experiences sympathy; when water is deficient it experiences antipathy. It experiences sympathy when for any given soil the right sort of plants are present, and so on. Thus nitrogen pours out over everything a living web of sensitive life, above all nitrogen knows all those secrets of which we know nothing in an ordinary way, of the planets Saturn Sun, Moon and so on, and their influences upon the form and life of plants, of which I told you yesterday, and in the preceding lectures. Nitrogen that is everywhere abroad, knows these secrets very well. It is not at all unconscious of what emanates from the stars and becomes active in the life of plants and of the earth. Nitrogen is the mediator which senses just as in the human nerves and senses system, it also mediates sensation. Nitrogen is in fact the bearer of sensation. Thus if we look upon nitrogen, moving about everywhere like fluctuating sensations, we shall see into the intimacies of the life in Nature. Thus we shall come to the conclusion that in the handling of nitrogen something is done which is of enormous importance for life of plants. We shall study this further in the subsequent lectures.

In the meantime there is, however, one thing more to be considered. There is a living co-operation of the spiritual principle (**Hydrogen**) which has taken shape within the carbonic framework with the astral principle working within nitrogen, which permeates that framework with life and sensations, that is, stirs up a living agility in the oxygen. But in the earthly sphere this co-operation is bought about by yet another element, which links up the physical world with the expanses of the cosmos. For the earth cannot wander about the Universe as a solid entity cut off from the rest of the Universe. If the Earth did this it would be in the same position as a man who lived on a farm, but wished to remain independent of everything that grew in the fields around him. No reasonable man would do that. What to-day is growing in the fields around us tomorrow will be in human stomachs and later will return to the soil in some form or another. We human beings cannot isolate ourselves from our environment. We are bound up with it and belong to it as much as my little finger belongs to me. There must be a continuous interchange of substances, and this applies also to the relation between earth with all its creatures and the surrounding Cosmos. All that is living on earth in physical shape must be able to find its way back into the Cosmos where it will be in a way purified and refined. This leads us to the following picture. (Drawing 6)

We have in the first place the carbon framework (which I have coloured blue in the drawing), then the etheric oxygenous life-element (coloured green) and then, proceeding from the oxygen and enabled by nitrogen to follow the various lines and paths within the framework, we have the astral element which forms the bridge between carbon and oxygen. I could indicate everywhere here how the nitrogen drags into the blue lines which I have indicated schematically with the green lines. But the whole of the very delicate structure which is formed in the living being must be able to disappear again. **It is not the spirit which disappears, but that which the spirit has built up in the carbon** and into which it has drawn the etheric life borne in the oxygen. It must disappear not only from the earth, but dissipate into the Cosmos. This is done by forming a substance which is allied as closely as possible to the

physical and yet is allied as closely as possible to the spiritual: This substance is hydrogen. Although hydrogen is itself the most attenuated form of the physical substance, it goes still further and dissipates physical matter which, borne by sulphur floats away into that cosmic region in which matter is no longer distinguishable. One may say then: **Spirit has first become physical and lives in the body at once in its astral form and reflecting itself as ego.** There it lives physically as spirit transformed into something physical. After a time the spirit begins to feel ill at ease. It wishes to get rid of its physical form. Moistening itself once again with sulphur it feels the need of yet another element by means of which it can yield up any kind of individual structure and give itself over to the cosmic region of formless chaos where there is no longer any determinate organisation. This element, which is so closely allied both to the physical and to the spiritual, is hydrogen. Hydrogen carries away all that the astral principle has taken up as form and life carries it out the expanses of the Cosmos, so that it can be taken up again from thence (by earthly substance) as I have already described. Hydrogen in fact dissolves everything.

Spirit has first become physical and lives in the body at once in its astral form and reflecting itself as ego.

This could be written in the words of the earlier sections of this lecture as:

Hydrogen has first become physical, by joining with Carbon, and lives in the body at once in its astral form and reflecting itself as Ego.

Thus we have these 5 substances which are the immediate representatives of all that works and weaves in the realm of the living and also in the realm of the seemingly dead, which in fact is only transiently so: **Sulphur, Carbon, Hydrogen, Oxygen and Nitrogen, each of these substances is inwardly related to its own particular order of spiritual entity.** They are therefore something quite different from which our modern chemistry refers to by the same names. Our chemistry speaks only of the corpses of these substances, not of the actual substances themselves. These we must learn to know as something living and sentient, and, curiously enough hydrogen, which seems the least dense of the five and has the smallest atomic weight, is the least spiritual among them.

Now consider: What are we actually doing when we meditate? (I am compelled to add this ensure that these things do not remain among the mists of spirituality) The Oriental has meditated in his own way. We in Middle and Western Europe meditate in ours. Meditation as we ought to practise it only slightly touches the breathing process; our soul is living and weaving in concentration and meditation. But all these spiritual exercises have a bodily counterpart, however subtle and intimate. In meditation, the regular rhythm of breathing, which is so closely connected with man's life, undergoes a definite if subtle change. When we meditate we always retain a little more carbon-dioxide in us than in the ordinary everyday consciousness, We do not, as in ordinary life, thrust out the whole bulk of carbon-dioxide into the atmosphere where nitrogen is everywhere around us. We hold some of it back.

Now consider: If you knock your head against some thing hard, like a table, you become conscious only of your own pain. But if you gently stroke the surface of the table, then you will become conscious of the table. The same thing happens in meditation. It gradually develops an awareness of the nitrogen all around you. That is the real process in meditation. Everything becomes an object of knowledge, including the life of the nitrogen around us. For nitrogen is a very learned fellow. He teaches us about the doings of Mercury, Venus, etc. because he knows or rather senses them. All these things rest upon perfectly real processes. And as I shall show in greater detail, it is at this point that the spiritual working in the soul activity, begins to have a bearing upon Agriculture. This interaction between the soul-spiritual element and that which is around us is what has particularly interested our dear friend Stegemann, For, indeed, if a man has to do with Agriculture it is a good thing if he is able to meditate, for in this way he will make himself receptive to the manifestations of nitrogen. If one does become receptive in this way, one begins to practise Agriculture in quite a different way and spirit. One suddenly gets all kinds of new ideas; they simply come and one then has many secrets in large estates and smaller farms.

I do not wish to repeat what I said an hour ago but I can describe in another way, Take the case of a peasant who walks through his fields. The scientist regards him as unlearned and stupid. But this is not so, simply because - forgive me but I speak the truth - simply because instinctively a peasant is given to meditation. He ponders much throughout the long winter nights. He acquires a kind of spiritual knowledge, as it were, only he cannot express it. He walks through his fields and suddenly he knows something; later he tries it out. At any rate this is what I found over and over again in my youth when I lived among peasant folk. The mere intellect will not be enough, it does not lead us deep enough, For after all nature's life and weaving is so fine and delicate that the net of intellectual concepts - and this is where science has erred of recent years - has too large a mesh to catch it.

Now all these substances of which I have spoken Sulphur, Carbon, Nitrogen, Hydrogen are united in albumen. This will enable us to see more clearly into the nature of seed formation. Whenever carbon hydrogen and nitrogen are present in leaf, blossom, calyx or root they are always united to other substances in some form or other. They are dependent upon these other substances. There are only two ways in which they can become independent. One is when the hydrogen carries all individual substances out into the expanses of the Cosmos and dissolves them into the general chaos; and the other is when the hydrogen drives the basic element of the protein (for albumen) into the seed formation and there makes them independent of each other so that they become receptive of the influences of the Cosmos. In tiny seed there is chaos, and in the wide periphery of the Cosmos there is another chaos, and whenever the chaos at the periphery works upon the chaos within the seed, new life comes into being.

Now look how these so-called substances, which are really bearers of spirit, work in the realm of Nature. Again we may say that the oxygen and nitrogen inside man's body behave themselves in an ordinary way, for within man's body they manifest their normal qualities. Ordinary science ignores it because the process is hidden. But the ultimate products of carbon and hydrogen cannot behave in so normal a fashion as do oxygen and nitrogen. Let us take carbon first. When the carbon, active in the plant realm enters the realms of animals and man it must become mobile - at least transiently. And in order to build up the fixed shape of the organism it must attach itself to an underlying framework. This is provided on the one hand by our deeply laid skeleton consisting of limestone, and on the other hand by the silicious - element which we always carry in our bodies; so that both in man and in the animals carbon to a certain extent masks its own formative force. It climbs up, as it were along the lines of formative forces of limestone and silicon. Limestone endows it with the earthly formative power, silicon with the cosmic. In man and the animals carbon does not as it were claim sole authority for itself, but adheres to what is formed by lime and silicon.

But lime and silicon are also the basis of the growth of plants. We must therefore learn to know the activities of carbon in the breathing, digestive and circulatory processes of man in relation to his bony and silicious structure - as though we could, as it were, creep into the body and see how the formative force of carbon in the circulation radiates into the limestone and silicon. And we must unfold this same kind of vision when we look upon a piece of ground covered with flowers having limestone and silicon beneath them. Into man we cannot creep; but here at any rate we can see what is going on. Here we can develop the necessary knowledge. We can see how the oxygen element is caught up by the nitrogen element and carried down into the carbon element, but only in so far as the latter adheres to the lime and silicon structure. We can even say that carbon is only the mediator. Or we can say that what lives in the environment is kindled to life in

This process of plant observation has been carried forward by several writers.

Grohmann in his two books "The Plant" looks into the physical sides of the workings of Calcium and Silica in plant form, while Wilhelm Pelikan looks more deeply into the spiritual activities of plants in his "Healing Plants". J Bohemuhl has looked into this subject through the guise of the metamorphosis of the leaf form in various plants.

We must learn to look upon each species of plant as placed within a great whole, the organism of the plant-world, just as each human organ is placed within the whole human organism.

When talking of the homeopathic Calcium earlier, I suggested that many plants act as homeopathic potentising organisms, which give to the atmosphere a unique gift of their transpired moisture. Here RS tells us legumes draw inwards due to lime in the Earth, while the other plants work in the opposite direction, building up the atmospheric calcium.

oxygen and must be carried into the earth by means of nitrogen, where it can follow the form provided by the limestone and silicon. Those who have any sensitiveness for these things can observe this process at work most wonderfully in all the papilionaceous plants (Leguminosae) that is in all the plants which in Agriculture may be called collectors of nitrogen, and whose special function it is to attract nitrogen and hand it on to what lies below them. For down in the earth under those leguminosae there is something that thirsts for nitrogen as the lungs of man thirst for oxygen - and that is lime. It is a necessity for the lime under the earth that it should breathe in nitrogen just as the human lungs need oxygen. And in the papilionaceous plants a process takes place similar to that which is carried out by the epithelium issue in our lungs lining the bronchial tubes, There is a kind of in-breathing which leads nitrogen down. And these are the only plants that do this. All other plants are closer to exhalation. Thus the whole organism of the plant-world is divided into two when we look at the nitrogen-breathing. All papilionaceae are, as it were, the air passages. Other plants represent the other organs in which breathing goes in a more secret way and whose real task is to fulfil some function. **We must learn to look upon each species of plant as placed within a great whole, the organism of the plant-world, just as each human organ is placed within the whole human organism.** We must come to regard the different plants as part of a great whole, then we shall see the immense importance of these Papilionaceae. True, science knows something of this already but it is necessary that we should gain knowledge of them from these spiritual foundations, otherwise there is a danger as tradition fades more and more during the decades, that we shall stray into false paths in applying scientific knowledge. We can see how these papilionaceae actually function. They have all the characteristics of keeping their fruit process which in other plants tends to be higher up in the region of their leaves. They all want to bear fruit before they have flowered. The reason is that these plants develop the process allied to nitrogen far nearer to the earth (they actually carry nitrogen down into the soil) than do the other plants, which unfold this process at a greater distance from the surface of the earth. These plants have also the tendency to colour the leaves, not with the ordinary green, but with a rather darker shade. The actual fruit, moreover undergoes a kind of atrophy, the seed remains capable of germination for a short time only and then becomes barren. Indeed, these plants are so organised as to bring to special perfection what the plant-world receives from Winter and not from Summer. They have, therefore a tendency to wait for Winter. They want to wait with what they are developing for the Winter. Their growth is delayed when they have a sufficient supply of what they need, namely, nitrogen from the air which they can convey below in their own manner. In this way one can get insight into the becoming and living which goes in and above the soil.

If in addition you take into account the fact that lime has a wonderful relationship with the world of human desires you will see how alive and organic the whole thing becomes. In its elemental form as calcium lime is never at rest; it seeks and experiences itself; it tries to become quick-lime, i.e. to unite with oxygen. But even then it is not content; it longs to absorb the whole range of metallic acids, even including bitumen which is not really a mineral. Hidden in the earth lime develops the longing to attract everything to itself. It develops in the soil what is almost a desire nature. It is possible if one has the right feeling in these matters, to sense the difference between it and other substances. Lime fairly sucks one dry. One feels that it has a thoroughly greedy nature and that wherever it is it seeks to draw to itself also the plant-element. For indeed everything that limestone wants lives in plants, and it must continually turn away from the lime. What does this? It is done by the supremely aristocratic element which asks for nothing but relies upon itself. For there is such an aristocratic substance. It is silicon. People are mistaken in thinking that silicon is only present where it shows its firm rock-like outline. Silicon is distributed everywhere in homeopathic doses. It is at rest and makes no claim on anything else. Lime lays claim to everything, silicon to nothing. Silicon thus resembles our sense-organs which do not perceive themselves but which perceive the external world. Silicon is the general external sense organ of the earth, lime the representing general which desires; clay mediates between the two. Clay is slightly closer to silicon and yet it acts as a mediator with lime. Now one should understand this in order to acquire a knowledge supported by feeling. One should feel about lime that it is a fellow full of desires, who wants to grab things for himself; and about silicon that it is a very superior aristocrat who becomes what the lime has grabbed, carries it up into the atmosphere, and develops the plant-forms. There dwells the silicon, either entrenched in his moated castle, as in the horse-tail (equisetum), or distributed everywhere in fine homeopathic doses, where he endeavours to take away what the lime has attached. Once again we realise that we are in the

presence of an extremely subtle process of Nature.

Carbon is the really formative element in all plants (**enacting the hydrogens archetypal impulse**): it builds up the framework. But in the course of the earth's development its task has been rendered more difficult. Carbon could give form to all plants as long as there were water below it. Then everything would have grown. But since a certain period, lime has been formed underneath and lime disturbs the work, and because the opposition of the limestone had to be overcome, carbon allies itself to silicon and both together, in combination with clay, they once again start on their formative work.

How, in the midst of all this, does the life of a plant go on? **Below is the limestone trying to seize it with its tentacles, above is the silicon which wants to make it as long and thin as the tenuous water-plants.** But in the midst of them is carbon which creates the actual plant-forms and brings order into everything. And just as our astral body brings about a balance between our ego and etheric body, so nitrogen works in between, as the astral element.

This is what we must learn to understand - how nitrogen manages things between lime, clay and silicon. And also between what the lime is always longing for below, and what silicon seeks always to radiate upwards. In this way the practical question arises: What is the correct way of introducing nitrogen into the plant-world? This is the question which will occupy us tomorrow and which will lead us over to deal with the different methods of manuring the ground.

