

AGRICULTURE

LECTURE 2. - 10th June, 1924,

In these first lectures we shall bring together, from the field of knowledge of conditions which go to promote a healthy Agriculture, those which are necessary in order to enable us to reach certain practical considerations which are to be realised in immediate application and which can only have significance when being so applied. To do so we have to enquire at the very outset how the products of Agriculture come into being and what is their connection with the Universe as a whole. Now a farm or agricultural estate comes to full expression as a 'farm' the best sense of the word if it can be regarded as being a kind of separate individuality" a self-contained individuality, This is the condition which every agricultural estate or farm should approach as near as possible, although It cannot be completely attained. In other words everything that is needed to bring forth agricultural products should be supplied by the farm itself which includes, of course, the necessary cattle and live stock.

Anything brought In from outside, such as manure and the like ought under ideal conditions of Agriculture to be regarded rather as medicine for use In the case of sickness. A sound farm should be able to bring forth from itself everything that it needs,. We shall see later why this is quite the natural thing As long as we neglect the inner nature and essence of things and regard them only from their outer material aspect, so long will it be legitimate to ask: Does it really matter whether cow-manure is taken from the neighbouring farm or from one's own steading? Although it may be Impossible to carry this out strictly it Is important to h o Id before one the ideal of a self-contained farm. You will find some justification for this statement if you consider first the earth from which our farm arises and secondly the factors which work in upon the earth from the universe. It is usual to speak of these factors in very abstract terms. People are aware it is true, that the light and warmth of the sun, and all the meteorological phenomena connected with these, have a particular bearing upon the type of vegetation produced in a given area, But modern views can give no further details nor throw any further light on the matter because they do not penetrate into to the underlying facts. Let us therefore start from the standpoint which embraces the fact that the basis of all Agriculture is the soil of the earth.

This soil - I will indicate It schematically by this straight line (see drawing no. 2) is generally looked upon as being something purely mineral into which at the best organic substance has entered either because humus has been formed or manure has been introduced. The idea that the soil not only contains added organic substance but also has itself a plant - like nature and even contains an astral activity; such an idea has never been considered, still less conceded. And if we go a step further and consider how this inner life of the soil in the delicate balancing of its distribution is quite different in summer from what it is In winter, we come to subjects which are of enormous importance in practical life to which no attention is paid to-day. If you start by considering the soil then you must bear in mind the fact that it is a of organ within that organism which manifests itself wherever the growth of nature appears, The earth surface is really an organ, an organ which, if you care to you may compare with the human diaphragm. We may put the matter broadly in this way (it is not quite exact but will give the right idea): Above the diaphragm there are in man certain organs, the head in particular, and the processes of breathing and circulation which work up into the head. Under the diaphragm are other organs Now if we compare the earth surface with the human diaphragm we must say: The individuality represented by our farm, having the earth surface for its diaphragm has its head under the earth, while we and all the animals live in its belly. Above the surface of the earth, is really what may be regarded as the bowels of what I will now call agricultural-individuality". On a farm we are walking about inside the belly of the farm, and the plants grow upwards within this belly. Thus we are dealing with an individuality which is standing on its head, and which is on1y rightly looked at if so understood, especially as regards its relation to Man. In relation to animals, the situation, as we shall see later on, is slightly different

Now why do I say that the *agricultural-individuality" stands on its head?

I do so because the air, vapours and warmth which are in the immediate neighbourhood of the soil and from which both man and the plants derive air, moisture and warmth - all this

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corresponds to the abdominal organs in the human body. On the other hand every thing that takes place within earth, under the soil, affects the general growth of plants in the same way as our head affects our organism - especially in childhood, but also throughout the whole of our life. Thus there is a constant and very living interplay of supra-terrestrial and sub-terrestrial activities.

The forces at work above the earth are immediately dependent upon what we will regard for the time being localised on the planets Moon, Mercury and Venus. These Planets in strengthening and modifying the effects of the Sun exercise their influence on all that is above the earth surface, while the more distant planets lying outside the earth's path round the Sun strengthen and modify the effects of the solar influences which penetrate upwards through the earth. Thus the growth of plants is affected by distant heavens in so far as it takes place underground, and by the nearer heavens in so far as it takes place above ground; and the influences upon vegetable growth coming from the expanses of the Cosmos do not shine directly down upon the earth but are first absorbed by the earth which then causes them to radiate upwards. What come from beneath as good or bad vegetable growth are really the cosmic influences which are reflected from below; whereas in the air and water above the earth the Cosmos exercises its power directly. The direct cosmic in-streaming is stored up beneath the earth's surface, and from there it works back. The inherent qualities of the soil affecting the growth of plants are dependent upon these stored up influences. (Later we shall consider the case of the animals). The soil still retains in it the effects of influences dependent upon the most remote parts of the Cosmos which need to be considered in connection with the Earth. These effects are found in what we know generally as sand and rock; the substances which do not; the absorb water, which are ordinarily supposed to contain no nutritive elements whatsoever and which nevertheless play a every important part in the promotion of growth. These minerals are entirely dependent upon the activities of forces coming from the remotest parts of the Cosmos, and, improbable as it may appear, it is primarily through the medium of siliceous sand that it comes about that soil contains and radiates upwards what may be called its elements of life-ether and chemical activity (chemical ether). The inner life of the soil and the formation of its particular chemical properties depend entirely upon the constitution of its sandy parts, and what the plant roots experience within the soil is determined by the amount of Cosmic life and Cosmic Chemistry which the Earth has absorbed through the mediation of its stony substance (which of course may lie at some depth below the surface). Anyone therefore, who has to concern himself with the growth of plants should be quite clear as to the geological structure of the ground from which the plants are to grow, and further should bear in mind in all cases that those plants whose roots are for us of primary importance cannot do without silicon in the soil, even though this may lie well below. We should be thankful that silicon makes up 47% to 48% of the Earth, either in the form of silicon (silicic acid) or in other compounds. Such supplies as we need are therefore always present.

Now the effects which have been brought about in the root through silicon must be borne upwards through the plant. It must stream upwards and there must be a constant interaction between the cosmic forces that have entered into the plant through silicon and those that are active above - forgive me In the "belly" and that supply the "head" below with what it required. True the "head" must be provided for out of the Cosmos but this process must interact with that which takes place above ground in the "belly". The forces coming in from the cosmos and being caught up underground must be able to flow upwards again, and the substance which brings this about is clay. Clay is the mediator through which the cosmic activity in the soil is enabled to work from below upwards. In actual practice this will give us the key to the handling of both clay soil and sandy soil according to the particular way we may wish to cultivate. But we must first know what is actually happening. How clay is to be described and treated in order to make it fertile are important but secondary considerations, The first and foremost thing to know about clay is that it promotes the cosmic upward flow.

However this cosmic upward flow is not enough by itself. There must also be present the opposite, which I could call the earthly or terrestrial element streaming downwards, All that undergoes a kind of eternal digestion in the "belly" (the processes above the surface throughout Summer and winter are indeed a kind of digestion in relation in the growth of plants!) has to be drawn down into the earth. All forces produced by the action of water and air above the Earth and also the substances in delicate homoeopathic distribution called from there are drawn down into the earth by lime presented in it in greater or smaller

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proportions. The lime content of the soil and the distribution of lime in homoeopathic dilution above the surface - these are the factors which have the task of leading the terrestrial ("belly" Ed) forces down into the soil.

These things will take on a very different aspect in future when we shall have a real science concerning them and not only the scientific guesswork of today: it will be possible then to give exact information. We shall then know that there is a great, an immense difference between the warmth that exists above the surface of the Earth and which stands within the sphere of the influence of the Sun, Venus Mercury and Moon, and the warmth which makes itself felt within earth and which stands under the influence of Mars, Jupiter and Saturn. These two kinds of warmth which we may call the "blossom and leaf warmth" and the "root-warmth" respectively, are completely different from one another - so much so, indeed that we can describe the warmth above the Earth as a *dead" warmth, the warmth below the Earth's surface a "living" warmth. The warmth below the surface, especially during Winter contains an inner vital principle. If we human beings had to experience in ourselves this living warmth, which works within the soil we should all become immensely stupid because in order that we may be intelligent beings, dead warmth has to be supplied to our bodies. But at the moment when the limestone and other substances enable warmth to be drawn into the soil and to change from outer into inner warmth it passes over into a condition of gentle aliveness. It is recognised to-day that there is a difference between the air which is above the Earth and that which is below the surface, but the difference between warmth above the Earth and that below the surface has been overlooked, It is generally known that the air under the Earth contains more carbonic acid while that above the Earth contains more oxygen; but the reason for this is not known. It is that the air, as it is drawn into the earth, is penetrated by a gentle aliveness. This is true both of warmth and of air. They both receive a tiny spark of life as they pass into the earth. It is different in the case of water and of the solid earth element itself. Both of these have less life inside the Earth than they have when above its surface. They become "more dead", they lose something of their life they had outside. But it is precisely this circumstance which exposes them to the influences of the most distant cosmic forces. The mineral substances have to free themselves from the forces which are working immediately above the surface of the Earth if they wish to be accessible to those far away cosmic forces. In our epoch this emancipation from the processes in the immediate neighbourhood takes place in the period of the time between the 16th January and 15th February, ie. in Winter, The time will come when these indications will be acknowledged as exact data. It is at this period of the Winter that within the Earth the formative forces of crystallisation reach their full development in the mineral substances. In these days of mid-winter it is a peculiar feature of the interior of the Earth that it becomes less dependent upon its mineral masses and falls under the influence of the crystallisation forces of the cosmic expanses.

Now consider what happens, Towards the end of January the mineral substances of the Earth have a greater "longing" than at any other time to reach crystal purity in the economy of nature; and the deeper one goes, the greater one finds this "longing" to be. The plants, absorbed in their own life in the Earth are less open at this time than at any other to the influence of the mineral substances. But for a time before and for a time after this period, (but especially before when the minerals are preparing to perfect their crystal shape and purity) they are of the utmost importance to the growth of plants. It is then that they throw out forces which are of extreme importance for plant growth. Thus some time in November and December there is a point of time when the mineral forces at work under the Earth are particularly propitious to the growth of plants. The question therefore arises: How can this best be utilised for the growth of plants? Some day it will become evident that by utilising this knowledge we are able to guide the growth of plants. I will say this now: That in the case of a soil which does not in itself promote the required upward movement of forces which ought to work upwards in Winter period, it is well to add clay in a proper proportion. (I shall indicate this proportion later on.) In this way we enable the soil to carry those forces, upwards to make it effective in the realm of plant growth above the Earth; before the forces of the minerals have reached their maximum effects for themselves, which will not be until the January or February period. (These forces show themselves outwardly - for those who can read their story - in snow crystals.) It may be noted that the power of these forces become stronger and stronger the deeper we go into interior of the Earth.

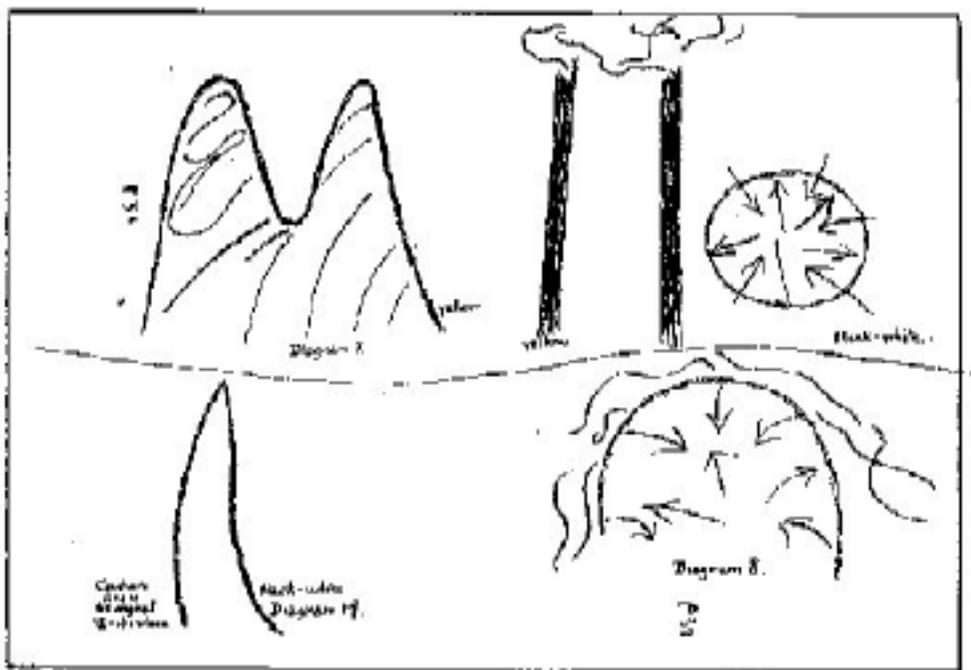
In this way what seems to most people recondite can give us insight of the

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greatest positive value and practical help, where we should otherwise be working at random. Indeed we must realise clearly that the cultivated ground together with what lies under the surface of the Earth forms an individuality living also within the element of time (ie. living through the four seasons) and that the life of the Earth still is particularly strong during Winter, whereas in Summer it undergoes a kind of death.

Now with regard to the cultivation of the soil there is a point of great importance which must be thoroughly understood. It is a point I have often dealt with amongst Anthroposophists. It is that we know the conditions which the forces of the cosmic spaces can work upon the earthly realm. Let us begin with seed formation. The seed which gives rise to the embryo of the plant is generally regarded as a molecular structure of exceptional complexity, and science lays great stress upon this interpretation. The molecules it is said have a certain structure, in simple molecules it is simple, in complicated molecules it becomes more and more complex, until we come to the extreme complexity of the albuminous or protein molecule. People stand in wonder and astonishment at the enormous complexity of the structure supposed to exist in the seed.

They do so because they reason as follows. The albumen (or protein) molecule, they say, must be enormously complex, and since its structure was determined by the embryonic conditions of the seed, the latter's microscopic or ultra-microscopic content must also have a structure of enormous complexity. Well it is complex indeed in the beginning. As the earthly albumen is formed, its molecular structure is driven to the utmost complexity; but this alone would never give rise to a new organism. For the organism arising from the seed does not proceed by a mere continuation in the off-spring of what was present in the parent plant or animal. What happens is that when the embryonic structure has reached the highest stage of complexity in the earth domain it falls to pieces and becomes a "little chaos". It breaks up and dissolves, one might say, into "world-dust". And when this little chaos of world-dust is there, the whole surrounding cosmos begins to work upon it to stamp it with its own image and to build up in it a structure conditioned by the forces of the Universe working in upon it from every side (see drawing no. 3). Thus the seed becomes an Image of the Cosmos. Every time this happens, and seed formation is carried through to the point of chaos, the new organism is built up from the seed-chaos by the activity of the cosmos. The parent organism has only the tendency to bring the seed to such cosmic position that through its affinity with this cosmic position the cosmic forces will act in the proper direction so that, eg a dandelion will give rise to another dandelion and not a berberis.



But the new thing that is built up is always the image of some cosmic constellation. It is built up out of the cosmos, And if in the Earth we would

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make effective the forces of the cosmos, we must drive the earthly elements into the state of greatest possible chaos. This has to be the case whenever we want the cosmos to act upon our Earth. In the case of plant-growth this is in a certain sense provided for by nature herself. But just because every new organism is built up by the Cosmos it is necessary that the cosmic principles must be allowed freedom to work in the organisms until the seed-formation is completed,

If for example, we plant the seed of a given plant in the earth the seed contains the impress of the whole cosmos from a particular cosmic direction, which means that it came under the influence of a particular constellation and received its particular form. At the moment when the seed is placed in the soil it is strongly worked upon by the terrestrial ("belly Ed.) forces, and it is filled with the longing to deny the cosmic forces, in order that it may spread and grow in all directions. For the forces above the surface of the Earth do not want the plant to retain this cosmic form. The seed had to be driven to the point of chaos; but now that the plant is sprouting it is necessary to oppose the terrestrial to the cosmic forces which live as the form of the plant inside the seed, For the cosmic forces must be opposed and balanced, as it were, by the terrestrial forces. We must help the plant to become more akin to the Earth in its growth. This can only be done by introducing into the plant some form of living earthly matter which has not yet reached the state of chaos and seed formation, life which has been held up in a plant before the seeds have been formed. For this purpose a rich humus formation comes to man's assistance in those districts that are fortunate enough to possess it. Man can hardly find any artificial substitute for the fertility given to the soil by Nature through humus. What causes formation of humus? It arises from the absorption of remnants of living plants into the whole process of Nature, These remnants have not yet reached the state of chaos and respect the cosmic forces, as it were. If humus is used for the growth of plants the terrestrial forces are held fast within them. The cosmic forces then work only in the upward stream that terminates in seed-formation. While the terrestrial forces work in the development of flowers, leaf and so on, the cosmos only radiates its influence into all this.

Let us suppose that we have before us a plant growing out of its own root. At the top end of the stem comes the grain of seed, while the leaves and blossoms spread out sideways. Now, in the leaf and the blossom the terrestrial element is working in giving shape and filling it with matter; the reason why a leaf grows or a grain swells and takes up the substance inside it is to be found in the terrestrial forces which we lead to the plant and which have not yet reached the point of chaos. The seed, however whose forces work upwards through the stem - vertically - not rotating around it (as in the formation of leaves. ed.) radiates the cosmic forces into leaves and blossoms. One can actually see this. We have only to look at the green leaves of a plant. In their shape, in the substances filling them and in their green colour, the leaves bear the terrestrial element, But they would not be green if they had not within them the cosmic force of the Sun, And now look at the coloured blossoms. In these the cosmic forces of the Sun is not working alone but is supported by the distant planets, Mars Jupiter and Saturn. If we regard the growth and development of plants from this point of view, we shall see the redness of the rose as the force of Mars, the yellow of the sunflower (so-called only because of its shape) as the force of Jupiter. It should be called the Jupiter flower, for it is the force of Jupiter that reinforces the solar force and brings forth the white and the yellow colours in the flowers. The blue of chickweed or chicory flower is the effect of Saturn reinforcing the effect of the Sun. Thus we can see Mars in the red coloured flower Jupiter in the yellow, Saturn in the blue, while in the green colour of the leaf we see the Sun itself. But the same powers which appear as colour in the flower are also at work especially strong in the root. Here once more the forces living in the distant planets are active within the soil. If we pull a plant out of the ground we may see that in the roots there is cosmic force, in the blossom mostly the terrestrial element and only in the finest shading by the colour

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the cosmic element can be seen. The terrestrial forces on the other hand, if living actively in the root cause the root to push out into form. For the form of the plant is determined by factors arising in the realm of earth. It is the terrestrial forces that causes the form to spread. When the root develops and divides, it is due to the terrestrial forces working downwards just as the cosmic forces (in the case of the colour) work upwards. Single roots are therefore cosmic roots, whereas forked roots are due to the terrestrial forces working down into the soil, just as in colour the cosmic forces work upwards into the flowers. And the cosmic force of the Sun stands between the two. The Sun force works principally in the green leaves, in the interaction between blossom and root, and in all that is between the two. Thus the Sun element really belongs to what we have called the diaphragm provided by the surface of the earth; whereas the cosmic element belongs to the interior of the earth and works its way up into the upper part of the plant. The terrestrial element above the earth works downwards and is drawn into the plant with the help of the limestone. Plants which draw down the terrestrial element into their roots through the lime are those whose roots divide in all directions such as all herbs used for fodder, (but not turnips) and such as the sainfoin. Thus It should be possible, looking at the form of a plant and the colour of the flowers to tell how much cosmic forces and how much terrestrial forces are at work in it. Now let us assume that we find some means of holding back the cosmic forces within the plant, These forces will then be prevented from manifesting it by pushing up into flowers but will live out their life region of the stem of the plant. Now wherein do these cosmic forces reside in the plant? They reside in the silicon. Take the Equisetum. It has this very property of attracting silicon and permeating itself with it. It is 90% silicon. Thus in this plant the cosmic element is present to a tremendous extent. It does not manifest itself in flowers, but in the growth of the lower part of the plant.

Now, let us take the opposite case. Let us suppose that we want to hold back these forces which work upwards from the root through the stem into the leaves and store them up in the region of the root. This possibility is no longer fully open to us in the present epoch of our earth, since genera and species of plants have been so firmly established. Formerly, in ancient epochs when men could easily transform one plant into another this possibility had to come greatly into consideration. Today we consider it only from the point of view of finding out the condition favourable to a given plant. How can we then set about preventing these forces from pushing upwards into blossom and fruit? How can we in addition hold back the development of stem and leaf within the formation of the root? We must place such a plant on sandy soil. For silicon or flint holds back the cosmic forces and even gathers them. Now the potato plant is one in which the growth of leaf and stem is held back. , The potato is a root-stock. The forces that form leaf and stem are held fast in the potato itself. The potato is not a root but a stem which has been held back. Potatoes must therefore be planted on sandy soil; this is the only way of holding back the cosmic forces in them.

The ABC of everything concerning the growth of the plant consist therefore, in knowing what in any particular plant is cosmic origin and what is due to terrestrial forces. How can we make a soil more inclined to condense, as it were, the cosmic forces to retain them in root and leaf? How can we thin them out so that they can be sucked upwards into the blossoms and colour them and even into the fruit and permeate them with a delicate taste? For the delicate taste in an apricot or plum is like the colour of a flower, both being due to the cosmic forces which have worked their upward through the plant. In the apple you are literally eating Jupiter, in the plum you are eating Saturn. If modern man were faced with the necessity of producing the innumerable species and varieties of fruit-bearing plants from the much smaller number of original plants existing in primordial times he would not get very far. And we may be thankful that the great majority of our existing fruit trees were brought into existence when mankind still possessed an ancient instinctive wisdom of how to produce new varieties out of the

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primitive species which then existed. Nowadays these things are done by trial and error. People do not enter into the process with knowledge. And yet a rational method` is the fundamental condition for any possible advance in Agriculture. What our friend Stegemann said in this connection was particularly opposite. He drew attention to the fact that agricultural products are deteriorating in quality. Now you may or may not agree with what I am going to say, but this deterioration is I claim, connected as is the transformation of the human soul with the declining of the Cosmic Kali-Yuga during the last few decades and the decades that are to come. For we are also in the presence of a complete inner transformation of Nature. All that we have inherited and been handed down in the way of natural talents, inherited knowledge, nature and of traditional medical remedies is beginning to lose its significance. We shall have to acquire new knowledge if we want to penetrate the natural connection of these things. Humanity has no other alternative before it today than either to learn again about the whole web of natural and cosmic connections, or to let both nature and humanity degenerate and die out. As in the past it is imperative that our knowledge should penetrate to the actual structure of Nature, For example, man knows more or less what happens to air inside the earth but he hardly knows any thing of what happens to light inside the Earth. He does not know that Silicon, the cosmic mineral, takes up light into the Earth and there makes it active, whereas humus, the substance closely allied to terrestrial life does not take up light and make it active in the earth but produces a lightless activity there. But these are the things which will have to become understood and known.

Now, to go further: In any given region of the earth there is not only a particular vegetation but also certain animals live there. For reasons which will appear later on we need not consider human beings for the moment, It is one peculiar fact, and I should be glad to see this put to experimental test as I am quite sure that such a test would confirm it. This fact is that the right quantities of cows, horses and other live-stock on a farm will supply just the necessary amount of manure for the farm to restore to it what has been discharged into "chaos". Moreover the right proportion of horses, cows and pigs will yield the right proportions in the mixture of manures. This is because the animals eat the right proportion of the plant substances yielded by the soil, and because in the course of their organic processes they produce as much manure as is needed to be given back to the soil. And, though it cannot be strictly carried out, I would say that manure of any kind introduced from outside can only be regarded as a curative substance for a farm that has become diseased. A Farm is only healthy if it can supply itself from the manure yielded by its own animals. This of course entails the development of a real knowledge of how many animals of a given sort are necessary for a given farm. But this will be found out as soon as some knowledge returns to us of the inner forces in Nature. To what I said about the "belly" being above the Earth and the "head" being under the Earth, belongs an understanding of the animal organism. For the animal organism is connected with the whole economy of nature. With respect to form and colour structure and consistency of its substance, it is under the influence of the planets. Working backwards from the snout the influences are as follows , Saturn Jupiter and Mars affect the region extending from the snout to the heart, the heart is worked upon by the Sun , while the region extending from behind the heart to tail comes under the influences of Venus, Mercury and Moon, (See drawing No 5).

Those who are interested in these things should try to examine the forms of animals from this point of view. For a development of knowledge along these lines would be of enormous importance, Go to a museum, for example, and examine the skeleton of an mammal, In doing so, bear in mind the principle that the structure and build of the head is primarily the result of the direct radiation of the Sun streaming into the mouth. Then you will see that the structure of the head and of the adjoining parts depends upon the way in which the animal exposes itself to the Sun. A lion exposes itself quite differently from a horse: the reason for these differences will be examined

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later on, Thus the front part of an animal and the structure of its head are directly connected with the Sun's radiation. Now the light of the Sun also reaches the Earth indirectly, by being reflected from the Moon. This too has to be taken into account. The sunlight that is reflected from the Moon is quite ineffectual when it falls on the head of an animal. (These things apply especially to embryonic life). The light reflected from the Moon produces its greatest effect when falling upon the hind parts of the animal. Look at the formation of the skeleton of an animals hind parts and the peculiar polarity in which it stands to the formation of the head. You should develop a feeling for this contrast in form between the animals hind quarters and its head and especially for the insertion of the hind limbs and the rear and the intestinal tract. This contrast between the front and the hindermost parts of the animal is the contrast between Sun and Moon. If you go further you will find that the influence of the Sun stops just short of the heart; that Mars, Jupiter and Saturn are active in the formation of the blood and the head; and that, from the heart backwards the activity of the Moon is reinforced by that of Mercury and Venus. Thus if we imagine ourselves to have picked up the animal, turned it round and set it upside down with its head in the earth we shall have the position invisibly taken by the "agricultural-individuality". The consideration of this formation of the animal enables us to see a relation between the manure produced by the animal and the needs of the earth in which the plants grow which serve as food for the animal. For you will remember that the cosmic forces which act in a plant are guided upwards through it from inside the earth. If, therefore, a plant is particularly rich in these cosmic forces, and an animal eats it, then the manure which this animal excretes will be particularly well-suited to the soil on which the plant grows. Thus if we learn to grasp the forms of things we shall see in what sense an agricultural unit, or farm is a "self-contained individuality" (or as we have called it an agricultural-individuality") only we have to include in it the necessary livestock.