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SPIRITUAL FOUNDATIONS  
FOR THE RENEWAL OF  
AGRICULTURE

BY  
Rudolf Steiner

A COURSE OF LECTURES  
HELD AT KOBERWITZ, SILESIA, JUNE 7 TO JUNE 16, 1924

Translated from the German  
by  
Catherine E. Creeger and Malcolm Gardner

Edited by Malcolm Gardner

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#### PUBLISHER'S NOTE

The following lectures were given by Rudolf Steiner to an audience familiar with the general background and terminology of his anthroposophical teachings. Rudolf Steiner always emphasized the distinction between his written works and the reports of his lectures, which were not originally intended for print and which he usually did not have time to correct. Due to the interest in the lectures, he eventually consented to their publication, but as he warned in his autobiography, "it must be borne in mind that faulty passages occur in these lecture-reports" (Steiner 1925: chap. 35). Further details about the basis for the text of the present lectures are found at the beginning of the editorial notes at the back of this volume.

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## FOREWORD

Rudolf Steiner's gift to the world was Anthroposophy or Spiritual Science. This is a path of inner development that aims to guide the spiritual in the human being to the spiritual in the universe.

He described how our physical/material world is permeated on all sides by a rich and multi-faceted divine spiritual world. In this view, the Earth is seen as an integrated living Being.

Anthroposophy touched many people deeply and they sought Rudolf Steiner for his perspectives into their own professional fields of work. In 1924, following repeated requests, Rudolf Steiner agreed to give a series of lectures to farmers in what was then Eastern Germany. These farmers had already noticed the deterioration of plant and animal health due to chemical fertilization. They wanted to know how to strengthen the vitality and forces of their crops and livestock. This course of lectures became the foundation for the Biodynamic Method of agriculture.

For the new reader of these lectures it is helpful to understand the context into which they were placed. Most of the members of Steiner's audience were well-trained and experienced farmers; the lectures were not intended to teach farming but rather to supplement existing good farming practices with a spiritual understanding of the forces of nature. Those who attended the Agriculture Course included both rich and poor, men and women. They were European and many of the references and questions dealt with their specific problems and situations.

The reader will become immediately aware that Rudolf Steiner was speaking to an audience that was already familiar with the basic concepts of Anthroposophy. He had recommended that all the participants first study his books *Theosophy* and *Occult Science*.

Preparing in this way is still good advice. Without it many of the passages may be incomprehensible or will give an incorrect meaning.

With this new edition we have tried to bring together all of the material by Rudolf Steiner relating to the Agriculture Course. To begin with, a completely new translation was commissioned to put the lectures into contemporary English. To complement the translation, an extensive section of editorial notes and references was added. These provide the reader with access to the wider body of anthroposophical literature, as well as to research and developments in biodynamic agriculture that have taken place since 1924.

Several important sections that have not previously been available to the English-speaking public are also contained in this volume. It includes a facsimile copy and translation of Steiner's handwritten notes that he used in preparation for the Course. Some of the material in these notes was gleaned from textbooks of the day, while much of the material is from his own research into the spiritual world. Although these were never intended for publication, they are presented here because they provide valuable background and insight to the development of his final presentation.

During each of the lectures Steiner made colored drawings to illustrate the subject he was speaking about. The original drawings were recently discovered and full-color reproductions are found at the end of this book. Upon his return to Switzerland he gave a lecture-report to his colleagues on several important aspects of the Course. A translation of this has been included as well as reports of several personal conversations he had with others on agricultural subjects.

On behalf of the Bio-Dynamic Farming & Gardening Association I wish to thank all those who have helped review this new edition prior to its publication. Special thanks is due to Catherine Creeger and Malcolm Gardner for their masterful new translation. I would also like to acknowledge Malcolm Gardner for the excellence and thoroughness of his work on the editorial notes, references, appendices, and index; his selfless devotion to this edition will benefit all readers.

Roderick Shouldice

## INTRODUCTORY:

### RUDOLF STEINER'S REPORT TO MEMBERS OF THE ANTHROPOSOPHICAL SOCIETY<sup>1</sup> AFTER THE AGRICULTURE COURSE

Dornach, Switzerland

June 20, 1924

As you know, I have just returned from a trip to Breslau and Koberwitz.<sup>2</sup> This trip, although it was also coupled with more general anthroposophical goals, served one goal in particular. A number of farmers in the Anthroposophical Society had requested a course on agricultural issues, and on this occasion the farmers in our Society came together from near and far for some earnest study of how anthroposophical research can contribute to this area of human endeavor. Of course, such an eminently practical area of life does not call for mere theories, but for perspectives applicable to practical work, so naturally people were expecting to hear specifics.

All the participants in this agriculture course, including those members of the Executive Council who could be present — Frau Dr. Steiner, Dr. Vreede, and Dr. Wachsmuth — were hosted at Koberwitz Manor by our good friend Count Keyserlingk. This meant that the conference was self-contained and unusually satisfying for the participants. The reception we were given was extraordinary by any standards. Koberwitz is forty-five minutes from Breslau, and it was no mean feat to welcome a company of more than a hundred conference guests every day, not only for the lectures but also for a substantial meal. Since the participants could not all stay overnight in Koberwitz, people had to come out from Breslau and usually arrived around eleven in the morning. Then the lecture began and lasted until around one o'clock, after which came the midday meal. During the break, which

lasted until around quarter of two, the guests had practically the entire house and its very interesting grounds at their disposal. After this there was still a discussion on agricultural subjects which lasted until three o'clock. That was the Koberwitz side of the event, and since it went on for ten days, you can see how much hospitality was involved.

I must confess, however, that it was not easy for Count and Countess Keyserlingk to get this course off the ground. It had been promised for a long time, but I did not manage to get there until Count Keyserlingk's nephew came to the Christmas Conference in Dornach with strict instructions not to return home without a firm commitment from me to conduct the course within the next six months. So when this nephew, who has a knack for making the most unlikely things happen, showed up here under those auspices, he was so persuasive that I told him the course would take place at the first possible moment. This turned out to be at Whitsun. And so it was a lovely Whitsun celebration, a truly anthroposophical Whitsun festival.

There is something very unusual about the Koberwitz estate and its surroundings. Since the estate is one of the largest in the region, encompassing about 30,000 Morgen [ca. 7500 hectares or 18,500 acres], there is a lot of farming activity to be seen there, and we could indeed see a great deal since they were more than willing to show us.<sup>3</sup> But one thing you notice as soon as you arrive in Koberwitz, or at least as soon as you go to wash your hands, is the iron stain in the sink. The soil around Koberwitz is extremely rich in iron, a fact which I believe could be utilized in a variety of ways. Iron comes to meet you everywhere. As I said in my greeting to our hosts that first day, everything in Koberwitz seems to have iron in it: the Count's nephew was iron-willed in his request when he came here at Christmas, the soil is full of iron there, and the whole atmosphere is so full of energy and purpose that I could only call our hosts the Iron Count and Countess. There was indeed something iron-like in their bearing.

with regard to the agriculture course, the first consideration was to outline what conditions are necessary in order for the various branches of agriculture to thrive. Agriculture includes some very

interesting aspects — plant life, animal husbandry, forestry, gardening, and so on, but perhaps most interesting of all are the secrets of manuring, which are very real and important mysteries. We began by discussing the basic principles and relationships, which are especially relevant nowadays because under the influence of our modern philosophy of materialism, it is agriculture — believe it or not — that has deviated furthest from any truly rational principles. Indeed, not many people know that during the last few decades the agricultural products on which our life depends have degenerated extremely rapidly. In this present time of transition from the Kali Yuga to a new Age of Light,<sup>4</sup> it is not only human moral development that is degenerating, but also what human activity has made of the Earth and of what lies just above the Earth. This degeneration can be confirmed statistically and is the subject of discussion in agricultural organizations, and yet it seems that nothing can be done about it. Even materialistic farmers nowadays — if they don't just live from day to day but give some thought to what is happening on a daily basis, or at least a yearly basis — can calculate in approximately how many decades their products will have degenerated to such an extent that they can no longer serve as human nourishment. It will certainly be within this century. This is a cosmic issue as well as an earthly issue. Precisely from the example of agriculture, we can see how necessary it is to derive forces from the spirit, forces that are as yet quite unknown. This is necessary not only for the sake of somehow improving agriculture, but so that human life on Earth can continue at all, since as physical beings we depend on what the Earth provides.

So you can see what a very broad theme this is. The principles given in the course — showing how plants develop under various conditions, how animals develop, the principles of manuring and of combatting weeds and pests as well as parasites and plant diseases — are all very pressing issues in agriculture today. After discussing these principles, we went on to talk about what actually needs to be done in order to reform the methods of manuring and the methods of combatting weeds, pests, parasites, and plant diseases.<sup>5</sup>

In conjunction with the course and the daily discussions that accompanied it, the anthroposophical farmers in attendance established a "Circle," as Cour. Keyserlingk called it, which will work very closely with the Natural Science Section here at the Goetheanum.<sup>5</sup> It will be up to the Natural Science Section to work out general principles based on the geological nature of the soil and other soil characteristics, and information on the types of fodder available, sources of manure, proximity to forest, climatic conditions, and anything else that might come into consideration. Once the farmers have provided these details, the Natural Science Section will then work out guidelines for setting up further experiments so that the practical pointers given in the course and in the accompanying discussions can actually be tried out. Thus in future everyone will be able to say, "We have tried it, and it works," even though some of these things may still seem strange right now. Towards this end, the farmers' Circle will work very closely with the Natural Science Section, and also with Dr. Vreede,<sup>6</sup> because astronomical information will be needed too. Of course, the whole School of Spiritual Science, and the Medical Section in particular, will also be involved in a variety of ways. This is in accordance with the intentions worked out by our friends Herr Stegemann<sup>7</sup> and Count Keyserlingk during the course, and it means that the whole venture will stand a much better chance of practical success than certain other recent undertakings that were not so well managed.

One condition for success, however, was strongly and repeatedly emphasized: for the time being, the content of the course must remain the spiritual property of the Circle of practicing farmers. Although some people only casually interested in agriculture were also present at the course, they were not permitted to join the Circle and were expressly instructed not to fall into the usual anthroposophical habit of immediately talking about everything with everyone. These things will only be able to live up to their true potential if the content of the course remains in the hands of the specialists and is tested by the farmers. Some things will require four years to try out. In the meantime, the practical pointers that were given are not supposed to stray outside the agricultural community. These things are meant to

enter right into practical life, so it does no good just to talk about them. Anyone who heard these things and goes around talking about them will be doing them an injustice.<sup>8</sup>

To begin with, that's what I wanted to tell you about the agriculture course, which I believe was quite fruitful. Alongside the agriculture course itself, which took place out in Koberwitz from about quarter past eleven until three in the afternoon, many other events were going on. These other events took place in Breslau, including a eurythmy performance on Whitsunday morning which was very well attended and exceptionally well received.<sup>9</sup> Each day concluded with a lecture for members of the Anthroposophical Society on questions relating to karma, which for some weeks has been the subject of our considerations here in Dornach. In Breslau, however, the subject was condensed into nine lectures.<sup>10</sup> I have already written a brief report on all these things for the newssheet included in the issue of *Das Goetheanum* that has just come out today.<sup>11</sup>

Let me emphasize once again something that has been discernable in many different places — in Prague, in Bern, in Paris, and now again in Breslau: The new esoteric quality that now permeates the whole Anthroposophical Society since its refounding is being received in a most satisfying way, in an extraordinarily warm-hearted way. Now that the Anthroposophical Society has won its spirituality through the Christmas Conference,<sup>12</sup> there is every reason to hope that the esoteric Executive in Dornach will work with this in a consciously spiritual manner. It is everywhere apparent that the hearts of the members are warmly coming to meet this stream as it flows outward.

This was especially apparent at the evening lectures for the members in Breslau. And the warm response to the Breslau and Koberwitz lectures also became evident in a spiritual-organizational way: the deep anthroposophical understanding they aroused was transformed into physical reality. I will only mention the social gathering, which took the place of a lecture on Monday evening in Breslau and brought the whole affair to a close. People had traveled to Breslau from all over — from southern Germany and western Germany, as well as from closer by — so that the halls were



overflowing with members. It has been a long time since the members in Germany have experienced such an event. At the social gathering on Monday night, after very many people had already had to leave on Sunday, there were still about three hundred and seventy members present, all of whom were treated to supper in Breslau by the Keyserlingks. You can just imagine the trucks arriving at a Breslau restaurant, full of everything needed to feed three hundred and seventy anthroposophists who on this evening, as I noticed as I walked around, all seemed to have exceptionally good appetites. I know that is what happens when you visit art museums — nothing makes you hungrier than looking at paintings — but the same thing seems to happen at anthroposophical lectures, and of course the effect had been building up for ten days! But the nicest thing about it was that there was plenty to go around, and even a lot left over, in spite of the three hundred and seventy hungry anthroposophists.

The days there were framed by the agriculture course and by the lectures for anthroposophical members at the end of the day. In between, a course on artistic speech-formation was given by Frau Dr. Steiner,<sup>13</sup> and there were also two meetings with the Breslau youth group and two Class Lessons.<sup>14</sup> And on the last Sunday we were also given something extra. Herr Kugelmann arrived with his troupe of actors, who have taken up the suggestions given during the speech course here at the Goetheanum two years ago and are using them to develop new artistic forms for stage dramas. Their performance of *Iphigenia* proved to be a very promising development. The days were full indeed, but it was good to be able to offer something to these members who had gone for so long without being able to take part in any anthroposophical gathering at all. Among all these goings-on, there was still time for tours of the farms. We saw all there was to see, including, of course, some signs of Central Europe's collapsing economy. The Koberwitz estate is admirably run, and farming has to continue regardless, but the economic situation in Germany is certainly terrible.

By Monday night around eleven o'clock the whole thing was over. Then on Tuesday I traveled to Lauenstein, near Jena, where a number

of our younger friends are working with Dr. Ilse Knauer to establish a curative-educational home for children who are not merely retarded, but seriously constitutionally handicapped; there they will be educated and their development furthered as much as possible. As I said, this institute is just getting established. I was able to see the very first children they have admitted, and help the place get on its feet a bit.<sup>15</sup>

After that I came here by way of Stuttgart. The general situation in Germany is depressing enough, but what is particularly depressing in Stuttgart is the financial situation of the Waldorf school.<sup>16</sup> Educationally and spiritually, however, the school is making great progress. Just this morning I had to arrange for the two fifth grades to be split into three, so that they now have grades 5a, 5b, and 5c. The sixth grade also has three parallel classes, while most of the other grades have two classes, even the highest. There are over eight hundred students in the school. So from an educational point of view, and also spiritually, the school is thriving, but financially the situation is just about hopeless, really hopeless. Just before Christmas, the Waldorf school's monthly budget was 6-8,000 marks, but given the tremendous inflation rate in Germany, this amounts to 25-27,000 marks by now, which is a terrible state of affairs. Just recently the financial situation got so bad that we weren't able to cover 15-17,000 marks of this monthly budget; that is, we have to deal with a deficit of 15-17,000 goldmarks a month. This is a very depressing state of affairs. It weighs heavily on the soul, for the school is well established, with a faculty of over forty teachers and a student body of over eight hundred. Of course, it is extremely difficult to keep a venture of that size going under the present economic conditions in Germany, which do not look like they are going to get better very soon. For the past four or five months, sacrifices on the part of some of our anthroposophical friends have enabled them to come up with about 10,000 marks a month, so we were only left to cover a deficit of 6-7,000 marks. We did manage to do this, but the truth is, my dear friends, that here in the Anthroposophical Society there are some rather impractical ways of behaving when it comes to practical matters. You need only consider what I said recently at a meeting of the Waldorf School Association —

and I hope that this is spread far and wide, since it is much more important than some of the other things anthroposophists spread around. I said that since at a conservative estimate there are some 10,000 anthroposophists in Germany, if they would just take up a weekly collection and each contribute only half a mark, that would add up to 5,000 marks a week. This could be managed easily enough; it is just a question of actually doing it. In the Anthroposophical Society our undertakings are so poorly organized that people who would actually gladly donate money — and I have experienced this — are often at a complete loss to know how to go about doing it. The situation of the Waldorf school is very difficult indeed, but let me take this opportunity to mention that because of the sacrifices on the part of friends here in Switzerland, some significant support has recently been forthcoming. This has been partly in the form of direct contributions, but primarily in the form of sponsorships for the children, with each sponsor paying 25-27 marks a month on behalf of one student. Still, the situation at the Waldorf School remains very depressing and the outlook remains grim. If we could come up with an additional 250 to 300 sponsors, if more contributions from members would come in, if collections were taken up, and so on, it would not be difficult at all. Part of the picture, of course, is the indescribable shortage of money in Germany at the moment. It's not that goods aren't available, but currency is so scarce that almost no circulation is possible. The economy of Central Europe is certainly in very bad shape.

That's about the extent of the report I wanted to give to you. These things all show what a potent force for our times is present in anything undertaken out of the spiritual core of the anthroposophical movement. The way the Waldorf School has developed demonstrates the strength inherent in anthroposophy, and it shows in other things as well. There is a great need for everything anthroposophy has to offer. Recently there was a course in artistic speech-formation, for example, which had to be squeezed into a few hours because there was simply no more time available. But still, about 160 people registered for it. Since it is impossible to teach speech to 160 people in five hours, the way it had to be arranged was that the thirty people or so who sat in

the front got some proper instruction, while the rest only got to listen. The need for anthroposophy is obviously there as a very deep and far-reaching need. We must only be prepared to activate the forces that are already available to us, so that we can really make some headway in our anthroposophical activities.

The fact is that an event like the Breslau gathering is a real tribute to all the work put into it by the Iron Count and Countess Keyserlingk, and by our old friend Herr Bartsch. Herr Bartsch was a young man when he became an anthroposophist and has been active in the anthroposophical movement almost since its inception. He has recently retired as a school principal, but still feels so youthful when he gets together with other people that at the first evening lecture he introduced me as "the father" — which he was teased about for the next ten days!

That's what I wanted to report about this gathering, which I was sure would be of interest to you because it shows the real possibility of bringing something originating in anthroposophy right into practical life. It shows that it is possible for anthroposophy to work from both the most highly spiritual side and from the most practical. In actuality we are only working in the right way when these two sides are woven together in complete harmony. When we work anthroposophically, it is all too easy to make the mistake of not letting things on the spiritual side break through into real life, of having them remain as some kind of theory or mere faith in words — not even faith in the thought content, but faith in the words. We fail to grasp the fact that spiritual things can really enter into immediate, practical life. Just take as an example the fact that nobody understands the essence of manuring anymore. Of course, manuring is still done because old instinctive traditions are carried on, but actually nobody understands it. Except for those who have access to spiritual sources of knowledge, nobody really understands the significance of the manure for the fields, and why it is indispensable in certain areas, and how it should be handled. No one realizes today that all the mineral fertilizers are just what are contributing most to the degeneration of the products of agriculture that I mentioned earlier. Nowadays people simply think that a certain

amount of nitrogen is needed for plant growth, and they imagine it makes no difference how it's prepared or where it comes from.

Where it comes from, however, is not a matter of indifference. There is a big difference between nitrogen and nitrogen, between the dead nitrogen that is found in the air along with oxygen, and another kind of nitrogen. I am sure you wouldn't deny that there is a difference between a human corpse and a person who is alive and walking around: one of them is dead, the other is alive and ensouled. The same thing applies to nitrogen and to other substances. Dead nitrogen exists; it is mixed with the oxygen in the air around us and plays a role in our entire breathing process and interaction with the air. This kind of nitrogen cannot be alive for the simple reason that if it was, if we had to live in air that was alive, we would always be unconscious. In order for people to be conscious and think clearly, the air they breathe has to be dead; both its nitrogen and its oxygen have to be dead. But the nitrogen in the soil, the nitrogen that must enter the soil with the manure, this nitrogen must be formed under the influence of the entire heavens; this nitrogen must be alive. Thus there are two kinds of nitrogen: the nitrogen above ground, which is dead, and the nitrogen below ground, which is alive.

That is the way it is with everything. In the course of this materialistic age of ours, we've lost the knowledge of what it takes to continue to care for the natural world. The most important things are no longer known. Because of certain healthy instincts, things are continued, but these instincts are gradually disappearing; the traditions are vanishing. People fertilize scientifically now; and the grains and potatoes and everything else become ever worse. People know this, they confirm it statistically, yet today there is only resistance to practical measures that derive from what can be gained in spiritual vision.

It is tremendously important to have some insight when it comes to things like this. I have said many times that if you have a compass needle, which always points in the same direction — one end toward magnetic north, the other end toward magnetic south — people would find it childish if you said the reason for this lay in the needle itself.

They would tell you that it is the Earth's magnetic north pole and south pole that determine the needle's alignment. You have to look away from the needle itself and take into account the entire Earth in order to explain how the needle behaves. People will think you are quite childish if you believe that the cause is inherent in the needle. But it is equally childish to believe that what you see in a plant depends on what science discovers in the immediate surroundings of that plant. In fact, the whole starry heaven is involved in the growth of plants. We have to know this and start to take it seriously. We have to convince ourselves that it is just as childish to discuss botany the way we do nowadays, as it is to talk about a compass needle determining its alignment all by itself.

And there are certain things that can be comprehended by any educated person, if they have a sense for at least the most elementary conditions of anthroposophy. What I indicated for the first time last year in Penmaenmawr is extremely important.<sup>17</sup> People nowadays don't even know how human beings and animals are nourished, let alone plants. They think nourishment consists in our eating the substances that are around us. First these go into the mouth, and then into the stomach. Then some of them are deposited in the body and some of them are excreted. Next the deposited portion is used up and also gets excreted, after which it is again replaced. People conceive of nutrition in the most superficial fashion. But the fact is that the foodstuffs taken in through the stomach do not build up our bones, muscles, and other tissues — they only build up our head. Everything that enters the body by way of the digestive organs, and is then metabolized and distributed, only provides materials to be deposited in the head, in what belongs to the nerve-sense system. On the other hand, the substances we need for building up our limbs or our metabolic organs — the long bones in our legs or arms, or our intestines, for instance — these substances do not come from the food taken in by way of our mouth and stomach; instead they are absorbed from our whole environment by means of our breathing, and even via our sensory organs. Within each human being, the following process is continually taking place: What is taken in through our stomach streams upward and is put to use in our head,

while what comes from the air and the rest of our surroundings is taken in through our head — our nerve-sense system — and then streams downward to build up the organs of our digestive system or our limbs. So, if you want to know what kind of substance your big toe is made up of, you must not look to your food. On the other hand, if you ask where the substance of your brain comes from, then you do have to look to your food. However, regarding the substance of your big toe, insofar as this is not sense-perceptible substance (to that extent it too is nourished via the stomach), but rather insofar as it consists of framework-substance, that is, insofar as it is pervaded by warmth and so on, *this* substance is taken in through your breathing and through your senses, partially even through your eyes. As I have often mentioned, these substances flow through the organs in a seven-year cycle, so that as far as our metabolic-limb system is concerned, we are built up out of cosmic substance; only our nerve-sense system is built up out of earthly substance.<sup>18</sup>

This fact is of such fundamental significance that the human and animal physical body cannot be rightly assessed unless it is known. Modern science, however, does not tell us about it at all; it doesn't even give us the ways and means to discover something like this. It is impossible to know this through present-day science; with the methods science uses, it cannot possibly come to something like this. It is impossible, absolutely out of the question.

These are the kinds of things we have to consider seriously. They account for the separation between theory and practice that exists today. Practical activity nowadays is an empty routine devoid of spirit; but anything that truly does come from the spirit is also always preeminently practical.

## LECTURE ONE

Koberwitz  
Saturday, June 7, 1924

It is with deep gratitude that I look back on the words Count Keyserlingk has just spoken. People who partake in anthroposophical endeavors in these difficult times deserve the gratitude not only of those who have something to gain from anthroposophy, but also, as it were, the gratitude of anthroposophy itself. And so, out of the spirit of our anthroposophical convictions, I wish to thank you most heartily for the words you have just spoken.

It is indeed deeply gratifying to be able to give this course of lectures on agriculture here in the home of Count and Countess Keyserlingk. The warm cultural and social atmosphere to be found here in Koberwitz is familiar to me from previous visits, and I am sure it will provide the best possible setting for what we hope to cover in this course. Although the Count pointed out that being here may cause certain inconveniences for one or the other of us — he was referring to the eurythmists,<sup>1</sup> though it might also apply to other visitors — I must say that with regard to our actual reason for coming together, I cannot imagine where this course on farming could possibly be better accommodated, surrounded as we are by this exemplary farm. When we meet to work out of anthroposophy, it is important to feel that the surroundings are conducive to our efforts, and that will certainly be the case here.

I am sure Frau Dr. Steiner joins me in expressing my most heartfelt thanks to Count Keyserlingk's household for allowing us to spend these festive days — which I'm sure will also be productive days — in just this place. Because we have chosen Koberwitz as our meeting place, I am convinced that an agricultural spirit already deeply related to our anthroposophical movement will prevail during this

conference. After all, it was Count Keyserlingk who supported the agricultural efforts we undertook in Stuttgart under the auspices of *Der Kommende Tag*.<sup>2</sup> Right from the beginning, he was there at our side offering advice and help, and we could feel his spirit, trained by a long and intimate connection to farming, at work in all our efforts in this direction. So, in a way, forces were already working out of the heart of our movement to draw us quite naturally toward Koberwitz as soon as the Count was ready to have us. I can assure you that I believe everyone is actually very glad to have travelled here to Koberwitz to attend this course. And that is why we all express our deep gratitude to the Keyserlingk household for being willing to host all of us and our endeavors during these days.

I myself feel this gratitude most deeply, and I beg the Keyserlingk household to accept my special thanks. I know what it means to offer hospitality to so many visitors for days on end, and especially in the way in which I know it will be done here. I am well aware of the difficulties involved in hosting a gathering like this in a house so far out in the country, so I feel I can give the appropriate nuance to these words of thanks. Regardless of the other potential difficulties Count Keyserlingk mentioned (speaking from the point of view of his guests, of course), I am sure each one of us will go away fully content with their gracious hospitality.

Whether you will all go away equally satisfied with the lecture course itself is a different question, but in the discussions we will have during the days to come, we will do our very best to arrive at a full understanding of the material I am going to present. Please keep in mind, however, that although people have been asking for a course like this for a long time, this is the first time that I am undertaking such a course out of the heart of our anthroposophical striving. Such a course is by no means simple or undemanding, for the interests of agriculture are bound up with the broadest spheres of human life, as you will see from the course itself. There is practically no field of human endeavor that does not relate to agriculture in some way. Seen from whatever perspective you choose, agriculture touches on every single aspect of human life. Of course, during this conference we will only be dealing

with what is absolutely central to agriculture, but even so, we must expect some apparent detours, which may well turn out to be necessary, simply because all of this is rooted in anthroposophy. In particular, you will have to forgive me if today's introduction brings in things from far afield. You may not all immediately be able to see the connection between this introduction and the specifically agricultural subject we want to discuss, but everything in the lectures to follow will be based on what I have to say today, remote as it may seem at first.

In some respects, agriculture has been hit especially hard by modern cultural and intellectual trends. These trends have assumed destructive forms especially with regard to economics, and many people still have no inkling of just how destructive they have become. The economic enterprises of our anthroposophical movement were undertaken by economists and business people and were intended to counteract such things. That they did not succeed in realizing their original intentions on all counts was due only to the fact that at present there are too many opposing forces at work to permit any real understanding of these things. Because individuals are often helpless in the face of the powers that be, even the most elementary and essential aspects of these economic ventures that developed out of the anthroposophical movement have yet to come up for public discussion. Indeed, what was it that was essential on a practical level?

In order that we may speak in concrete terms and not in generalities, let me answer using agriculture as an example. Nowadays there are all kinds of books and lecture courses available on economics, and they all include chapters on agronomy. There are even whole books on how agriculture should be organized according to various socio-economic principles. All of this, all of these books and lecture courses on economics, are nothing more than blatant nonsense. But blatant nonsense is promulgated everywhere nowadays. It ought to be clear to anyone that people have no right to talk about agriculture, including its social and organizational aspects, unless they have a sound basis in agriculture, and really know what it means to grow grain or

potatoes or beets. Without this, you cannot talk about the economic principles involved. These things have been derived from real life and not merely from theoretical considerations. Of course, if you say this to people who have taken a few courses in agricultural economics at the university, they will think it is absurd, because to them everything seems so cut-and-dried. But in actual fact, the only ones entitled to an opinion on agriculture are the people whose judgment derives directly from the field, the forest, and the stable. All discussion of economics that is not derived from the things themselves, should simply stop. Until people realize that the economic discussions that float above the things are mere talk, the outlook for agriculture or anything else will remain pretty dim.

The reason that all kinds of people think they are entitled to talk about agriculture, even when they don't know anything about it, is that they cannot get down to fundamentals even in their own fields of endeavor. Of course, we can all describe a beet, and say whether it is hard or easy to slice, what color it is, or whether it has these or those constituents. But with this we are still very far from any understanding of the beet, and even further from any understanding of how the beet interacts with the soil, and with the season when it is ready to harvest, and so on. What we must come to understand, is the following.

I have often used a comparison to make this point clear with regard to other areas of life. If you look at the needle of a compass, you discover that one end always points more or less towards the north, while the other end points south. If you want to explain this, you don't look to the needle but rather to the whole Earth: you hypothesize that there is a magnetic north pole at one end of the Earth and a magnetic south pole at the other. It would be ridiculous to try to explain the behavior of the compass needle by looking for the cause in the needle itself. The position of the needle cannot be understood unless you know the needle's relationship to the whole Earth.

To many people, however, what is nonsense with regard to a compass needle makes perfect sense in relation to other things. For example, take a beet growing in the ground. It makes no sense to restrict our attention to the narrow confines of the physical beet, if its

growth actually depends on countless conditions present not only on the Earth but also in the cosmos. People today explain all kinds of things, and also arrange their practical affairs, as if they were dealing only with self-contained entities, and not with influences coming from the entire universe. Many different aspects of our life have suffered tremendously from this, and they would show even greater damage were not for the fact that in spite of all our modern science, we still have certain instincts left intact from a time when everyone's actions came out of instinct and not out of scientific knowledge. I must always think to myself how fortunate it is with people whose doctors have prescribed just how many ounces of meat or vegetables they should be eating — and some even keep a scale handy to weigh it all out — that they also feel hunger if what they weighed out wasn't enough for them, that this instinct is still present.

Before any science of these things existed, everything people did was guided by instinct, and these instincts were often quite specific and reliable. It is astonishing to read the farming rules contained in the old peasant almanacs and see the remarkable wisdom they expressed in clear and simple terms. And they also had ways of not becoming superstitious in such matters. In their almanacs, along with deeply meaningful proverbs governing sowing and reaping, we also find a sprinkling of sayings like: When the cock crows on the old manure pile, it'll rain soon — or in a long while. Enough humor is mixed in with this instinctive wisdom to ward off superstitiousness.

However, from an anthroposophical point of view, returning to old instincts is beside the point. Instead, we need to make use of a deeper spiritual insight in order to discover what these increasingly unreliable instincts are now less and less able to supply. In order to do this, we have to commit ourselves to a much broader way of looking at the life of plants and animals, and also at the life of the Earth itself. We must widen our outlook to include the cosmos.

It is quite right, of course, from one point of view, not to relate rainy weather to the phases of the Moon in a superficial fashion; on the other hand, however, the following incident actually took place. In other settings I have often told the story about two professors in

Leipzig, one of whom was Gustav Theodor Fechner,<sup>3</sup> a man of considerable spiritual insight. He was able to tell from purely external observations that certain periods of rain or lack of rain actually did have something to do with the Moon and its orbit around the Earth. Statistical investigations had brought him to this conclusion. However, at that time, people were already overlooking such things, and so his well-known colleague, Professor Schleiden,<sup>4</sup> simply dismissed his claims as scientifically impossible. However, both of these professors at Leipzig University also had wives. Professor Fechner, who was endowed with a certain sense of humor, suggested that they let their wives decide who was right. In those days — because the water for doing laundry had to be hauled from some distance away — it was still the practice to set out buckets and barrels to catch rainwater, and both Frau Schleiden and Frau Fechner did this. There was not enough space, however, for both of them to do this at the same time, so Professor Fechner said: "If my worthy colleague is right and it really does not make any difference, then let Frau Schleiden put out her containers when I expect little rain according to the phases of the Moon, and my wife will put out her containers when I expect more rain. If this is really all nonsense, Frau Schleiden will be glad to oblige." And what do you think happened? Frau Schleiden refused to go along with it — she preferred to go by Professor Fechner's indications rather than by what her husband had to say! That's how it goes. Science can be quite correct, but real life can't always afford to act according to scientific "correctness." But now, this isn't how we want to talk — we want to be serious. I only said these things in order to point out that when we look at what makes our life on Earth physically possible — in other words, at agriculture — we need to look a bit farther than we are accustomed to nowadays.

I cannot guarantee that what can be said on the basis of anthropology at this point in time will satisfy us on all counts, but I will do my best to tell you what anthropology is able to offer for agriculture.

So, by way of introduction, I would like to point to those things in our earthly existence that are most important for agriculture.

Nowadays, when we talk about something, we are in the habit of talking as if its chemical and physical components were the most important things to consider. Today, however, let us not start with these chemical or physical components, but rather with something that stands behind them and yet is of special importance in the life of both plants and animals. You see, if we look carefully at how human beings live, we find that a considerable degree of emancipation from the outer world is typical. To some extent this is also true for animals, but the closer we get to the human level, the greater is the degree of emancipation we find. In human and animal life there are phenomena that seem at first to be quite independent of any influences coming either from outside the Earth or from the Earth's immediate surroundings, its atmosphere and so on. And this not only seems to be the case, this is actually quite true with respect to many things in human life. To be sure, we know that certain meteorological conditions intensify the pains of certain illnesses. But we are already less aware of the fact that certain diseases, and also other phenomena in our lives, run their course in such a way that they replicate the timing of processes in outer nature, although their beginning and end do not coincide with these processes. We need only remind ourselves that the course of one most important phenomena — women's menses — replicates the course of the Moon's phases, even though the beginning and end don't necessarily coincide with any particular phase. And there are many, many other more subtle phenomena in the biological makeup of both men and women that are replicas of rhythms in nature.

If we studied things more closely, we would find that a lot of what goes on in society, for instance, would make much more sense if we properly understood the periodic recurrence of sunspots. But we don't notice things like that because the human events corresponding to the periodicity of sunspots have freed themselves from that connection, and do not necessarily begin and end together with the sunspots. They demonstrate the same inherent periodicity, the same rhythm, but outwardly their cycles are independent.<sup>5</sup> Of course, if we tell people that human life is a microcosm which imitates the macrocosm, they

may very well reject this as nonsense. When we tell them that certain illnesses have a seven-day fever cycle, they may object that the fever should appear at the same time as certain external phenomena, run its course parallel to them, and then disappear when they do. This the fever does not do, but it does stick to the same inner rhythm, even if its beginning and end do not coincide with the outer phenomena.

With regard to human life, this emancipation from the cosmos is almost total. It is less so for animals, and the plants are to a great extent still embedded in and dependent on what is occurring in their earthly surroundings. That is why it is impossible to understand plant life without taking into account the fact that everything on Earth is actually only a reflection of what is taking place in the cosmos. This fact is hidden with human beings, because we have emancipated ourselves; we carry only the inner rhythms within us. The plants, however, are still very much a reflection of the cosmos. And that is what I would like to talk about in these introductory remarks.

You see, the Earth is surrounded in the heavens first by the Moon and then by the other planets of our solar system. In an old instinctive science that reckoned the Sun among the planets, they were considered to have this sequence: Moon, Mercury, Venus, Sun, Mars, Jupiter, Saturn.<sup>6</sup> Now, without going into any astronomy, I want to talk about the activity of these planets and how it relates to life on Earth.

The first thing we need to take into account when we take a broad view of life on Earth is the extremely important role played by the siliceous substances, by silica. Silica is found, for instance, in the prisms and pyramid forms of that beautiful mineral we call quartz. Silica contains oxygen, and if you imagine the oxygen removed, what is left is called silicon. Modern chemistry lists it among the chemical elements — oxygen, nitrogen, hydrogen, sulfur, and so on. So silicon is a chemical element that combines with oxygen. We must remember that this silicon is very widely distributed, constituting twenty-seven to twenty-eight percent of the Earth's surface. Except for oxygen, which constitutes forty-seven to forty-eight percent, all other substances are present in lesser amounts. There is an enormous amount of silicon present.

Now it is true that when we find silicon present in a form like quartz, it seems — from a material standpoint — of little importance for the soil and its associated plant growth. Quartz is not soluble in water — water just trickles around it. Thus, at first glance, it seems to have little to do with the ordinary, obvious prerequisites for life. But then take the horsetail plant — *equisetum*; you will find that it contains up to ninety percent silicic acid. It has the same thing that is in quartz, but in the plant it is very finely distributed.<sup>7</sup>

From such things you can begin to see what great significance silicon must have. Indeed, almost half of everything we meet on Earth consists of silica.<sup>8</sup> Strangely enough, so little notice is taken of silica today that it is still virtually excluded even from those areas where it could have an extremely beneficial effect. In anthroposophical medicine, silica is a significant ingredient in many medications, and a whole class of illnesses is treated by giving silicic acid either internally or externally as baths. These illnesses are characterized by disturbances that show up in the senses — although they do not actually originate in them — including also the inner senses, which convey pain from the organs. The senses are influenced in a remarkable way by silicon. And silicon plays the greatest imaginable part not only in the body, but also in the whole household of nature, if I may use this traditional expression. Silicon is present not only where it is found in quartz or other rocks, it is also present in extremely fine dilution in the atmosphere. It is actually everywhere.

Half, that is, forty-eight percent, of the Earth available for our use consists of silica. What then does this silica actually do? Let's put this question in a hypothetical form. If there were only half as much silica in our earthly environment, then all our plants would have more or less pyramidal forms. All their flowers would be stunted and almost every plant would have a cactus-like shape. The cereal plants would look very strange: their stems would get thicker toward the bottom, even fleshy, and the ears would be stunted — there would be no full ears of grain at all. That's on the one hand.

On the other hand, there are substances like lime, and related substances such as potash and sodium, which are also present every-



where in the Earth, though not to the extent that silica is. If these were present in lesser amounts, we would get plants that had only very thin stems, plants with twining stems for the most part — a bunch of vines, as it were. The flowers would open, to be sure, but they would be infertile, and they would also not produce much foodstuff. Plant life as we know it today can thrive only when these two forces — the forces of substances like lime and like silica — are in equilibrium and are working together properly.

Now let's continue. Everything active in silica-like substances contains forces that do not originate with the Earth, but rather with the so-called distant planets — Mars, Jupiter, Saturn. These forces affect plant life by way of silica and similar substances. On the other hand, the forces of the planets closer to the Earth — Moon, Mercury, Venus — have an effect on plants (and also on animals) by way of lime and other related substances. Silica as well as lime are active in every cultivated field. In the siliceous substances, Saturn, Jupiter, and Mars are working, in the calcareous substances, Moon, Venus, and Mercury.

With that, let us now look at the plants themselves. There are two things we need to observe about the life of plants. The first is the fact that plants possess the power of reproduction. Not only the plant world in general but also each individual species develops the ability to bring forth its own kind. That is the one side. The other side is the fact that plants, as members of a comparatively lower kingdom of nature, serve as nourishment for members of the higher kingdoms. Initially, these two currents in the life of plants have little to do with each other. With regard to how plants develop from one generation to the next, it makes no difference to the generative forces of nature whether we eat the plants and get our nourishment from them or not. Two very different sets of interests are expressed in these two currents, and yet in the context of the forces of nature as a whole, things work as follows. In everything related to the inner force of reproduction and growth, in everything that makes one generation of plants follow another, Moon, Venus, and Mercury are working from the cosmos into the Earth by way of lime and similar substances. If we look only at plants that we do not eat, plants that simply renew themselves over and

over again, it's as if we were only interested in the influence of the cosmos as it manifests in the forces of Venus, Mercury, and Moon, since these are the forces involved in plant reproduction on Earth. On the other hand, when plants become food or fodder, when they develop in such a way as to form substances that can nourish people or animals, then Mars, Jupiter, and Saturn are involved, via substances like silica. These substances make the plant receptive to the expanses of the universe; they arouse the plant's senses so that it takes up from the whole surrounding universe what is shaped by the distant planets, by Mars, Jupiter, Saturn. Conversely, what makes a plant capable of reproduction is taken up from the spheres of Moon, Venus, and Mercury.

Now, though this may seem like isolated information, these things that are taken from a somewhat broader context than usual, lead over quite naturally from knowledge into practice. What we need to ask next is this: Since the forces of Moon, Venus, and Mercury enter into the Earth and have an effect on its plant life, how can these forces be either intensified, or somewhat restrained? What promotes or hinders the Moon's influence on plant life; what promotes or hinders Saturn's influence?

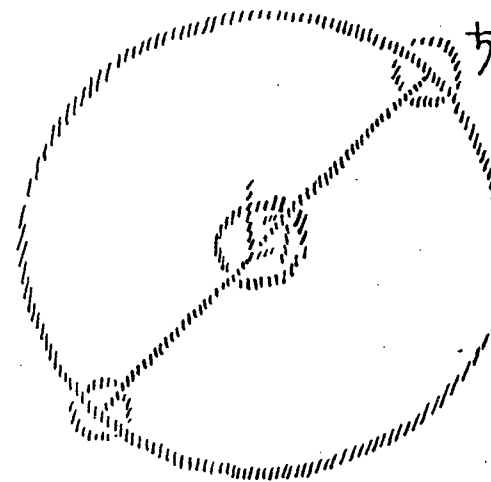
When we observe how the year runs its course, we find that there are rainy days and also days without rain. Today, scientists don't investigate much more about rain than the obvious fact that when it rains, more water falls on the ground than when it doesn't. For them, water is an abstract substance composed of hydrogen and oxygen. When water is decomposed by means of electrolysis, it does indeed separate into two substances, which behave differently, but that does not tell us anything conclusive about water itself. Water is much more than merely a chemical compound of oxygen and hydrogen. It is the ideal substance for bringing into the Earth those forces that come from the Moon, for instance, for bringing about a distribution of the lunar forces within the Earth. There is a definite connection between the Moon and the water on the Earth. Suppose that it has just rained for a few days, and that these rainy days are followed by a full moon. Something stupendous takes place on Earth as a result of the full

moon's forces. These forces shoot into all the vegetative growth; but only if the full moon was preceded by some rainy days.

Thus, we will need to consider whether it is important to sow our seed after a rainfall and shortly before full moon, or whether we may thoughtlessly do our sowing at any time. Of course, something will result either way, but the question is raised of whether it is preferable to arrange our sowing in accordance with the rainfall and the full moon. For the effect of the full moon on certain plants is very powerful after rainy days, but very slight and weak after sunny days. Such things were contained in the old farmers' sayings. They knew what to do next simply by quoting a proverb. Nowadays proverbs are considered outdated superstitions, yet we still have no science of these things — people just cannot bring themselves to work it out.

Let's continue. Our Earth is surrounded by the atmosphere. Aside from the obvious fact that it is airy, a particular characteristic of the atmosphere is that it is sometimes warmer and sometimes cooler. At certain times it accumulates a considerable amount of warmth, which when the tension gets too great is discharged in thunderstorms. Now, what is the situation with warmth? Spiritual observation reveals that while silica has no relation to water, it has an extremely strong relationship to warmth. Warmth heightens the effectiveness of the forces that work through the siliceous substances, the forces of Saturn, Jupiter, and Mars. The forces of these distant planets must be considered quite differently from the lunar forces. Don't forget. Saturn takes thirty years to revolve around the Sun, while the Moon takes only thirty or twenty-eight days to go through its phases, so Saturn must have a totally different relationship to plant growth. Saturn is only visible for fifteen years.<sup>9</sup> Of course, it also has an effect when it is not actually shining down on the Earth, it also has an effect when its rays have to pass through the Earth. If we draw Saturn's path [Drawing 1], which it takes thirty years to complete, we can see that it sometimes shines directly onto a certain spot on Earth, but that it can also work through the Earth onto this spot. There [referring to Drawing 1], the strength with which the Saturn forces approach the Earth's plant life always depends on the air's condition of warmth:

when the air is cold, they cannot reach the plants; when the air is warm, they can.



DRAWING 1 (COLOR PLATE 1)

Where then, do we see the effect of the Saturn forces on plants? What Saturn does with the help of the Earth's warmth forces can be seen, not in the annual plants, which grow up and die in the course of a single year and leave only seeds behind, but rather in the perennial plants. The effect of these forces, which enter the plants via warmth, can be seen in the bark of trees, and in everything else that makes plants perennial. Annual plants, those with short life spans, are related to the planets with short periods of revolution. In contrast, those plants that emancipate themselves from this transitory state, that cover themselves with bark and make themselves perennial, they are related to the planetary forces that work via the forces of warmth and cold, to the forces of the planets with long periods of revolution, like Saturn's thirty years or Jupiter's twelve. Thus, for someone who wants to plant an oak tree, it is certainly of importance to have a good understanding of the Mars periods, because an oak tree planted properly during the corresponding Mars period will develop differently from one simply

put into the ground whenever it happened to be convenient. And the coniferous forests, where the Saturn forces play such a great role, will turn out quite differently if they are planted in a so-called ascending period of Saturn than if they are planted at some other time.<sup>10</sup> Someone who understands such things can tell by what will or will not grow whether it was planted with any understanding of these kinds of forces.

Although these things don't immediately strike the eye, they do become apparent in more intimate aspects of life. For example, suppose we burn wood that comes from trees that were planted in the Earth without any understanding of the cosmic rhythms; the warmth from these trees will not be as healthy as the warmth from trees that were planted with understanding. It is precisely in the more intimate aspects of daily life that things like this show their tremendous significance. Today, however, people go through life quite thoughtlessly, and are glad when they do not have to think about such things. They imagine it all functions like a machine — once everything is in place, just flick a switch and there it goes. They conceive of the whole of nature in this materialistic way. But when people carry on like this, they eventually come to certain practical things in life where it makes a tremendous difference, and then they are confronted with huge riddles. Why, for instance, is it no longer possible to find potatoes as good as the ones I ate when I was a boy? That is simply a fact; I've tried them everywhere. Potatoes like those are simply not found anymore, not even in the places where I used to eat them. Especially in the last few decades, a lot of things have diminished in their nutritive value simply because people no longer understand the more subtle influences at work in the universe. These things will have to be looked for again in ways that I could only begin to point out today. I wanted to indicate where the questions lie, questions that go far beyond our contemporary frame of reference. In the lectures to follow, we will continue in this vein, and then apply ourselves to practical issues with new and deepened understanding.

## LECTURE TWO

Koberwitz

Tuesday, June 10, 1924

We will spend the first few lectures gathering together information on the conditions that are necessary in order for agriculture to thrive. We will then be able to draw conclusions for the actual practice of agriculture — conclusions that should be put into practice and that only have meaning in practice. Thus, in these first lectures, we will have to study how the products of agriculture actually come into existence, and what part they play in the world as a whole.

Now, a farm comes closest to its own essence when it can be conceived of as a kind of independent individuality, a self-contained entity. In reality, every farm ought to aspire to this state of being a self-contained individuality. This state cannot be achieved completely, but it needs to be approached. This means that within our farms, we should attempt to have everything we need for agricultural production, including, of course, the appropriate amount of livestock. From the perspective of an ideal farm, any fertilizers and so forth that are brought in from outside would indeed have to be regarded as remedies for a sickened farm. A healthy farm would be one that could produce everything it needs from within itself. We shall see in a moment why this is so. As long as the essential being and reality of things is not taken into account, but only their outer material aspect, it is quite understandable that people believe it makes no difference whether farmers get their cow manure from the neighbors' farm or from their own farm. As I said, these things cannot be strictly implemented, but if we want to organize things appropriately, we must still realize how necessary it is for a farm to be self-contained.

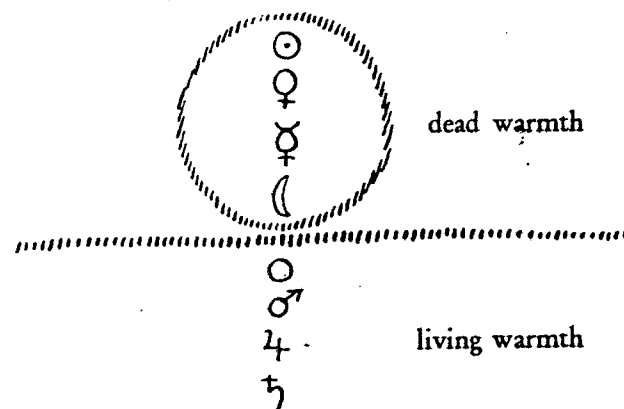
This assertion will acquire a certain justification if we look on the one hand at the Earth, from which our agriculture springs, and on the other hand, at what influences the Earth from outside. People nowadays tend to talk very abstractly about outside influences on the Earth. They are aware that the Sun's light and warmth, and everything meteorologically related to these, are connected in some way to the condition of a crop-producing soil, but present-day ideas cannot properly explain this because they do not penetrate to the realities, to the real facts. Let us begin today from the point of view that takes the soil as the foundation of agriculture, and then later we will also look at things from other points of view.

We usually think of the soil — which I'm going to indicate here with this line [Drawing 2] — as being something purely mineral, with organic matter coming into it only incidentally to the extent that humus develops or manure is applied. That the soil might contain not only this sort of life, but also an inherent plant-like vitality, and even something of the nature of soul-qualities, this is not even conceived of, much less accepted as fact. And if we go even further, and see how this inner life of the soil — in terms of its fine dosages, I would like to say — is quite different in summer than in winter, we then get into domains that are of tremendous significance for practical life, but which at present are not taken into account at all. Indeed, if we take the soil as our point of departure, we will have to recognize that the soil functions as a kind of organ within the organism that reveals wherever in nature there is growth.

The soil is a real organ, an organ we might want to compare to the human diaphragm. We get a proper idea of what is present there if we picture that certain organs in a human being are located above the diaphragm — especially the head and everything that provides for the head through respiration and circulation — while others are located below it. The comparison is not quite exact, but for purposes of illustration it is good enough. If we compare the soil to a human diaphragm, we then have to say that the head of the individuality in question is under ground, and that we, and all our farm animals, are living in its belly. Everything above ground actually belongs to the

bowels of this — we can say — agricultural individuality. When we walk around a farm, we are actually walking through its belly, and the plants are growing up into its belly. This individuality is standing on its head; we only look at it correctly when we imagine that with regard to a human being, it is standing on its head. (With regard to animals, it's somewhat different, as we'll see in the course of these lectures.)

Now, why do I say the agricultural individuality is standing on its head? I say this because what is in the immediate vicinity to the Earth — the air, water vapors, and warmth, in which we live and breathe, and from which the plants also get their outer warmth, air, and water — this corresponds in fact to the human being's abdominal organs. Conversely, everything happening below ground has an effect on plant growth that is similar to the effect that our head has on our body — most notably during childhood, but also to some extent throughout life. A lively interchange is constantly taking place between what is above ground and what is below ground.



DRAWING 2 (COLOR PLATE 2)

In addition, we can say that the aboveground activity is directly dependent on the Moon, Mercury, and Venus as they support and modify the influence of the Sun. Consider this for the time being as a localization of the planetary influences. These so-called near-Earth

planets have an effect on everything above the surface of the soil. In contrast, the distant planets, those beyond the Sun's orbit, work on everything beneath the soil, and support those influences that the Sun exercises from below. As far as plant growth is concerned, we must look under ground for the effects of the distant heavens and above ground for the effects of the Earth's more immediate environment. Thus, what comes from the expanses of the universe and affects plant growth, does not work directly — through direct radiation — but by first being absorbed by the ground and then radiated upward. Beneficial or detrimental influences on plant growth that come from the ground are actually cosmic influences radiating back upward. On the other hand, the direct radiation at work in the air and water above the ground is stored up above and takes effect from there. This interacts with the effect that the inner constitution of the ground has on the plant growth. (Later we will have to widen this picture to include the effects on animals.)

To begin with, what we meet in the soil are all the effects that depend on the most distant reaches of the universe, insofar as these concern the Earth. There we find what we commonly call sand and rocks. Sand and rocks, although impervious to water and said to contain no nutrients, are actually no less important for plant growth than the other factor that is relevant here. They are, in fact, extremely important for the processes of growth because they convey forces from the furthest reaches of the universe. Unlikely as it may seem, it is especially by means of the silica-containing sand that the life-ether and chemical-ether — as we can call them — first enter into the soil and then take effect as they stream back upward. The extent to which the soil itself becomes alive and develops its own chemistry depends primarily on the sandy component of the soil. The conditions encountered by plant roots in the soil are greatly influenced by the extent to which the cosmic life and cosmic chemistry are collected by the rock and stone, which for this purpose need be present only at considerable depths. Whenever plant growth is studied, it is important to know the geological stratum beneath the plants. And with plants whose roots are of particular interest or importance, we should never

forget that silica is indispensable, even if it is present only in the depths. Silica, thank God, is very widespread on the Earth; forty-seven to forty-eight percent of everything consists of silica in the form of silicic acid and other silica compounds, so we can almost always count on enough silica being present to have the desired effect.

The next thing to consider is how the forces brought into relationship with the plant roots by silica can be led up through the plant. These influences must stream upward — there must be a constant interplay between what is drawn in from the universe through silica, and what goes on up there in the "belly," which also nourishes the "head" down below. Although the head must be provided for out of the universe, it must also truly interact with what is occurring in the belly up above. What is collected down below from the cosmos must always be able to stream upward, and the presence of clay in the soil makes this possible. Substances like clay support the upward flow of the effects of the cosmic entities in the ground.

Once we get down to practice, knowing this will help us deal with clay soils or sandy soils in accordance with the kind of crop we want to grow there. But first we need to know what is really going on. However else clay may be described, however else we must treat it so that it becomes fertile — all this is of secondary importance; the primary thing we need to know is that clay promotes the upward stream of the cosmic factor.

But this cosmic upward stream is not the only thing to be considered. Everything going on in the "belly," in the air above ground, constitutes a kind of digestion for the plants, and this digestion — I will call it the terrestrial or earthly factor — must be drawn down into the ground so that a real interplay takes place. All the forces and fine homeopathic substances produced by means of the water and air above ground are drawn down by the soil's greater or lesser content of lime. It is the lime in the soil and the presence of calcareous substances in homeopathic doses just above the soil's surface that serve to draw this terrestrial factor down into the ground.

You see, everything will look quite different once we have a real science of these things in place of the meaningless talk that currently

passes for science. Then we will be able to give exact details about these things. Then we will know, for instance, that there is a huge difference between the aboveground warmth that is in the domain of Sun, Venus, Mercury, and Moon, and the kind of warmth that is active below ground, which is under the influence of Jupiter, Saturn, and Mars. As far as plants are concerned, we can describe the former as leaf and blossom warmth, and the latter as root warmth. These two kinds of warmth are totally different, so different that we might even say the aboveground warmth is dead, while the underground warmth is living [see Drawing 2, page 29]. The underground warmth includes a definite life principle; something living is inherent in it, especially in winter. If we human beings had to experience the warmth that is active down below, we would all become exceedingly stupid, because in order to be smart, we need to have dead warmth around our bodies. As soon as warmth is drawn into the Earth by means of the lime in the soil — indeed, wherever outer warmth passes over into inner warmth — this warmth becomes slightly enlivened.

We are aware today of a difference between the air that is above ground and the air that is below ground, but we do not take into account the fact that warmth too is different above and below the Earth's surface. We know that the air below ground contains more carbon dioxide, while the air above ground contains more oxygen, but we don't really know why. The reason is that the air too takes on a slight degree of vitality when it is absorbed into the Earth. It is the same with both warmth and air — they are both slightly enlivened when they are absorbed into the Earth.

It is different, however, with water and with the solid, earth element. Both of these become even more dead inside the Earth than they are outside it, but in losing something of their outer vitality, they free themselves from what is immediately above the Earth's surface and become receptive to the forces coming from the most distant parts of the universe. In our present epoch, the time between January 15th and February 15th is the time when it is easiest for them to be independent of the Earth's immediate surroundings and come under the influence of the distant cosmic forces that are within the Earth. These are things

that will eventually become recognized as exact indications. For the mineral substances, midwinter is the time when the strongest formative forces, the strongest crystallizing forces can develop within the Earth. That is when the inner nature of the Earth has the characteristic of being least reliant on itself, on its mineral masses, and most under the influence of the crystal-forming forces from the widths of the universe.<sup>2</sup>

The situation is this: The mineral substances of the Earth have the greatest desire to be crystallized at the end of January, and the deeper down you go, the stronger is their desire to become pure and crystalline. This is the time when what's going on in the mineral kingdom is most neutral as far as plant growth is concerned, when the plants are most self-absorbed in the Earth and least exposed to the mineral substances. On the other hand, for a period of time before and after — especially before, when the minerals are just getting ready to become formed and crystalline — that is when the minerals radiate forces that are of particular importance for plant growth. Thus we can say: During the months of November and December, there is a time when what is beneath the surface of the Earth has a particularly strong effect on plant growth. And so the question becomes, how can we put this knowledge to use? People will some day realize how important it is to take advantage of such things in order to be able to regulate the growth of plants.

Let me remark here that if we are dealing with a soil that does not carry these influences upward during the winter as it should, it is good to furnish the soil with some clay, the dosage of which I will indicate later.<sup>3</sup> With the clay, we prepare the soil to conduct the crystalline force upward, for the plant growth above the Earth's surface. This force of crystallization, which is already apparent in the crystallizing snow, reaches its peak intensity in January or February and gets stronger and more intense the further down into the Earth one goes.

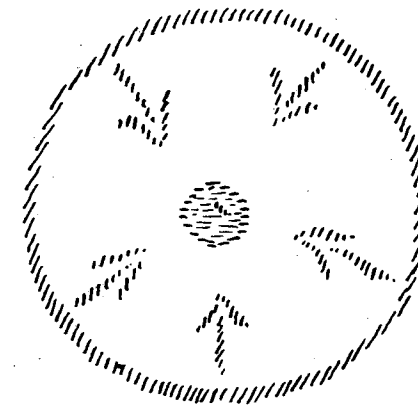
So you see, we can derive some very positive and truly helpful hints from information that initially seems far-fetched. Without such information, we would just be experimenting in the dark. We must realize that a given area of farmland — together with what's beneath the soil — forms an individuality that also exists in time, and that the

life of the soil is especially strong in winter, while in a certain sense it tends to die down in summer.<sup>4</sup>

Now, especially in connection with agriculture, there is one thing I have often mentioned among anthroposophists that is extremely important to understand. It entails knowing under which conditions the universe and its forces can work upon earthly things. In order to understand this, let us take the seed-forming process as our starting point. We usually think of the seed, from which the embryo develops, as having an extremely complicated molecular structure, and we set great store in being able to understand it in all its complexity. We imagine molecules as having certain definite structures, simpler in the simple ones and getting ever more complicated until we come to the incredibly complicated structure of a protein molecule. We stand there in wonder and astonishment in front of what we imagine to be the complex structure of the seed's protein. We're sure it has to be terribly complicated, because, after all, a new organism has to grow out of it. We assume that a whole new complicated organism is already inherent in the plant embryo in the seed, and that therefore this microscopic or submicroscopic substance must also be incredibly complicated in its structure. To a certain extent this is true at first. When earthly protein is being built up, the molecular structure is indeed raised to the highest degree of complexity. But a new organism could never, never develop out of this complicated structure. That is not how a new organism comes about. The organism does not emerge from the seed in such a way that what was formed as seed out of the mother plant or mother animal simply continues on into what develops as the offspring. That's not true at all.

The truth of the matter is that when this structural complexity of earthly matter has been taken to the ultimate degree, it then disintegrates, leaving in its place a miniature chaos. You could say it disintegrates into cosmic dust. And when the seed that was brought to the ultimate degree of complexity has disintegrated into dust and forms a miniature chaos, then the whole surrounding universe begins to work on the seed, to leave its imprint and to build up whatever can be built up by means of the influences coming from all sides of the universe

[see Drawing 3]. In the seed we have an image of the whole universe. Each single time a seed is formed, the earthly organizing process is led to its end, to the point of chaos. And each time, within the seed-chaos, a new organism is built up out of the whole universe. The parent organism simply has the tendency, through its affinity for a particular cosmic setting, to bring the seed into relationship with the forces from the proper directions, so that what emerges from a dandelion is a dandelion and not a barberry. But the image reflected in the individual plant is always the image of some cosmic constellation and is built up out of the cosmos.<sup>5</sup>



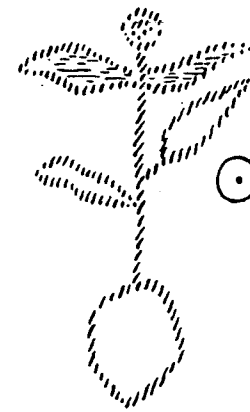
DRAWING 3 (COLOR PLATE 2)

So, if we ever want the forces of the cosmos to take effect in earthly substance, we have to drive this earthly substance as strongly as possible into chaos. This is what we must do, whenever we want the universe to exert its influence. As far as plant growth is concerned, nature itself takes care of this in a certain respect. But, since every new organism is built up out of the universe, it is also necessary to sustain this cosmic factor in the organism until seed formation is again present.

Let us say we plant some kind of seed in the ground. There in that seed we have the imprint of the whole universe from some cosmic direction. A particular constellation takes effect in the seed, giving it its

particular form. However, the moment the seed is planted in the ground and the external forces of the Earth begin to work on it, it is filled with the urge to deny the cosmic factor, to grow rampantly in all directions, because everything working above ground does not really want to maintain that form. Thus, once the seed has been driven to the point of chaos, and then later begins to sprout, it is necessary to bring the earthly factor into the plant, in contrast to the cosmic factor, which lives as the form of the plant in the seed. We must help the plant draw nearer to the Earth in its growth. This can only be done, however, by infusing the plant with life as it is already present on Earth, that is, with life that has not yet reached the stage of complete chaos — the stage of seed formation — but has stopped at an earlier stage. And here nature helps us out a lot in regions fortunate enough to be blessed with a rich formation of humus. Anything we can do artificially is only a poor second to the fertility the Earth itself can provide. Humus formation occurs when something derived from plant life is incorporated into the general processes of nature, and this material that has not yet reached the point of chaos, tends to push back the cosmic factor. If material like this is applied to growing plants, its effect is to anchor the actual earthly factor securely within the plant, so that the cosmic factor is active only in the upward stream leading again to seed formation. The earthly factor, on the other hand, works in the development of leaves and flowers and so on. Into all this, the cosmic factor only radiates its influences. This can be followed quite exactly.

Assume you have a plant growing up from the root. A little seed kernel forms at the top of the stalk. The leaves and flowers spread themselves out [Drawing 4]. Now, what is earthly in the leaves and the flowers is their shape, and also the earthly matter that fills them out. So the reason why a leaf or kernel becomes plump, absorbs inner substantialities, and so on, lies in what we bring to the plant as the earthly factor, as material that has not yet reached the point of chaos. In contrast, the seed, which develops all its strength via the stalk — that is, in a vertical direction, not peripherally — this seed irradiates the leaves and blossoms with cosmic forces. This is a matter of direct observation.

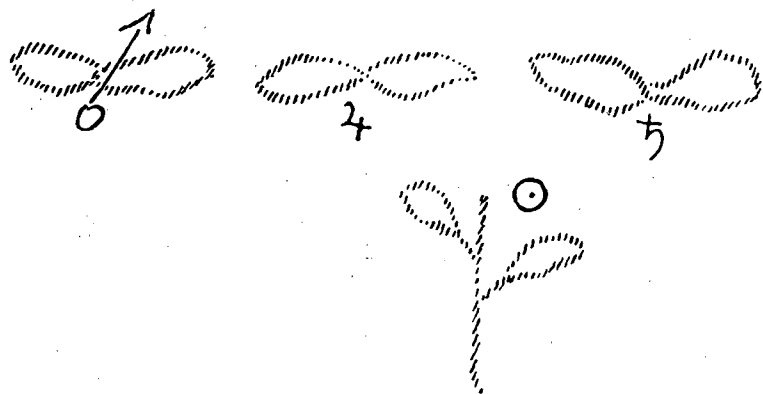


DRAWING 4 (COLOR PLATE 2)

Just take a look at the green leaves of a plant. In their shape, their thickness, and their green color, a plant's leaves are the carriers of the earthly factor. However, they would not be green if the cosmic force of the Sun were not living in them too. And when you get to the colored blossoms, it is not only the cosmic power of the Sun that is active there, but also the support that the cosmic Sun-forces receive from the distant planets — Mars, Jupiter, and Saturn. For instance, if we look at a rose, we see the forces of Mars in its red color. Next, look at a yellow sunflower. It is not quite right to call it a "sunflower" — we give it that name only because of its shape. It ought actually to be called a "jupiterflower" on account of its yellow color, because the Jupiter-forces supporting the Sun are what bring out the white and yellow colors in flowers. And when we see a blue chicory flower, we must sense in its blue color the activity of Saturn, supporting the activity of the Sun. So we definitely have the possibility of recognizing Mars in a red flower, Jupiter in a yellow or white flower, and Saturn in a blue flower; and in a green leaf we see the Sun itself [see Drawing 5].

What is visible in the coloration of a flower, works especially strongly as a force in the root; for the living forces of the distant planets are active also within the soil. The situation is as follows: If we look at a plant that we have pulled up, then in the roots we have the cosmic factor, and in the flower, primarily the earthly factor, with the cosmic factor present only in the delicate nuances of color. On the other hand, when the earthly factor is especially strong in the root, it then shoots into the form. The plant has its form from what can develop in the earthly region. Everything that expands the form is





DRAWING 5 (COLOR PLATE 2)

earthly. When a root divides and branches, this is a sign that the earthly factor is working downward, just as the cosmic factor works upward into the color of the flowers. Thus, with roots that are undivided, that are unitary, we have cosmic roots. With branching roots we have the effect of the earthly factor working into the soil, just as we have the cosmic factor working upward into the color of the flowers. The influence of the Sun stands between the two, working primarily in the plants' green leaves and in the interplay taking place between the flowers and the roots. The Sun thus corresponds to what we called the soil diaphragm. Whereas the cosmic factor is associated with the Earth's interior and works upward into the upper part of the plant, the earthly factor is localized above ground but works downward, drawn into the plant with the help of substances like lime. Look at plants in which lime strongly pulls the earthly factor right down into the root. These are plants that send out branching roots in all directions like the good fodder plants, that is, plants like sainfoin,<sup>6</sup> not like beets or turnips. Thus, if we want to learn to understand plants, we need to be able to tell from their form, and from the color of their flowers, to what extent cosmic and earthly factors are at work in them.

Now, let us assume that we somehow manage to hold the cosmic factor in a plant strongly in check. In that case, it won't manifest itself much, it won't shoot into flower, it will rather manifest itself in something stem-like. As I told you earlier, the cosmic factor lives in the plant via silica. Just take a look at the equisetum plant — it has an unusual ability to draw the cosmic into itself, to permeate itself with silica. It contains ninety percent silicic acid. In equisetum, the cosmic is present to excess, but in such a way that it does not manifest in the flower but shows up in the plant's growth lower down.

Let's take another example. Suppose we want to hold in check everything that wants to stream upward through the stem into the leaves; suppose we want to keep it down below in the plant's root system. In our day and age this isn't so crucial, because through various circumstances we have already established the different species of plants. But long ago, in primeval times, things were different — it was still easy to change one plant into another. In those days, this sort of thing was extremely important. And it is still important today because we need to discover which conditions favor a particular plant. So, what do we have to look for today? How do we have to look at a plant in which we want the cosmic force to stay down below, instead of shooting up into the flowers and fruit? What do we have to do so that the process of forming stems and leaves is kept down below in the root system? We have to place this plant in sandy soil, because in sandy soil the cosmic is held in check, is really held fast. In the case of potato plants, we want to retain the flowering process down below in the actual potatoes, which are not true roots at all, but rhizomes — stems that have been held in check. To hold the cosmic force in check, we must plant our potatoes in a sandy soil.

From all this we can see that the ABC of judging plant growth is always to know what is cosmic in a plant and what is terrestrial, earthly. We need to know how to adjust the composition of the soil, so that the cosmic factor tends to become more dense, as it were, to be held back in the roots and leaves. Or conversely, how to make it thinner so that it can be more readily sucked up into the flowers, giving them color, or into the fruits, permeating them with fine flavor.

Just like the color of flowers, the fine taste of apricots or plums is a cosmic quality that has made its way up into the fruit. In every apple "you are actually eating Jupiter; in every plum, Saturn."<sup>7</sup>

If we human beings, with what we know today, had to try to develop all the many modern varieties of fruits from the relatively few varieties of primeval times, we would not get very far. Fortunately for us, the forms of our different fruit varieties already became hereditary back in a time when humanity's instinctive, primeval wisdom still knew how to create the different kinds of fruits out of the primitive varieties. If we didn't already have our different varieties of fruit, which we can propagate again and again through heredity, but found ourselves in the situation of having to recreate them all, we would not be able to accomplish much with our modern intelligence. Nowadays we do everything by trial and error and don't at all enter into the process rationally. This is a fundamental prerequisite, however, that must be reacquired if we hope to continue at all in our work on the Earth.

What our friend Stegemann said about being able to notice a decline in the quality of agricultural products was very much to the point. This decline, like the transformation in the human soul itself, has to do with the Kali Yuga<sup>8</sup> coming to an end in recent decades and in those to come. You can take this remark amiss or not, as you wish. We are also faced with a great inner transformation in nature. The natural gifts, naturally inherited knowledge, traditional medicines, and so on that have been passed down from ancient times are all losing their value. We need to acquire new knowledge in order to be able to enter into all the interrelationships of these things. Humanity has only two choices: either to start once again, in every field of endeavor, to learn from the whole of nature, from the relationships within the whole cosmos, or to allow both nature and human life to degenerate and die off. There is no other choice. Today, no less than in ancient times, we are in need of knowledge that can really enter into the inner workings of nature.

People today have a vague idea of how air acts inside the Earth — I spoke about this earlier — but they have practically no idea about what light does down there. They don't know that it is the cosmic,

silica-bearing rocks and stones that take up the light in the Earth and allow it to work there, while on the other hand humus, which is closely related to earthly life, neither takes up light nor allows it to become effective, and thus engenders lightless activity. But these are things that need to be known and understood.<sup>9</sup>

Now, the plants growing on the Earth are not the **only** things to consider — a certain complement of animal life also belongs to each region of the Earth. For reasons that will become apparent, we can leave human beings out of the picture, but we cannot disregard the animals, because the best cosmic qualitative analysis, if I may put it like that, takes place in the interaction between the plants and animals of a given area. The strange thing is that if a farm has the right number of cows, horses, and other animals on it, the manure provided by these animals adds up to just the amount needed by the farm — just enough to give to what has already reached the stage of chaos. I would be glad if this statement were put to the test — I am sure experiments would confirm it. And further, if you have the right number of horses, cows, pigs, the mixture of the manure will also be the appropriate one. This is due to the fact that the animals will consume the right amount of the plants that the land provides, and, in the course of their metabolic processes, will also produce just the right amount of manure that is necessary to return to the land. In principle — this can never be implemented completely, but it is correct in an ideal sense — if farmers find it necessary to bring in manure from outside, they should only use and regard this as a remedy for a farm that has become ill. It is healthy only insofar as it supplies its own manure from its own animals. This means, of course, that we will have to develop a proper science of the number of animals of each kind needed for any given farm, and this will happen quite naturally as soon an understanding of the intrinsic forces becomes available again.

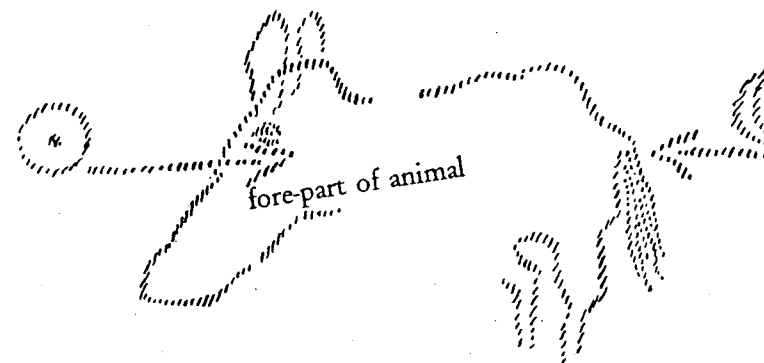
An understanding of the animal organism belongs, of course, to what we said earlier about the farm as a totality, having its belly above ground and its head below. The animal organism is intimately involved in the whole household of nature. Thus, if we look at an animal with regard to its shape and coloration, and also the structure and

consistency of its substance, we see the effects of Saturn, Jupiter, and Mars as we proceed from the animal's nose toward its heart, and the effects of Venus, Mercury, and Moon as we move beyond its heart toward its tail.

People who are interested in these things should really develop their knowledge of how to observe form. It is really extremely important to develop this capacity. Go to a museum sometime and look at the skeleton of any mammal, and keep the following in mind as you do: The primary influence at work in the formation of the head is the radiance of the Sun, the direct radiation of the Sun as it streams into the mouth. And depending on other conditions, which we will discuss later, one animal exposes itself to the Sun differently than another; a lion exposes itself differently than a horse, and it is this exposure that determines how the head and adjacent parts are formed. So, at the front end of the animal, we are dealing with the direct action of the Sun in the forming of the head. Now, you will recall that sunlight also approaches the Earth in another way, by being reflected by the Moon. We have to take into account not only the direct sunlight, but also the sunlight reflected by the Moon. This reflected sunlight is quite ineffective when it shines on an animal's head. (These things come into play during the animal's life as an embryo.)<sup>10</sup> But light reflected by the Moon becomes highly effective when it falls on an animal's hind end. Look at the formation of the hind end of an animal skeleton and its characteristic relationship to the form of the head. Cultivate a sense for these contrasting forms, for the way the thighs are attached, the way the lower end of the digestive system is formed, in contrast to the opposite pole, which is formed from the head inward. There, in an animal's front and hind ends, you have the contrast between the Sun and the Moon [see Drawing 6].<sup>11</sup>

If you follow this up, you will find that the Sun's influence extends right up to the heart, stopping just short of it — and that Mars, Jupiter, and Saturn work in forming the head and the blood — and that from the heart backwards, the influence of the Moon is supported by Mercury and Venus. Thus, if you turn the animal so that its head sticks

into the ground and its hind end sticks up, you then have the position that the agricultural individuality assumes invisibly.



DRAWING 6 (COLOR PLATE 2)

Looking at an animal's form in this way will enable you to discover a relationship, for example, between the manure that the animal provides and what is needed by the land whose plants the animal consumes. You must know, for instance, that the cosmic influences that come to expression in a plant, come from the interior of the Earth and are led upwards. Thus, if a plant especially rich in these cosmic influences is eaten by an animal, the manure that the animal's digestive system provides as a result of consuming such fodder, will be just the right thing for the soil where that plant grows.

You see, if you acquire insight into the forms around you, you will discover everything that is needed in the self-contained individuality that a farm is. The animals must be included also.<sup>12</sup>

### LECTURE THREE

Kobeřvitz

Wednesday, June 11, 1924

In agriculture, the cosmic and earthly forces I have spoken to you about have to work through the substances of the Earth. Before we can start turning to various practical points, as we will do in the next days, we must spend some time today exploring in more detail the question of how these forces work. This will require that we investigate nature's activity in a very broad sense.

One of the most important questions that can be asked with regard to agricultural production is: What is the significance of nitrogen? But it is just this question as to the essence of nitrogen's activity that has become extremely confused. We see, as it were, wherever nitrogen is active, only the last remnants of its influence, only its most superficial manifestations, and are unable to see the natural relationships in which it works. In fact, we cannot possibly see these relationships if we restrict ourselves to a specialized area of nature, but only if we look at nature in a broader sense and consider nitrogen's activity in the whole universe. As we will come to see, nitrogen as such may not even play the leading role in the life of plants. However, knowing what role it does play, is one of the first things we need to know in order to understand the life of plants.

The nitrogen at work in the natural world has four siblings, so to speak, whose effects we must also learn to recognize in order to understand nitrogen's functional significance within the household of nature. These four siblings are carbon, oxygen, hydrogen, and sulfur. They are combined with nitrogen in plant and animal protein, but how they are combined remains a mystery for today's superficial science.

To understand the full significance of protein, we cannot list merely hydrogen, oxygen, nitrogen, and carbon as its chief constituents; we must also include another substance whose activity is profoundly significant for protein, namely sulfur. Sulfur is the element in protein that plays the role of mediator between the physical in the world and the omnipresent spirit with its formative power. You might even say that anyone wanting to follow the trail the spirit leaves in the material world must follow the activity of sulfur. Its activity is not as apparent as that of the other elements, but that's exactly why it is so extremely important. The spirit working into the natural world follows the paths of sulfur. Sulfur is actually the carrier of the spirit; its ancient name is related to the name 'phosphorus' and derives from the fact that in ancient times people could see the radiating spirit within the radiating light of the Sun. That is why they called substances like sulfur and phosphorus, which have to do with how light works into matter, the "light-bearers."

Since sulfur's activity in the household of nature is so subtle, we would do better to look first at its four siblings — carbon, hydrogen, nitrogen, and oxygen — and learn to understand what these substances mean within the life of the whole world. Chemists today actually know very little about these substances. They recognize their external appearances when they have them in the laboratory, but they know nothing at all about their inner significance for the world as a whole. What we understand about these substances through today's chemistry is actually no greater than the knowledge we have of people who we've passed on the street, people we've photographed perhaps, and whose external appearance we recall with the help of the photographs. What science does with these substances is not much more than take snapshots, and everything we learn about them through books and lecture courses is not much better. We need to get to know them in their essence, in their deeper nature.

How all this relates to plants will soon become evident if we start with carbon. In recent times, carbon has fallen from its former aristocratic status to a very lowly one — and heaven knows how many other exalted beings have since taken the same path. Nowadays, all we

see in carbon is coal for fuel and graphite for pencils. True, we still grant aristocratic status to one of carbon's manifestations, the diamond, but we don't get much opportunity to admire diamonds since we can't afford to buy them! Considering carbon's great significance in the universe, what we actually know about it is extremely little. But as recently as several hundred years ago, this black and dirty fellow was highly esteemed and given the very noble title of the Philosopher's Stone. There has been a lot of fruitless speculation about the Philosopher's Stone, but when the alchemists of old and such people talked about it, what they meant was carbon in all its different manifestations. They kept its identity so secret only because if they hadn't, anyone and everyone could have possessed the Philosopher's Stone. It was in fact carbon.

And why was it carbon? We can answer that question with an idea that was current in olden times, and which will also tell us something we need to know about carbon today. We must disregard carbon in the broken-down form in which we know it when it has gone through various natural processes and emerged as anthracite or graphite. Instead, we must look at it in its activity in the realm of the living, as it passes through human or animal bodies or builds up plant structures as only it can do. Then we realize that the amorphous stuff we imagined carbon to be is only the last remnant, the corpse, of what carbon actually is in nature's household. In fact, carbon is the carrier of all of nature's formative processes. No matter what is being formed, be it the relatively short-lived form of a plant or the constantly changing figure of an animal, carbon is at work as the great sculptor. When it is fully active and internally mobile, it bears within itself not merely its own black substantiality, but also all the form-giving cosmic pictures, the great universal imaginations, which are the source of all forms in the natural world.

A hidden sculptor is at work in carbon, and this hidden artist makes use of sulfur when it builds up the many different forms that have to be built up in nature. To look at carbon in nature in the right way, we must see how the spirit-activity of the universe works as a sculptor, moistening its fingers with sulfur, so to speak, and how with

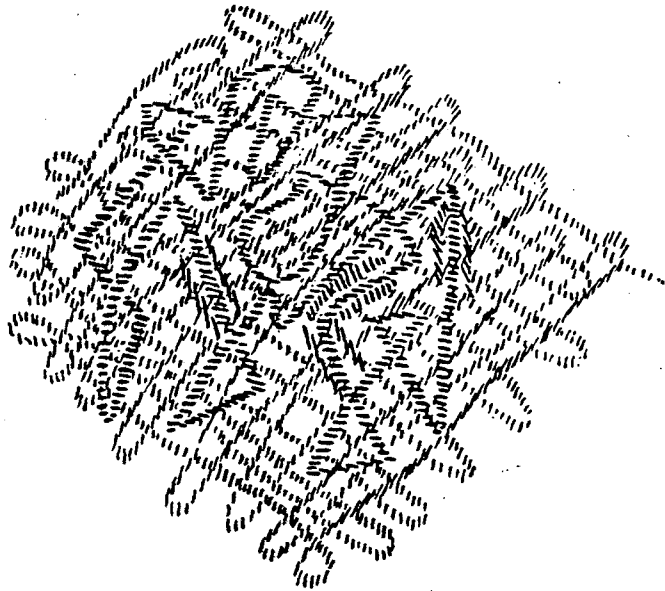
carbon's help it builds up not only the more static forms of plants, but also the ever-changing human form. For we are humans rather than plants precisely because by excreting the carbon as carbon dioxide, we can immediately destroy the forms that arise in us. The carbon would make our body too stiff and rigid, too much like a palm tree, if it weren't for our respiration, which tears the carbon out of its rigidity, combines it with oxygen and diverts it to the outside; thus we human beings can retain the flexibility of form we require. In plants, on the other hand — even in animals, to a certain extent — carbon is bound to a static form. With regard to human beings, the old saying, "Blood is a very special fluid," is quite true, since the human ego manifests physically in our pulsating blood. But it would be still more accurate to say that the human spirit — what we know as "I" — moves through our blood along paths moistened by sulfur and laid down by the weaving and working, shaping and dissolving activity of carbon. And just as the human ego, the true human spirit, lives in carbon, so too does the universal ego in the spirit of the universe live — via sulfur — in the ever forming and dissolving carbon.

In earlier epochs of the Earth's evolution, it was carbon that was precipitated; only later were the calcareous substances added, which human beings then used to create a solid support for themselves. In order for what lives in carbon to remain mobile, human beings (and also the higher animals) created an underlying solidity in their calcareous skeletons. That is how we raise our mobile carbon formations above the solid, purely mineral calcareous formations of the Earth, which we also incorporate into ourselves in order to have solidity within us. In the lime of our bones we have solid earth within us.

You can conceive of this as follows: All living things have an underlying carbon framework (more or less solid or more or less fluctuating as the case may be), and as the spirit moves through the world, it moves along the lines of this framework. Let me just sketch this schematically, so we can have something in front of us. Here is the framework that is built up in some way by the spirit with the help of sulfur [Drawing 7, green]. This carbon framework is either constantly

changing and moving around within the very finely-diluted sulfur, or it is more or less solidified and mixed with other constituents to form a solid structure, as it is in plants.

Now you see, whenever we consider a human being, or for that matter any other living being, we must realize that this living being is permeated by something etheric, which is the actual bearer of life — we have often talked about this.<sup>1</sup> The carbon framework of a living being has to be permeated by this etheric principle, which either clings to the framework or moves around and fluctuates. But the etheric principle must extend just as far as the framework does. We can say, something etheric must exist wherever this framework is [Drawing 7, blue].



DRAWING 7 (COLOR PLATE 3)

Now, if this etheric principle remained on its own, it could not exist in our physical earthly world. It would constantly be slipping away as if it were nothing at all. Without a physical carrier, it would be unable to take hold of what it needs to take hold of in the physical

world. It is characteristic of everything on Earth that spiritual things must always have physical carriers. Materialists see only the physical carriers and forget about the spirit; and since the physical carrier is always the first thing we encounter, they are always right. But they don't take into account that spiritual things always need physical carriers.

We can say that in the etheric the lowest spiritual principle is at work. This etherically-working principle permeates its physical carrier — helped again by sulfur's moisture — in order to guide into physical existence something that is not concerned with building up the framework, but rather with infusing it with unceasing life and movement. This physical element, which carries the life-effects out of the ether with the help of sulfur, is oxygen. You can imagine what I have sketched here in blue as representing the physical aspect of oxygen, and, within the oxygen, the surging, weaving, and vibrating of the etheric. With the assistance of sulfur, the etheric principle moves along the paths provided by oxygen.

Seen in this light, our breathing process begins to make sense. Through our breathing, we take in oxygen. Modern materialists speak only of the oxygen that is present in chemists' flasks when water is broken down by electrolysis. However, everywhere within this oxygen, the lowest supersensible principle — the etheric principle — is present, unless it has been killed off, as indeed it must be in the air that we have around us. In the air we breathe, the life of the oxygen is killed off, so that we do not faint because of the living oxygen. That is what happens if something with a greater degree of vitality enters into us — we become unconscious. Even an ordinary case of rampant growth, if it occurs in us in a place where it shouldn't, is enough to make us faint, or worse. If we were surrounded by air with living oxygen in it, we would all go around in a stupor. The oxygen around us has to be killed off. Nevertheless, right from its inception, it is the carrier of life, of the etheric, and as soon as it escapes from the tasks allotted to it while it is outwardly surrounding our senses, it immediately reverts to being the carrier of life. As soon as it gets inside us through our breathing, it is allowed to become alive again and promptly does so. The oxygen

circulating inside us is not the same as the oxygen that surrounds us on the outside. Inside us, oxygen is alive, and it also becomes alive as soon as it leaves the atmosphere to enter the soil. Although it's less alive there than it is inside human beings and animals, it is alive nonetheless. The oxygen under ground is simply not the same as the oxygen above ground.

Naturally, it's hard to come to a common understanding on this subject with physicists and chemists. Because of the methods they employ, the oxygen they know always has to have been removed from the ground, so all they ever see is dead oxygen. That is the way it has to be. But that is the case with any science that chooses to take into account only physical things; it only understands corpses. In reality, however, oxygen is the carrier of the living ether, and this living ether uses sulfur to gain control over oxygen.

I have just juxtaposed two things. One is the carbon framework, in which the activity of the highest spiritual principle accessible to us on Earth is revealed, either as the human ego or as the universal spirit at work in the plants. The other is the living, ether-bearing oxygen, which appears within the human being during the process of respiration. These two things need to come together. The oxygen needs to be able to proceed along the paths of the framework, it must be able to go wherever any sort of line has been traced by carbon, by the spirit of carbon. Everywhere in nature the etheric oxygen principle has to be able to find its way to the spiritual carbon principle. How does it do that? What is the mediator in this process?

The mediator is none other than nitrogen. Nitrogen guides life into the form or structure embodied in carbon. Wherever nitrogen appears, its role is to mediate between life and the spirit, which temporarily assumes form in the carbon. Everywhere, in the animal and plant kingdoms and also in the interior of the Earth, the bridge between oxygen and carbon is provided by nitrogen. The kind of spirituality active in nitrogen (once again with the help of sulfur) is what we call astrality; it is the same as the astral spirituality in the human astral body, or the astral spirituality that surrounds the Earth and works into the life of plants and animals, and so on.<sup>2</sup>

Spiritually speaking, astrality stands between oxygen and carbon, but in order to become physically effective, it makes use of nitrogen. Wherever nitrogen is, astrality reaches too. The etheric life-principle would float around like a cloud, would not take the carbon framework into account at all, if the nitrogen did not have such a strong attraction to the carbon framework. Nitrogen drags the oxygen — that is, the astrality in nitrogen drags the etheric in oxygen — along to wherever lines and pathways have been set out in the carbon [Drawing 7, yellow]. Nitrogen is the great transporter, who constantly brings life toward the spirit. That is why nitrogen is essential to the human soul, which as you know is the mediator between mere life and the spirit.<sup>3</sup>

This nitrogen is really something wonderful. If we trace its paths in the human organism, we find it forms a complete human being, a kind of "nitrogen person." If we could separate it out, it would make the most beautiful ghost you could imagine, because it imitates a person's solid framework so exactly. On the other hand, immediately afterwards, it flows right back into the life-element. This gives you an insight into the breathing process. Through the breathing process, the human being takes in oxygen, that is, etheric life. Then the internal nitrogen comes along and drags the oxygen to wherever there is carbon, something formed that is also weaving and changing. It carries the oxygen to the carbon so that the oxygen can grab hold of the carbon and expel it. The transformation of oxygen into carbon dioxide, the breathing out of carbon dioxide, is mediated by nitrogen.<sup>4</sup>

We are surrounded by nitrogen on all sides. Only a small percentage of the air around us consists of oxygen, the carrier of life; most of it consists of nitrogen, the carrier of astral spirituality. The oxygen in our surroundings is of tremendous importance for us by day, and also by night, but we often have relatively little respect for atmospheric nitrogen. We think we don't need it. Nitrogen, however, is precisely the thing that has a spiritual relationship to us.

You could try the following experiment. Put someone in an airtight space and take away a bit of the nitrogen in the air, so that the air surrounding the person is slightly poorer in nitrogen than usual. If the experiment were carried out carefully, I'm sure you would find that

the nitrogen immediately replaces itself, not from outside, but from within. The person would have to give off some nitrogen in order to bring the percentage of nitrogen in the surrounding air up to the accustomed level. As human beings, we depend on being able to bring about the right relationship between our whole inner being and the surrounding nitrogen; we can't tolerate a decrease in the nitrogen outside of us. Of course, since we do not need nitrogen for breathing, the reduced amount would still be adequate, but for the spiritual relationship that exists, only the usual amount is sufficient.<sup>5</sup>

So you see how strongly nitrogen plays into the spiritual, and so you can also imagine how important nitrogen must be for the life of plants. It is true that the plant as it stands there in the ground has only a physical and an etheric body, and does not contain an astral body as the animal does; nevertheless, the astrality must outwardly surround the plant on all sides. The plant would not bloom if the astrality did not touch it from outside. Plants do not internalize astrality the way animals and human beings do, but they do need to be touched by it from outside.<sup>6</sup>

Astrality is everywhere, and nitrogen, the carrier of astrality, is also everywhere. It floats in the air as a corpse, but the moment it enters the soil it becomes alive again, just as oxygen does. And, paradoxical as this may seem to materialistic minds, the nitrogen in the soil not only becomes alive, it also becomes sensitive. This needs to be taken into account, especially in agriculture. Nitrogen really becomes the carrier of a mysterious kind of sensitivity that is poured out over the whole life of the Earth. It is nitrogen that senses whether the right amount of water is present in a given area. It reacts sympathetically when the right amount of water is present and antipathetically when there is not enough water. It also reacts sympathetically when the right plants for a particular soil are there, and so on. In short, nitrogen pours out over everything a kind of sensitive life.

Ordinarily we are not aware of any of what I told you yesterday and earlier about the influences of the planets Saturn, Sun, Moon, and so forth on the form and life of plants. We simply don't know about it. But the nitrogen that is everywhere knows all about it; it knows

what comes from the stars and takes effect in the life of the plants and the life of the Earth. Here, as well as in our nerve-sense system, nitrogen is truly the mediator of sensitivity, the carrier of sensation. You can get a glimpse into the most subtle workings of nature if you look at nitrogen as it constantly moves about like fluctuating sensations. And we will find that the way we handle nitrogen is something of tremendous importance for plants. We will go into this further, of course, but first there is one other thing we need to look at.

We have seen now how there is an active interplay between what comes from the spirit and takes on form in the carbon framework, and what works out from the astrality in the nitrogen, which permeates the framework with life and makes it sensitive; and we have also seen how life is active there within the oxygen. In the earthly physical world, all these things work together by virtue of their being permeated by something further, something which establishes a connection between this world and the widths of the universe. Our earthly existence would not be possible if the Earth simply wandered through the universe as a solid body separate from the rest of the cosmos. If the Earth did that, it would be like a person who lived on a farm but who wanted to keep what's growing in the fields separate from himself or herself. That is not very sensible. There are things growing out there in the fields which will soon be in the stomachs of this worthy company, and which will then find their way back to the fields in one way or another. As human beings, we cannot possibly keep ourselves apart from this, since we are connected with our environment and ultimately belong to it. The things in the surroundings belong to the human being just as my little finger belongs to me. A constant exchange of substance must take place. And the same thing must happen between the Earth, with all its creatures, and the whole universe. Everything that lives on Earth and assumes a physical form, must be able to be led back into the universe in order to undergo a kind of cleansing and purification.

This is the situation [see Drawing 7, page 48]: First we have the carbon framework that I sketched in green; then the etheric oxygen principle in blue; and then, proceeding from the oxygen, we have in yellow the astrality that nitrogen carries to the different lines, the



astrality that builds the bridge between what is carbon-like and what is oxygen-like. I could indicate everywhere how nitrogen pulls what is represented by the blue lines over into the green lines. But everything that assumes an organized and detailed form in living beings must also be able to disappear again. It is not the spirit that disappears, but rather what the spirit has built into the carbon, and for which it has absorbed the life from the oxygen. All this must be able to disappear again. And it must not only vanish on Earth, it must be able to vanish into the universe. This is brought about by hydrogen, a substance that's as closely related as possible to both the physical and the spiritual. We must recognize that in hydrogen — despite being itself the finest physical element — the physical is completely shattered and with the help of sulfur flows out into the universe and loses all distinguishability.

We could say that in organized structures, the spirit has become physical, that there in the body it lives astrally as the image of itself as spirit, as ego. It leads a physical existence there as spirit transformed into physicality. After a while, however, it no longer feels comfortable there — it wants to dissolve itself. Then, as it again moistens itself with sulfur, it needs to find a substance in which it can give up all structure and specificity and set out into the indeterminate chaos of the universe. And this substance, so close to spirituality on the one hand and to physicality on the other, is hydrogen. Hydrogen leads every kind of formed, enlivened astrality back into the expanse of the universe, to a state where it can then once more be taken up from the universe as I have described. It is hydrogen that dissolves and disperses everything.

So here we have these five elements — sulfur, carbon, hydrogen, oxygen, and nitrogen — which represent what's working and weaving in everything that is alive, and also in everything that temporarily appears dead. All these elements are inwardly related to a very specifically differentiated spirituality. They are quite different than the elements modern chemistry talks about. Modern chemistry talks only about the corpses of the substances, not about the real substances. We have to get to know their living, sensitive aspect. And, because hydrogen is the least dense and has the smallest atomic weight, hydrogen is actually the least spiritual of them all.

At this point, I need to interject something so that you can see that such things are not just thought up out of the blue. Let's ask ourselves what we are actually doing when we meditate. In the Orient, people used to do it in a particular way. We in the West, in Europe, do it differently. Our kind of meditation is only indirectly dependent on the breathing process; we live in the rhythm of concentration and meditation. Nevertheless, what we do in devoting ourselves to these soul exercises still has a bodily counterpart, even though it is very delicate and subtle. In a very subtle way, the regular pace of our breathing, which is so closely tied to human life, is always slightly changed during meditation. While meditating, we retain somewhat more carbon dioxide than we do in a state of normal waking consciousness. A little extra carbon dioxide always remains behind in us. Usually we are eager to thrust the full force of the carbon dioxide out into our surroundings, but in this case we hold some back. We don't thrust the full force of the carbon dioxide out there, into the environment that is filled with nitrogen. We hold some back.

You see, if you bump your head against something hard — a table, for instance — you will only be aware of your own pain. If, however, you rub against it more gently, you will become aware of the surface of the table and so on. It is the same when you meditate. You gradually grow into an experience of the nitrogen that surrounds you. That is the real process involved in meditation. Everything becomes known, including everything that lives in nitrogen. And this nitrogen is a very smart fellow who can teach you about what Mercury and Venus and the rest of them are doing, because it knows these things and is sensitive to them. Activities like meditation are based on very real processes.

And in fact, it is at this point that the spirit in our inner activity begins to acquire a certain relationship to farming. This interaction of our soul and spirit with everything that is around us is what has always particularly aroused the interest of our dear friend Stegemann. It is not a bad thing, you know, when a farmer can meditate and thus become ever more receptive to the revelations of nitrogen. Our agricultural practices gradually change once we become receptive to what nitrogen

can reveal. Suddenly we know all kinds of things, they are simply there. Suddenly we know all about the mysteries at work on the land and around the farm. I cannot repeat what I already said here in the previous lecture, but perhaps I can characterize it again in a certain way. Take a simple farmer, someone an educated person would not consider educated. The educated person may say the farmer is stupid, but in fact that is not true, for the simple reason that the farmer is actually a meditator. He meditates on many, many things during the winter nights. And indeed he arrives at a way of acquiring spiritual knowledge; he is only not able to express it. It just happens that it is suddenly there. As he is walking through the fields, it's suddenly there. He knows something, and afterwards he tries it out. I lived among farmers when I was young, and I saw this happen over and over again. It really does happen.

These are the kinds of things that have to be linked on to. Mere intellectuality is not enough; it does not get us deep enough. Nature's life and flow are so fine and subtle that in the end they slip right through the coarse mesh of our rational concepts. That's the mistake science has made in recent times — it tries to use coarse conceptual nets to catch things that are actually much too fine for them.

So, all of these elements — sulfur, carbon, oxygen, nitrogen, and hydrogen — are combined in protein. And now we'll be able to understand the process of seed formation more exactly than before. Wherever carbon, oxygen, and nitrogen are present in leaf, flower, calyx, or root, there they are always bound to other substances in some form; they are not independent of these other substances. Only in two ways is it possible for them to become independent: either when hydrogen carries them out into the expanses of the universe, taking away all their specific characteristics and letting them dissolve into a general chaos; or when hydrogen drives them into the seed-forming process and emancipates them there, so that they become receptive to the influence of the cosmos. Chaos is present in the formation of the tiny seed as well as way out there in the periphery; and when the chaos in the seed interacts with the chaos in the periphery, that is when new life comes about.

Let's take a look now at how these so-called elements work in nature — they're called elements, but actually they are carriers of spirit. The behavior of oxygen and nitrogen within the human being, for instance, is actually relatively straightforward; the characteristics of oxygen and nitrogen are indeed present there, we just don't have access to them with ordinary science, because they are seemingly hidden within nature. Carbon and hydrogen, however, cannot be so well-behaved. Let's take a look at carbon. When the carbon activity leaves the plant kingdom and enters the animal or human kingdom, it has to become mobile, as I have already indicated. There, in order to present a solid form, it needs to be supported by a more deep-seated framework, and this framework consists not only of our calcareous skeleton, but also of the siliceous element that we always carry within us. In humans, and also in animals, the formative power of carbon is thus disguised to a certain extent, because it uses the formative power of lime and silica as a kind of trellis. Lime supplies the earthly formative force, and silica the cosmic formative force. In human beings and in animals, carbon is not the sole determining factor; it builds on the formative activities of lime and silica.

Lime and silica, however, are also fundamental for the growth of plants. And now we must develop an understanding of what carbon brings about in the human processes of digestion, respiration, and circulation, in relation to the skeletal structure and the silicious structure. We need to develop an insight into what is happening in there, into what we would see if we could creep inside and let the human circulatory process show us how carbon's formative activity radiates out into the calcareous and silicious elements. This is the perspective we must take when we look out over a field that is covered with plants and has lime and silica beneath it. We can't look inside a human being, but when it comes to the land, we must be able to recognize how oxygen is caught up by nitrogen and carried down into the carbon — that is, carbon insofar as it is supported by lime and silica. We could also say that the oxygen only passes through the carbon. The oxygen around us must enter the Earth, where it will become enlivened. With the help of nitrogen, it must penetrate into the

depths of the Earth, where it can then conform to the lime and be supported by the silica.

If we have any sensitivity to these things, we can observe this process wonderfully in the Papilionaceae, in the legumes, in all those plants known in agriculture as "nitrogen collectors." These plants are indeed dependent on drawing in nitrogen in order to pass it on to what is below them. When we look at them, we can see that something down there in the ground needs the nitrogen, just as human lungs need oxygen. And this is the lime in the ground. It is dependent on a kind of nitrogen-inhalation, just as the human lungs are dependent on inhaling oxygen. And these plants, the legumes, represent something similar to what takes place on the epithelial cells of our lungs during inhalation. By and large, the legumes are the only plants of this kind; all the others are more closely related to the process of exhalation. Viewed in this way, the whole organism of the plant kingdom falls into two parts. Wherever we encounter legumes, we are seeing organs of respiration for the most part, and wherever we meet other plants, we are seeing organs that breathe in a much more hidden way and actually have other functions to perform.

Our task, then, is to learn to see plants in such a way that each species' place within the overall organism of the plant world becomes apparent, just as within the human organism each human organ has its place. Once we have learned to see the individual plants as parts of a single whole, we will discover the great significance of the legumes. Of course, we know these things already, but it is important to understand them on this spiritual basis, because otherwise the danger is great that in the near future, as even more of our traditions are lost, we will set off in the wrong direction when we put new things into practice.

You can see how the legumes actually function. It is typical of all of them that the fruit-forming tendency, which in other plants takes place farther up, is held back in the leafy region of the plant. These plants want to fruit even before they come into flower.<sup>9</sup> You find this tendency in all the legumes, and it comes from the fact that these plants tend to keep what lives in nitrogen very close to the ground — in fact, they carry it into the ground — while the other plants develop

it higher up. You can see how the legumes tend to color their leaves somewhat darker green than other plants. You can also notice that the actual fruits of these plants are somehow stunted, as it were, and that their seeds lose their viability quite quickly.<sup>9</sup> These plants, in fact, are organized in such a way as to bring to expression what the plant world receives from the winter, not from the summer. Therefore it could be said: In these plants there is always the tendency to wait for winter; they would actually like to wait for winter with what they develop. Their growth slows down when they find enough of what they really need, enough nitrogen in the air, which in their own fashion they are able to carry downward.<sup>10</sup>

That is an example of how we can look into the very life of what goes on in and above the soil. Then, if you also include the fact that lime has a remarkable relationship to the world of human desires, you will see how organic and alive everything becomes. In the form of calcium, a pure element, lime does not rest for a minute. It longs to be satiated, to combine with oxygen and become quicklime; but even then it's not content. It still has all kinds of cravings; it wants to combine with any kind of metallic acid, even with bitumen, which is not even mineral any more. It wants to draw everything into itself. Down in the soil, it manifests a real instinctual craving. People who are sensitive to these things will notice the difference between lime and other substances — lime sucks at us, pulls us out. You get the distinct impression that something of the nature of desire is always present in conjunction with anything related to lime. Lime even draws the vegetative realm into itself, because everything it desires is there in the plants. This has to be wrested away from it again and again. And how is this done? By means of something so thoroughly noble that it no longer desires anything.

This noble substance — self-content, and wishing for nothing more — is silica. Silica has come to rest in itself. And people are mistaken if they think silica is to be found only in the form of a solid mineral. Silica is actually present everywhere in homeopathic amounts. Silica is self-contained and undemanding. Lime is full of demands, but silica, like our sense organs which do not perceive themselves but only

what is outside of them, silica no longer claims anything at all for itself. In earthly existence, silica is generalized outer perception, lime is generalized outer desire, and clay mediates between them. Clay is closer to silica, but it still mediates towards lime.

We need to come to understand this so that we can achieve a kind of sensitive knowing. We should be able to experience lime as a creature of many desires who wants to grab and take possession of everything, and silica as a noble aristocrat who carries everything wrested from the clutches of lime into the atmosphere and there gives shape to the plants. Silica lives either as if in a castle, as in the horsetail plant, or spread out over everything, sometimes in very homeopathic amounts. It is responsible for wresting away from the lime what must be wrested away. Here again we are confronted with extremely subtle processes in nature.

Carbon serves as the actual form-giver for all plants, the shaper of their framework. But in the course of the Earth's evolution, this task has been made difficult for carbon. It could easily shape the plants if it only had water beneath it, but now the lime is down there and interferes. Therefore, in order to go on shaping the plants, carbon now allies itself with silica, and then also with clay, because the resistance of the lime must be overcome.

So, what is it like for a plant to be involved in all of this? From below, the lime is reaching out to grab it; from above, the silica is trying to make it as thin and fine and fibrous as the aquatic plants; and in the midst is carbon, the real shaper of plant forms, keeping everything in order. And just as our own astral body brings about order between our ego and our etheric body, so does the astrality of nitrogen work there too. We must learn to understand what the nitrogen is accomplishing in among the lime, the clay, and the silica, in the middle of everything that lime is trying to pull downward and silica is trying to radiate upward.

This leads to the question of how to bring nitrogen into the plant world in the right way. We will take up this question tomorrow, and thereby find the transition to the various forms of manuring.

## LECTURE FOUR

Koberwitz

Thursday, June 12, 1924

We have seen that in order to arrive at spiritual-scientific methods applicable to agriculture, we need to look at nature, and the spirit's activity in nature, in its entirety, in its most encompassing dimensions. Materialistic scientists, on the other hand, have increasingly tended to narrow their scope and investigate ever more minute entities, although at least with agriculture they haven't immediately gotten down to the microscopic level, which is so often the focus in other scientific disciplines. Even in agriculture, however, they still tend to be concerned with very small spheres of activity and the conclusions that can be drawn from them. But it is impossible to assess the world of human beings and other living things solely from such narrow perspectives. The way current science deals with the realities of agriculture is equivalent to trying to reconstruct the totality of a human being from just a little finger and an earlobe. Today there is an absolutely urgent need to counteract this tendency with a genuine science that can encompass the large-scale cosmic interrelationships.

Just think of how often current science — or the science of a few years ago — has had to correct itself. Take, for example, the scientific absurdities that were prevalent not too long ago regarding human nutrition. Everything was highly scientific and scientifically proven, and from a certain perspective the proofs were irrefutable. It was scientifically proven that an average person weighing 70-75 kilograms [155-165 pounds] required about 120 grams [4¼ ounces] of protein a day for adequate nourishment. As I said, this was "scientifically proven," yet today, no scientifically-inclined person believes this any

more. Science has corrected itself. Today everyone knows that 120 grams of protein per day are not only not necessary, but downright harmful, and that people will be healthiest if they consume no more than 50 grams [1 3/4 ounces] a day. Here science has corrected itself. Today we know that excessive protein consumption creates by-products in the intestines that are in fact toxic. And if you consider people's entire lifetime and not just the period of life when the protein is being eaten, you will find that arteriosclerosis in old age is primarily due to the toxic effects of this excess protein. This is an example of how scientific investigations involving human subjects are often flawed because they consider only the short-term effects. A normal human life span, however, is much longer than ten years, and although initial results may seem favorable, detrimental effects often become evident much later on.

Spiritual science is less likely to fall into errors like these. It is certainly not my intention to join in the cheap criticism that is often leveled at current science because it has had to correct itself as I described; such things cannot always be helped. But on the other hand, it is just as cheap to criticize spiritual science when it enters into practical life and is obliged for once to consider life's larger relationships and to investigate not just the forces and substances that are crudely material, but also those that are more spiritual. This certainly applies also to agriculture, and to the issue of fertilizers in particular.

Even the way the scientists phrase their statements about fertilizing, shows that they don't have any idea of its significance in the household of nature. Today we often hear the phrase: fertilizers contain the nutrients for the plants. Well, I deliberately said what I did just now about human nutrition in order to show how even in very recent times, science has had to correct itself. It has had to correct itself because it starts from a totally false view of how living things are nourished.

People have believed that the most important factor in nutrition — please don't take it amiss if I speak quite freely now — is what we put into our mouths and eat. Certainly, what we eat is important. But most

of what we consume on a daily basis is not there to be absorbed into the body and deposited as substance. It is there in order to convey its forces to the body, to rouse the body to activity. Most of what we consume is actually excreted again, so that with regard to metabolism, the important thing is not so much the correct weights and proportions, but whether or not the vitality of the forces in the food can be taken up in the right way. We need this vitality, for instance, whenever we walk or work, or simply move our arms.

On the other hand, what our body uses in order to have deposits of substance, in order to enrich itself with substances — which are then again expelled as the body renews its substance every seven or eight years — most of this is taken up through the sensory organs, through the skin, through respiration. What the body takes in and deposits as substance is continually being absorbed in extremely fine doses; it only becomes condensed once it is inside the body. The body absorbs it from the air and then hardens and condenses it to the point where we eventually cut it off in the form of nails, hair, and so forth. It's completely wrong to hold to the formula: ingestion of food — passage through the body — sloughing off of hair, nails, skin, etc. It should actually be: breathing and refined uptake through the sensory organs (even the eyes) — passage through the organism — sloughing off. On the other hand, what we take in through our stomach is important because it has inner energy like a fuel, because it brings in the forces that enable the will to be active in the body.<sup>1</sup>

This is the truth, the simple result of spiritual research, and it can drive one to despair to see modern science defending exactly the opposite point of view. I say this because when it comes to the most important questions, it is so very difficult to come to any kind of understanding with this modern science — and yet we must come to terms with it. If we don't, today's science will soon come to a complete dead end as far as practical matters are concerned, since its own methods prevent it from understanding some things that are right under its nose. I am not talking about experiments — as a rule, what science says about experiments is true, and they're very useful. It is the theorizing after the fact that's so bad, for out of this theorizing come

the practical guidelines in many different fields of activity. Given all this, you can see how difficult it is to come to any kind of understanding. But on the other hand, such understanding must come, especially in the most practical areas of life, which include agriculture.

You see, if we want to manage things properly in the various domains of agriculture, it is certainly necessary to have insight into the way substances and forces work, and also into the way the spirit works. Just as a small child who does not yet understand the purpose of a comb may chew on it or misuse it in some other way, so too will we misuse things if we do not understand their essential nature.

To understand what I mean, let us begin by considering a tree. A tree is different from an ordinary annual plant that never gets past the herbaceous stage. A tree surrounds itself with bark and so on; but what is the essential nature of a tree in contrast to an annual plant? Let us compare the tree with a mound of soil that is unusually rich in humus, that contains an unusual amount of plant matter in the process of decomposition, and perhaps some decomposing animal products too [Drawing 8].



DRAWING 8 (COLOR PLATE 4)

Here on the left is the mound of humus-rich soil, in which I have made a crater-shaped depression. On the right is the tree, which is more or less solid on the outside, and which on the inside is growing and creating its shape. I am sure it seems strange to you that I have drawn these two things side by side, but they are actually much more closely related than you might think. Soil that is permeated with humus-like substances in the process of decomposition, actually contains living ether. And that is what is important. When such soil shows us by virtue of its particular structure and character that it contains something etheric and alive, this means it is on the way to becoming a kind of plant sheathing. It just doesn't go as far as to become the kind of sheathing that draws itself into the bark of a tree. As you can imagine, it can't go that far in nature. But the fact is that instead of having a mound that incorporates the special etheric qualities characteristic of humus, at a higher stage of evolution the mound simply wraps itself around the plant.

For any given locality on Earth, there is a certain level that separates what is above the Earth from what is inside the Earth. Anything raised up above the normal level for that locale will show a particular tendency to life, a tendency to become permeated with etheric vitality. You will therefore find it easier to permeate ordinary inorganic soil with humus-like material — or any other kind of refuse in the process of decomposition — if you first build up the soil into mounds. Then of its own accord the soil will tend to become inwardly alive and plant-like. The same process occurs in the formation of a tree. The soil mounds itself up and surrounds the plant — it envelops the tree with its etheric vitality.

You see, I am telling you all this so that you will begin to comprehend that there is an intimate relationship between what is within the contours of a plant, and the soil surrounding the plant. It is not at all true that life stops at the plant's perimeter. Life as such continues on, namely from the roots of the plant into the soil, and for many plants there is no sharp dividing line between the life inside them and the life in their surroundings. We must be imbued with this idea

and understand it thoroughly in order to understand the nature of soil that has been manured or otherwise fertilized in some way.

We must recognize that fertilizing must consist of enlivening the soil, so that the plant is not in dead soil and does not have difficulty making it through to the fruiting stage out of its own vitality. The plant does this more easily if from the very beginning it is embedded in something living. Basically, all plant growth has a slightly parasitic quality, because it grows out of the living soil like a parasite. This has to be that way. In many regions of the world we have to help out the plants by fertilizing, because we cannot count on nature itself to incorporate enough organic residues into the soil and break them down far enough so that the soil becomes sufficiently enlivened. This is least necessary in the regions where there is so-called black earth; there nature itself sees to it that the soil is sufficiently alive.<sup>2</sup>

So you see that we must really understand what fertilizing is all about. But now there is also something else we must understand, and that is how to establish a kind of personal relationship to everything in farming, especially to the various manures, to the methods of working with them. This may seem unpleasant, but without the personal relationship, it really won't work. And why not? Well, this will soon become evident to you if you consider the fact that living things always have an inside and an outside. The inside is enclosed within a skin of some kind, and the outside is outside of that skin. Let us now consider the inside.

The inside of something living not only has forces that stream outward, in the direction of these arrows [Drawing 9], but also forces that stream inward, that are turned back. In addition, it is surrounded by all kinds of forces on the outside. Now there is something that expresses very exactly, if rather personally, how something living establishes a balance between its inside and its outside. All the forces working to stimulate and maintain life within this living organism — within the contours of its skin — have to smell; you could also say they have to stink. This is basically what it means to be alive: that the things that would spread odors around if they were released, are held together, that they do not stream outward too strongly, but are held

together inside and smell there. An organism lives in such a way that it allows as little as possible of the odor generated by the life within it to slip past the boundary of its skin. You might say that the healthier an organism is, the more it smells on the inside and the less it smells on the outside. An organism, that is to say, a plant organism, is not predestined to give off odors, but rather to absorb them. And if we comprehend the beneficial effects of an aromatic meadow full of fragrant plants, we will realize the kind of mutual support that takes place among living things.<sup>3</sup> The fragrance that spreads around out there is what works on the plant from outside. It is different than the mere life-scent, and spreads around for reasons that we will still come to. We must have a personal relationship to all these things — then we will truly participate in nature.



DRAWING 9 (COLOR PLATE 4)<sup>4</sup>

It is important to comprehend that manuring and similar practices must consist in providing the soil with a certain degree of vitality. But in addition to this, they must also allow the soil to develop the process I called special attention to yesterday. The nitrogen must be able to spread out in the soil in such a way that life is guided towards certain lines of force, as I illustrated for you. Thus, when we fertilize, we must bring sufficient nitrogen to the earth realm so that in the fields where plants are to be grown, life can be brought to those structures in the

earth realm that need it. That is the task, and it must be carried out in a sober and exact manner.

Now, this could already lead us to suspect that when you use pure minerals as fertilizer, you can never really influence the earthy element in the soil, but only at most the watery element. By using mineral fertilizers, you can influence the soil's watery element to some degree, but you will never really be able to enliven the earthy element itself. Plants that have been treated with any kind of mineral fertilizer will show by their growth that they have been sustained only by stimulated water and not by enlivened earthiness.<sup>5</sup>

If we want to understand these things, we would do best to turn first to the least pretentious type of fertilizer, namely compost, which is sometimes even treated with disdain. In compost we have a means for enlivening the soil, and compost can include any kind of organic waste from the farm or garden — spoiled hay, fallen leaves, even dead animals. We should not turn up our noses at things like this, since they still contain valuable etheric forces, and also astral forces. These forces are not as strong as those in solid manure or liquid manure, but in a certain sense they are more stable; the astrality in particular is more stable. It is simply a matter of allowing for this stability in the right way. If the etheric life in a compost pile is too rampant, the ability of the astrality to influence the nitrogen is immediately impaired; the astrality is prevented from coming into its own, so to speak. There is a particular substance, however, namely lime, whose favorable influence in the natural world I have already described from several different points of view. If you add some lime to the compost pile, perhaps in the form of quicklime, a remarkable thing happens. Without causing the astrality to volatilize too strongly, the quicklime takes up the etheric, and with it also the oxygen, so that the astrality becomes effective in a wonderful way.<sup>6</sup> This accomplishes something very specific. When you use this compost as fertilizer, you will be giving the soil's earthy component something that strongly permeates it with astrality, without the detour of the etheric. Just picture it: the astrality penetrates very strongly into the earthy component of the soil — without first going by way of the etheric — so that the soil becomes

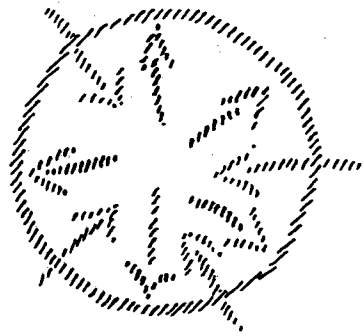
strongly astralized, and by means of what is astralized, becomes permeated with nitrogenous substance.<sup>7</sup>

What arises there is really very similar to a certain plant-like process in the human organism, a plant-like process that is not concerned with reaching the fruiting stage, but which is content to remain, as it were, at the stage of leaf and stem formation. The process we impart to the soil must also exist in us, so that in a corresponding way we can bring our food to the necessary energetic state that I mentioned earlier.<sup>8</sup> When we treat the soil in the way I have described, we stimulate it to the same energetic state. And this prepares the soil to bring forth something that is especially good for animals to consume, so that under its influence they can develop inner liveliness, so that their bodies can become inwardly energetic. In other words, we would do well to fertilize our pastures and meadows with this compost. If we do this conscientiously — that is, if we also carry out the other procedures that are necessary — we will end up with good pasturage, which even when it is cut will make good hay. I would like to say, however, that in order to proceed in the right way with things like this, we need to have insight into the whole matter. What we do in particular instances will naturally depend on our feeling, but this feeling develops itself once we have proper insight into the whole nature of the process.

Now, if you simply leave a compost pile lying around as I have described it so far, it can very easily begin to scatter its astrality. It is at this point that the personal relationship you develop to these things becomes important, because you need to do whatever you can to make the pile smell as little as possible. This can be easily accomplished if you build up the pile in thin layers and cover each layer with something like loose peat before adding the next one. This holds together what would otherwise escape in the form of odors, that is to say, the nitrogen, which wants to escape in all kinds of guises and combinations. The main thing I want to indicate here is that we must approach everything in farming with the conviction that in order for the whole thing to work, we need to pour life and also astrality into everything around us.



Now, if we continue from here, something else may occur to you. Have you ever thought about why cows have horns, but certain other animals have antlers? That's an extremely important question. However, what science has to offer on this point is usually very one-sided and superficial. Let us try to answer this question of why cows have horns. Remember that I said that something living need not have forces that only stream outward, it can also have forces that stream inward. Imagine here some organic entity with streams of force going in both directions [see Drawing 10]. If that were all there was to it, we would have a rather irregular, lumpy creature. A cow would look very peculiar — its limbs would stay tiny, the way they are in the earliest embryonic stages. It would simply look grotesque. But that's not how a cow is put together; a cow has horns and also hoofs. What happens at the places where the horns and hoofs grow? At these places the streams are especially strongly turned back inward, and the outside is particularly strongly shut off. All outward communication, such as can occur through skin or hair, is completely ruled out. In this way, the development of the horns and hoofs is connected to the form and development of the animal as a whole.<sup>9</sup>



DRAWING 10 (COLOR PLATE 4)

Antler formation is something totally different. In the case of antlers, the streams are not directed back into the organism; instead,

the antlers serve as outlets so that certain streams can be led outward for a ways and discharged there. ("Streams" don't always have to be fluid or gaseous, they can also be streams of force, which in this case are localized in the antlers.) A stag is beautiful because it stands in intense communication with its surroundings, because it directs some of its force-streams outward and lives at one with its environment and thereby takes in everything that influences the nerves and senses on an organic level. A stag thus becomes a quick and nervous animal. In a certain respect, all animals with antlers are suffused with a slight nervousness, which can already be seen in their eyes.<sup>10</sup>

A cow has horns in order to send the formative astral-etheric forces back into its digestive system, so that much work can be accomplished there by means of these radiations from the horns and hoofs. Anyone trying to understand foot-and-mouth disease — that is, how the periphery of the animal works back on the digestive tract — needs to understand this relationship. Our remedy for foot-and-mouth disease is based on insight into this relationship.<sup>11</sup> So you see, there is something inherent in a horn that makes it well-suited for reflecting living and astral influences back into the activity of the interior. In a horn you have something that can radiate life, and even astrality. It is truly so. If you could crawl around inside the living body of a cow, if you were right inside the cow's belly, you would be able to smell how living astrality streams inward from the horns. And with the hoofs, it is similar.

This all points to measures we might introduce to enhance the effectiveness of ordinary barn manure. What is this manure in reality? It is outer nourishment that has entered into the animal, that has been absorbed to some extent and given occasion for the dynamic development of forces within the organism, but which has then been excreted, rather than serving primarily to enrich the animal with substance. In passing through the organism, however, it has become pervaded with astral and etheric activity. It has become permeated with nitrogen-bearing forces and oxygen-bearing forces. The mass that emerges as manure is impregnated with all this.

Now suppose we take this mass in some form or other — we'll go into details later — and give it over to the Earth. What we would actually be doing is putting something etheric and astral into the Earth, something that by rights belongs in the belly of an animal and in the belly produces plant-like forces. Indeed, the forces that are engendered in our digestive tract are plant-like. We ought actually to be terribly grateful that there is anything left over as manure, because in this way something etheric and astral is carried from inside the organs out into the open. These etheric and astral forces are inherent in the manure; all we have to do is to preserve them so that they can have an enlivening and astralizing effect on the soil, and not only on the watery part of the soil, but also on the earthy, mineral component. Manure has sufficient force to overcome even the inorganic earth element.

Now, what we put into the ground, of course, must lose the form it originally had before it was consumed as fodder; it must have gone through an internal organic process in the animal's metabolic system. To a certain extent it will already have begun to decay and dissolve, but it is best if it has just reached the point where it's beginning to fall apart by virtue of its own etheric and astral forces.<sup>12</sup> Then microscopic parasites, the smallest living creatures, put in an appearance and find a fertile breeding ground in the manure. This is why people think these parasitic beings have something to do with the manure's quality. In actuality, however, they are only a sign that the manure is already in a certain condition. They can be useful as indicators, but we are succumbing to an illusion if we think we can radically improve manure by inoculating it with bacteria and so on. It might initially appear to do so, but in reality that's not the case. I will return to this later. Meanwhile, let's continue.

Next let us take the manure, in whatever form is available, stuff it into a cow horn, and bury it in the ground at a certain depth — I would say between  $3/4$  and  $1\frac{1}{2}$  meters [ $2\frac{1}{2}$  to 5 feet], provided the soil beneath is neither too clayey nor too sandy. We should select a good soil that's not too sandy. You see, by burying the cow horn with the manure in it, we preserve in the horn the etheric and astral forces that the horn was accustomed to reflect when it was on the cow. Because

the cow horn is now outwardly surrounded by the Earth, all the Earth's etherizing and astralizing rays stream into its inner cavity. The manure inside the horn attracts these forces and is inwardly enlivened by them. If the horn is buried for the entire winter — the season when the Earth is most inwardly alive — all this life will be preserved in the manure, turning the contents of the horn into an extremely concentrated, enlivening and fertilizing force.

Once the winter is over, we can dig up the cow horn and take the manure out of it. During our last experiments in Dornach, people discovered that when we took the manure out, it did not stink at all anymore. This was very striking. It had no smell anymore, although of course it did begin to smell a little as we mixed it with water. This shows that all the smell in it had been concentrated and transformed. After spending the winter underground, the cow horn contains an immense astral and etheric energy, which you can now use by diluting the contents with ordinary water, which should perhaps be warmed up a bit.

I have always found — inasmuch as I first looked at the area to be treated to get an impression of the quantities — that for an area as large as, say, from the third window here to the first footpath, that this needs only one hornful of manure diluted in about half a bucket of water.<sup>13</sup> You must make sure, however, that the entire contents of the horn have been thoroughly exposed to the water. To do this, you have to start stirring it quickly around the edge of the bucket, on the periphery, until a crater forms that reaches nearly to the bottom, so that everything is rotating rapidly. Then you reverse direction quickly, so that everything seethes and starts to swirl in the opposite direction. If you continue doing this for an hour, you will get it thoroughly mixed.

Just imagine how little work this takes! The burden of labor for these things will not be very great. Besides, I could imagine that otherwise unoccupied members of a farming household might really enjoy stirring the manure, at least for a while. The sons and daughters of the household could do an excellent job of it. It is a very pleasant feeling to experience how a delicate odor develops out of what was

initially odorless. The personal relationship that you can develop to such things is extremely beneficial for people who wish to experience nature as a whole, and not just as it appears in the Baedeker guidebooks.

The next thing to do is to spray the substance over your plowed fields, so that it can really unite with the soil. When only small areas are involved, you can apply it with an ordinary syringe-sprayer, but of course for larger areas, special machines will need to be constructed. If you manage to supplement your usual manuring with this kind of "spiritual manure," you will soon see what fertility will result. In particular, you will find that these things lend themselves to further development in a most remarkable way. Thus, you can follow up the measure I've just explained with another one, which can be as follows.

Once again take cow horns, but this time, instead of stuffing them with manure, fill them with quartz that has been ground to a powder and mixed with water to the consistency of a very thin dough. Instead of quartz, you could also use orthoclase, feldspar.<sup>14</sup> And now, instead of leaving the cow horn in the ground through the winter, let it stay underground all summer, and then take it out in late autumn. Save the contents until the next spring and then take what was exposed to the summer life of the Earth and treat it just as you did the manure. In this case, however, you will need much smaller quantities; you can take a portion the size of a pea, or maybe no bigger than a pinhead, and stir it into a whole bucket of water. This too needs to be stirred for an hour. If you apply this as a fine spray on the plants themselves — especially on vegetables and things like that — you will soon notice how its effect complements and supports the influence coming from the other side, from the soil, as a result of the cow-horn manure.

And if you were also to extend this treatment to entire fields — it shouldn't be too difficult to construct machines that would apply the very light spraying we need — you would then see how the cow-horn manure pushes from below and how the other stuff pulls from above, neither too strongly nor too gently. It could be wonderfully effective, especially in the case of grains.<sup>15</sup>

You see, these things are derived from a wider field of observation, and not just from dealing with the single thing in question, which is like trying to reconstruct a whole human being from a single finger. Something is attained, thereby, which is definitely not to be underestimated. The studies that are made nowadays — studies on "farm productivity" and the like — are really nothing more than studies on how to make production as profitable as possible. They don't amount to much more than that. Of course, even farmers are impressed, although they aren't always conscious of it, when some measure or other achieves big results — huge potatoes, for example, or anything else big and swollen. But then the investigation is not taken any further, even though these things are not the most important aspects at all. The most important thing is that once these things reach human beings, their effect on human life should be as beneficial and health-giving as possible. You can raise fruits that look magnificent in the orchard or field, but as far as human beings are concerned, they may simply be stomach-filler and not promote human life. But today's science is unable to pursue things to the point where people would be getting the best kind of nourishment; it simply does not know how to go about it.

In contrast, what spiritual science has to say on the subject is rooted in the whole household of nature. It is always conceived out of the totality, and for this reason the individual measures are also decisive for the totality. If we farm like this, the result can be nothing other than what is best for human beings and also for animals. In spiritual science, human beings are our standard and our starting point. All our practical suggestions serve the purpose of sustaining the whole human being in the best way possible. That is what distinguishes this kind of study and research from what is customary today.

## FIRST DISCUSSION

Koberwitz  
Thursday, June 12, 1924

QUESTION: *Does the dilution [of the horn manure preparation] continue in arithmetic progression?*

DR. STEINER: That is something that needs to be investigated further. You will probably find that as the areas to be treated get larger, you can use greater amounts of water and fewer cow horns. Thus you will be able to manure large areas with relatively few cow horns. In Dornach, we had twenty-five cow horns and we used some of these to treat a large garden. First we used one horn to half a bucketful; later we treated it again, using two horns to a whole bucket. Then we also had to treat an area that was much bigger; there we took seven horns to seven buckets of water.

*Is it all right to use a machine to stir the manure for larger areas, or is that not permissible?*

Well, you can either be quite strict about things like that, or you can decide to gradually slide toward surrogates. There's no question that stirring by hand has a quite different significance than mechanical stirring, although of course someone with a mechanistic world-view would never admit it. Just consider what a huge difference there really is: when you stir by hand, all the fine movements of your hand go into the stirring, and quite possibly all kinds of other things do too, including the feelings you have as you stir. People nowadays don't think that makes any difference, but in the field of medicine, for instance, the difference is quite noticeable. Believe me, it is really not a matter of indifference whether a certain medication is prepared by

hand or by machine. Something is imparted to the things that are produced by hand — you mustn't laugh at this. I have often been asked what I thought of the Ritter remedies, about which some of you may have heard.<sup>1</sup> As you may know, some people sing the praises of these remedies while others go around saying they have no particular effect. Of course they do have an effect, but I am firmly convinced that they would lose a great deal of their effectiveness if they became available commercially. With these medicines in particular, it makes a great difference when the doctor prepares the remedy and gives it directly to the patient. A certain enthusiasm is administered along with the remedy when this all occurs only in smaller circles. You may say that enthusiasm cannot be weighed or measured, but an enthusiastic doctor is an inspired doctor, and the doctor's enthusiasm supports the dynamic effect of the medicine. After all, light has a strong influence on remedies, so why shouldn't enthusiasm? As a mediator, enthusiasm can have a very great effect, and so can an enthusiastic doctor. That is why the Ritter remedies can be so effective. Great things can be accomplished with enthusiasm. However, if something like this were prepared by machine, the effects would probably disappear. That is what is involved here, whether something is done with everything that proceeds from the human hand — and this is a lot — or whether it is done by machine. But it could also turn out that doing the stirring is such fun that you wouldn't even consider using a machine, even when a lot of cow horns were needed. It could be something you do on Sundays after lunch. Then, if you invite a lot of guests and provide some entertainment, you could get it done just beautifully without any machines.

*There are already some technical difficulties in distributing half a bucket of water over a third of a Morgen [1/5 acre]. If now the number of cow horns is increased, this means not only more horns, but more difficulties in the distribution. Can that half bucket of water be diluted with more water, or is it important to keep this proportion? I mean, should we always use about half a bucket for a third of a Morgen?*

You could do as you suggest, but then I think the method of stirring would have to be modified. You could finish stirring one hornful in a half a bucket of water, and then further dilute what is in the bucket, but then you would have to stir it again. I think it would be better to calculate how much less of the material you would need in a half bucket of water, and then stir by the half bucketful, even if you use less than one hornful. It is very important to get a thorough and intimate mixture; simply pouring the stuff into the water and stirring it won't do at all. You must bring about an intimate permeation, and this does not occur when you put in any kind of thickened substance, or if you don't stir vigorously. I think it is easier for people to stir a lot of half buckets with a little bit of substance in them, than to stir the diluted water a second time.

*Could the liquid be strained, since there will always be some solid particles left, so that it can be better applied with a spraying apparatus?*

I do not think that will be necessary. If you stir it quickly, you will get a fairly cloudy liquid and will not have to worry about there still being foreign particles in it. The manure will allow itself to be evenly distributed. Pure cow manure is best, but I don't think you have to go to the extra effort of straining it, even if there are other things mixed in. The other things, rather than being harmful, might even be beneficial, because the process of concentration and subsequent dilution really only involves a dynamic radiant effect, not a substantial one. Thus there's no danger, if one of those foreign bodies lands somewhere, for instance, of getting potato plants with long shoots and nothing on them. There's no danger of that.

*I was only thinking of what it would do to the sprayer.*

You can put it through a strainer; that won't hurt. The best thing would be to have your machinery fitted with a strainer ahead of the sprayer.

*You didn't say whether we should weigh what comes out of the horn so as to get a specific proportion. And is that half bucket a Swiss bucket, or is it a certain number of liters?*

I took an ordinary Swiss milk bucket — everything was developed from direct experience. Now the weights and measures need to be worked out.<sup>2</sup>

*Can the cow horns be reused, or do they always have to come from freshly slaughtered animals?*

We have not tried it out, but as far as I can tell, you ought to be able to use the horns three or four times. After that, they probably won't work as well. It might be possible to use them for another year if you store them in the cow barn for a while after they've been used three or four times. I don't have any idea, though, how many horns will be available on the average farm, so I cannot tell whether or not you will need to be especially economical with them. That's a question I cannot answer right now.

*Where can we get the cow horns? Do they have to have come from Eastern or Central Europe?*

Where you get them from does not matter at all, just not from the slaughterhouse dump — they need to be as fresh as possible. However, the strange thing is that life in the Western hemisphere is something quite different from life in the Eastern hemisphere. Life in Africa, Asia, and Europe has a totally different significance than life in America. So it is possible that horns from American cattle would have to be treated somewhat differently to make them effective. For instance, you might have to pound the manure in more tightly to make it denser. It is best to use horns from your own locality. There is a very strong kinship between the forces present in the cow horns of a given area and the other forces at work in that area; the forces of the foreign horns might conflict with the local forces of the Earth. Of course, you also have to take into account that frequently the cows providing the horns in a given area do not originate in that area. But this is not such a problem, because when cows have been grazing and living on a certain piece of land for three or four years, they then belong to that land, unless they are Western cattle.<sup>3</sup>



*How old can the horns be? Do they have to come from an old or a young cow?*

You will have to try all these things out, but from what I know, it would seem that horns from cows of medium age would be best.

*How big do the horns have to be?*

[Rudolf Steiner drew the size of the horn on the blackboard — about 12 to 16 inches — the average horn size of the local Allgäu cattle.]



DRAWING 11  
(COLOR PLATE 4)

*Isn't it also important whether the horn comes from an ox, or from a male or female animal?*

It is very likely that horns from castrated cattle would not work at all, and that bull horns would not work very well. That's why I keep saying cow horns. Cows, as a general rule, are female! I mean the female animal.

*When is the best time to sow grains for breadmaking?*

The answer to this question will emerge more exactly when I talk about sowing later on in the lectures. Planting dates are extremely important, of course, and it makes a great difference whether you sow closer to the winter months or further away from them. If you sow close to winter, you induce a strong reproductive capacity; if you sow further away from winter, you engender a strong nutritive force in your grains.<sup>4</sup>

*Could we also distribute the cow-horn manure by mixing it with sand? And, does it make any difference if it is raining?*

With regard to the sand, you can go ahead and try it. We haven't tried it, but there is nothing to be said against it. What effect rain has is something that would have to be tested. Presumably the rain would not make any difference; it could even lead to everything becoming more firmly established. But on the other hand, since there is such a strong concentration of forces involved here, it is also possible that even the tiny impact of the falling raindrops might disperse things too much. It is really a very subtle effect we're working with, so all these things have to be taken into account. There is nothing to be said against spreading the cow manure with sand.

*How can we protect the cow horns and their contents from harmful influences during storage?*

The general rule in cases like this is that removing the so-called "harmful influences" does more damage than simply leaving things alone. People are so eager to disinfect everything these days that they invariably overdo it. In the case of our remedies, for instance, we found that if we wanted to absolutely prevent any possibility of mold, we would have had to use methods that would also have inhibited the therapeutic effect. I don't have all that much respect for these "harmful influences"; they don't do much damage. It is better to leave things alone than to go to great lengths to keep them clean. We just covered the cow horns with pig bladders to keep the dirt from falling in. As for the horns themselves, I wouldn't recommend cleaning them in any special way. You have to get used to the idea that dirt is not always "dirt." If you cover your face with a thin layer of gold, that's "dirt," and yet gold is not dirt. So dirt is not always dirt. In fact, sometimes the dirt is precisely what does the preserving.

*Should we take any special measures to help drive the seed as far as possible into chaos?*

You could, but it isn't necessary. If seeds are formed at all, a maximum of chaos is already there, and needs no further support.

Manuring is where the support is needed; as far as seed formation goes, I don't think there is any need to enhance the chaos. If the seeds are fertilized at all, the chaos is already complete.

*Won't it also be necessary to do something for the cosmic forces that are supposed to be retained until a new plant is formed?*

This could be done, of course, by making the soil more silicious, since it is through silica that the actual cosmic factor is absorbed by the Earth and becomes effective. You could do that, but I don't think it is necessary.

*How big should our experimental plots be?*

You could make experiments in the following way. Giving general guidelines for these things is always relatively easy, but you will have to try out for yourself what size works best in practice. In this case it will be relatively easy to set up the experiments. Let's say you plant two experimental beds of wheat and sainfoin side by side. You will find that the wheat, which has a strong natural tendency toward seed formation, will be hindered in this respect if you add silica to the soil, while with the sainfoin you will see that seed formation is probably completely suppressed, or perhaps simply delayed. When you want to research things like this, you can always compare the features shown by a grain like wheat with analogous features in sainfoin or some other legume. In this way you can set up very interesting experiments on seed formation.

*Does it matter when the diluted substance is applied to the fields?*

Undoubtedly it does matter. As a general rule, you can leave the cow horns in the ground until you need them. They'll be none the worse for it, even if they were meant to be there over winter and still stay in for part of the summer. But if it is necessary to keep them somewhere else, you should make a crate and line it with a cushion of loose peat on all sides. If you keep the cow horns in there, the powerful concentration inside them will be maintained. On the other

hand, it is not at all advisable to keep what you've already diluted with water. You have to stir it not too long before you use it.

*If we want to use this treatment on winter grains, should we use the cow horns a whole quarter of a year after they've been taken out of the ground?*

It is always best to leave them in the ground until you want to use them, although it doesn't really matter. If you use them in early autumn, you can let them stay there until you need them. It won't harm the manure.

*Won't the etheric and astral forces be lost if you use a machine that breaks the liquid up into a very fine spray?*

Not at all. They are very firmly bound. In general, you don't have to be nearly as afraid that spiritual things will run away from you as you do with material things — that is, unless you chase them away to begin with.

*How do you handle the cow horns with the minerals in them that have spent the summer under ground?*

These are not at all harmed if they are taken out and stored somewhere; you can just toss them in a pile. The material that has been under ground during the summer will not be harmed. The sun can shine on the horns; it might even do them good.

*Do you have to bury the horns in the particular location you want to manure afterwards, or can you bury them all next to each other somewhere else?*

It makes so little difference that you don't have to worry about it. In practice, it is best to look for a spot that has relatively good soil with some humus in it, a soil that is not too highly mineral. Then you can bury all the horns you need in one spot.

*What about using machines on the farm? Some people say we shouldn't use any machinery at all.*

Well, that of course is a question that cannot be answered agriculturally. Given the state of affairs in society today, it is not really relevant to ask whether machines should be used; it is hardly possible to be a farmer today without using machines. Not everything you do is related to the most intimate processes of nature in the same way as such things as the stirring. In cases where we should not approach one of these intimate natural processes with anything purely mechanical, nature itself sees to it that machines are not of much use. You cannot do much with a machine when it comes to seed formation — nature takes care of that on its own. I don't think the question is actually very relevant. Today, how can you manage without machines? On the other hand, I would also like to say that we do not need to encourage machine-mania on the farm. I am sure that people who always have to have the latest and best in machinery will do less well as farmers — even if the new machinery is also an improvement — than they would if they went on using their old machines until they wore out. Strictly speaking, however, these are not really agricultural issues any more.

*Can you use the given quantity of cow-horn manure mixed with water on an area half as large?*

If you do, you will end up with rampant growth, as I mentioned just now in another connection. If you use it in growing potatoes, for instance, you will get rampant growth and sprawling stems, and what you want will not really develop at all. You will get what are known as rank patches. If you have rank patches, you have used too much.

*What about fodder plants, where rampant growth is desirable, or something like spinach?*

Even there, I think you ought to use no more than the half bucket with one cow horn, as we did in Dornach on an area that is mainly vegetable garden. You will need much less for crops grown in larger fields. That is already the optimum.

*Does it matter whether you use cow manure or horse manure or sheep manure?*

Cow manure is undoubtedly the best material for this procedure, but it might not be a bad idea to investigate whether horse manure could be used too. If you want to use horse manure for this purpose, it would probably be necessary to wrap the horn with some hair from the horse's mane, so that those forces can be brought into play, since a horse has no horns.

*Should we do it before or after sowing?*

Before sowing is the right time to do it; but this year we got around to it a bit late, and some of it was done after sowing. So we'll see how that goes and whether it does any harm. Naturally, though, you should do it before sowing so that the soil has already been influenced.

*Can we use the same horns for both the manure and the ground minerals?*

Yes, you can do that, but you still won't be able to use them more than three or four times. They lose their forces after having been used three or four times.

*Is it important who does the work? Can it be anyone at all, or should it be an anthroposophist?*

That is a good question. Of course, people will laugh if you raise a question like that nowadays. But let me remind you that some people who grow flowers in their window boxes are very successful, while with others the flowers simply wither away. Such things do exist. These things — which cannot be explained outwardly, but which are inwardly quite clear — occur through the personal influence of the human being. They can come about simply because the person in question practices meditation, becomes prepared through meditative life, as I described yesterday. Indeed, when people meditate, they relate quite differently to nitrogen, which contains the imaginations. They put themselves in a position that enables all these things to be fully effective; and they are then in this position with regard to all plant growth.



But these days, it is not as clear as it used to be when things like this were generally accepted. There were indeed times when people actually knew that through certain practices they undertook, they made themselves fit to care for growing plants. Nowadays, when this is not taken into consideration, other people's attitude rubs off. The delicate and subtle influences are lost if you are constantly among people who don't heed such things. That's why they are so easy refute, if you try to apply them. I still hesitate to talk openly about them in any large gathering, because the circumstances of our life today are such that it is very easy to refute them.

The question raised by our friend Stegemann in the meeting the other day in the Bockschen Saal,<sup>6</sup> about whether it is possible to combat parasites in this way, by means of concentration and similar exercises, is actually a very ticklish one. There is no doubt that it can be done if you do it right. If you were to establish a sort of festival, especially during the season when the strongest forces unfold and are concentrated within the Earth — that's the time between mid-January and mid-February — and undertake certain concentration exercises at this time, there could well be some effect.

As I said, it is a very ticklish question, but it can be answered in the affirmative. You just have to do it in harmony with nature as a whole. You have to know that doing a concentration exercise is something totally different in midwinter than it is in midsummer. Certain folk-sayings already contain a lot that can still provide valuable hints today. I might easily have mentioned in yesterday's talk<sup>7</sup> that one of the many things I should have done in this incarnation but didn't get around to, was to pursue the idea I had as a youth of writing a kind of peasant philosophy that would portray the conceptual life of the peasants with regard to everything that touched them. It could have been something very beautiful, and it would certainly have refuted the statement that farmers and peasants are stupid. A subtle wisdom would have emerged, a philosophy that would have expounded on the intimate details of nature in a wonderful fashion, down to the very way the words were put together. It is really astonishing how much the peasants knew about what goes on in nature.

Today, it would no longer be possible to write this peasant philosophy; almost all of these things have been lost by now. Things simply aren't the way they were forty or fifty years ago. Back then it was something very significant, for you could learn so much more among the peasants than you could at the university. But that was an altogether different age. You lived with the peasant farmers in the country, and it was a rarity for people with broad-brimmed hats to come along and try to introduce the modern socialist movement. Now the world is quite different. You younger ladies and gentlemen have no idea how much the world has changed in the last thirty or forty years. A lot of the beauty in the country dialects has gotten lost, and even more of the cultural philosophy of the country people. Even the peasant almanacs had things in them that are no longer there today. I still remember almanacs printed on cheap paper, but inside the planetary signs were painted in different colors, and on the title page, as the first thing you met, was a little sugar-candy you could lick whenever you used the book. That was one way of making the subject palatable! And of course, people used it one after the other.

*When we need to manure larger areas, should we decide how many cow horns to use just according to what feels right?*

I would not recommend this. Here I think we really have to be rational. I would advise you to first do everything you can to get the best results by trying things according to what feels right, and then start to translate your results into figures, so that you have proper tables that people can use. I would say that anyone who thinks they can do it simply by feel, should go ahead and do so; but in interacting with others, they should not act as if the tables weren't valuable. People need these things translated into calculable figures and amounts. That is something that is really required nowadays. We need cow horns to do this work, but that doesn't mean we should become bull-headed in advocating it! This is just the kind of thing that so easily arouses opposition. I would like to advise you here to compromise and to respect the opinions of the world as much as possible.

*Should quicklime be used in compost piles in the proportions that are usually recommended?*

I'm sure the old method will prove to be a good one, only you may have to modify it a bit, depending on whether you have moorland soil or sandy soil. With sandy soil you will need somewhat less quicklime, while with moorland soil you will require somewhat more, on account of the acids that are formed.

*What about turning the compost heap?*

That's not bad for it. Once you have turned it, however, you should try to protect it by covering it with a layer of earth. Peat soil or peat mold is especially good for this.

*What kind of potash did you mean when you said that if necessary it might be used in a transition stage?*

Potash-magnesia.<sup>8</sup>

*What is the best way to use the manure that is left over after the cow horns are filled? Should it be spread on the fields in the fall so it can go through the experience of winter there, or should it be stored until spring?*

You must be clear that fertilizing with cow-horn manure is not meant to replace manuring in the usual way — you have to go on doing that. You must think of the new method of manuring as a kind of extra, which enhances the effect of the manuring that you have been doing up to now. This latter must continue.

## LECTURE FIVE

Koberwitz  
Friday, June 13, 1924

The purpose of the cow-horn preparations I introduced yesterday, is simply to improve and enhance your manuring; you will, of course, still need to go on manuring. Today, we will need to consider how this manuring can be done in accordance with the perspective we developed yesterday, namely that the etheric vitality must be retained within the realm of the living, that it should never leave the realm of growth. That's why it is so important for us to recognize that the soil surrounding the growing plants' roots is a living entity with a vegetative life of its own, a kind of extension of plant growth into the Earth. Yesterday I even went so far as to show how we can imagine the transition between a raised-up mound of soil, which possesses some internal vitality due to its humus content, and the bark that surrounds a tree and seals it off from the outside. In modern times, people have lost all insight into the great interrelationships of nature. Thus it is not surprising that they have also lost all insight into how the life that is common to plants and to the soil, also extends into the excretory products of life as we find them in manure. It was inevitable that insight into the forces of life would gradually disappear.

Now, as I said in the discussion yesterday, spiritual science should not act out of a certain fanaticism as something turbulent and revolutionary with respect to the achievements of the modern world in the various fields of practical life. These achievements should be fully acknowledged. The only things that merit our active opposition are those that are so bound up with the modern materialistic world-view that they rest on totally false premises. We must acknowledge what is

legitimate and simply complement it with what can flow from a living conception of the world. That is why I am not going to spend much time describing how manure, liquid manure, or compost should be prepared for use as fertilizer; a great deal has already been accomplished in this regard. Perhaps we will have time to say more on the subject during the discussion session this afternoon.

Let me start by saying that the idea that we are exploiting the land when we farm is quite accurate. In fact, such exploitation is unavoidable, because with everything we send off the farm and out into the world, we are taking away forces from the soil and even from the air, which need to be replenished. Eventually, the manure must be treated in order for it to acquire the capacity to properly vitalize the depleted soil. It is just here that various misconceptions have recently arisen as a result of materialistic ways of thinking.

For example, scientists of today study in great detail the activity of bacteria, the smallest living things. They credit these microorganisms with being able to condition the manure in the right way, and this has led to extremely ingenious and logical attempts to inoculate the soil. In most cases, this has had no lasting positive effect, since the reasoning behind it is roughly equivalent to thinking that a room is dirty because there are a lot of flies in it. The room is not dirty because of the flies; the flies are there because the room is dirty. And you will never get the room any cleaner by dreaming up all kinds of ways of either getting rid of the flies, or of increasing their numbers in the hope that they will eat up all the dirt. Not much can be achieved through methods like that. It is much more effective to tackle the dirt directly.

Thus, when animal manures are used as fertilizer, the appearance of microorganisms must simply be regarded as something that results from the processes that are taking place within the manure. These creatures are useful as a symptom of the condition that the manure is in, but there is little to be gained by inoculating the manure with them or breeding them on purpose; if anything, it would be better to combat them. When we are dealing with the living realm, which is so important for agriculture, it is always a matter of keeping to larger

perspectives. As much as possible, we must avoid regarding these tiny creatures in an atomistic manner.

Of course, making a statement like this does no good at all unless you can also show how the things ought to be done. What I have just been talking about has also been stressed by other people, of course, but knowing what is right is not the only important thing. Something may be perfectly correct, but if this is something negative, it is often not possible to get anywhere unless positive principles can be put forward as well. As a general rule, when it is not possible to make positive suggestions, it is better to refrain from stressing the negative, since that only makes people angry.

A second result of materialistic ways of thinking, is the idea of treating the manure with all kinds of inorganic compounds and chemical elements. Once again, experience has shown that this has no lasting positive effect. We must understand that if we try to improve manure with inorganic chemicals, we will only succeed in penetrating and enlivening the watery part of the soil. In order to grow sound and substantial plants, however, this is not enough, because no further vitalization proceeds from the water that seeps through the soil. We have to enliven the soil directly, and this cannot be done with mineral fertilizers, but only by means of organic material that has been conditioned to organize and enliven the solid earth itself. To indicate how this stimulus can be imparted to manure or liquid manure, or any other sort of organic matter, is the task of spiritual science with respect to agriculture. Spiritual science always looks to the large-scale activities of life, and ignores the microscopic realm and the conclusions drawn from this realm, because this is of less importance. The task of spiritual science is to observe the macrocosm, the broadest dimensions of the workings of nature, and to understand these workings.

Now, in the current agricultural literature, you will find various statements — derived from what people believe to be their experience — to the effect that nitrogen, phosphoric acid, lime, potash, chlorine, and even iron, are all important to have in the soil if plants are to thrive. On the other hand, silicic acid, lead, arsenic, mercury — they even include sodium compounds in this category — are said to be

of value to plants only as stimulants. Such statements just go to show that people are groping in the dark. It is only fortunate — thanks to old traditions, no doubt — that people do not do the crazy things to plants that they would if they seriously followed such statements. As a matter of fact, it is impossible to follow them.

What, then, is the real state of affairs? If we fail to take proper account of silicic acid, lead, mercury, or arsenic, nature does not leave us as forsaken as it does if we fail to properly consider potash or lime or phosphoric acid. This is because silicic acid, lead, mercury, and arsenic are provided by the heavens, provided freely along with the rain. On the other hand, for phosphoric acid, potash, and lime to be present in the soil in the right way, we must properly manure the soil, since these things are not a free gift from heaven. Even so, over many years of farming, it is possible to deplete the soil. Indeed, we deplete it constantly — that is why we have to apply manure. But eventually, as is already the case on many farms, what we can replace through manuring is no longer sufficient. Then we begin to exploit the land, then it becomes permanently impoverished.

We must ensure that the real natural process can take place in the right way. What are called stimulant effects, are actually the most important effects of all. It is just the substances that are regarded as unnecessary, that are actively present in fine dosages all around the Earth, and plants need them just as much as they need what comes to them from the Earth. These substances are absorbed by the plants from the surrounding universe: mercury, arsenic, silicic acid. The plants absorb them out of the soil after the substances themselves have been radiated into it. We human beings, however, are quite capable of preventing the soil from properly receiving what the plants need from the surrounding universe. If we continue to fertilize haphazardly, we may gradually prevent the soil from absorbing what is active in finest homeopathic doses as silicic acid, lead, mercury. What comes in from the periphery in this way is needed by the plants to help them build up their body in the form of carbon.<sup>1</sup>

For this reason, we cannot stop with what I mentioned yesterday; the manure we have must also receive further treatment. It is not a

question of merely augmenting the manure with substances that we believe will be of benefit to the plants. It is a question of infusing the manure with living forces, which are much more important to the plants than the material forces, the mere substances. Although we might gradually make our soil especially rich in one substance or another, that would not help the plants unless our manuring also enabled them to absorb what the soil offered. That is the important thing.

People today are totally unaware of the potent effect that tiny quantities can have on living things. However, Frau Dr. Kolisko's brilliant investigations into the effects of smallest entities have now placed what was blind groping in homeopathy onto a sound scientific basis.<sup>2</sup> I believe this has made it scientifically acceptable to say that just those radiant forces needed by the organic world are released when small quantities of substance are applied in the appropriate way.

When it comes to manuring, it won't be difficult at all for us to use small quantities in the right way. We have already seen how to make the cow-horn preparations, and how to apply them either before or after manuring. They supply forces that enhance the effectiveness of the manure that is used normally. But we must also experiment with other ways of giving the manure the right degree of vitality and the right consistency. We must enable it to retain of its own accord the proper amount of nitrogen and other substances that it needs in order to bring vitality to the soil. Today I would like to indicate some general guidelines for working in this way, for working with things that can be added to the manure in small doses — in addition to what we take out of the cow horns — so that the manure can become vitalized and can transmit this vitality to the soil where the plants will grow.

I am going to mention specific things, but let me emphasize right from the beginning that if one or the other of them is difficult to find in a given area, it is possible to replace it with certain other things. There is only one case in which substitution will not be possible, because what is so characteristic in this particular plant is not likely to be found in the same way in any other species.

To begin with, we need to make sure that the major elements of the organic realm — carbon, hydrogen, oxygen, nitrogen, and sulfur — can come together in the right way with other substances, with potash salts, for instance. It is generally known that plants require a certain amount of potash salts for growth, and that potash salts, or potash in general, tends to restrict the growth process to those parts of the plant that usually become the solid framework, that is, to the stems and stem-like parts. But in the context of the interaction between the plant and the soil, it is important to transform this potash so that it relates itself properly to the forming of the proteinaceous material that constitutes the actual body of the plant. This can be achieved by doing the following.

Take some yarrow, a plant that is usually easy to obtain. If it does not happen to grow in your area, you can use the dried herb just as well. This yarrow is actually a miracle of creation. So is any other plant, of course, but if you compare yarrow to any other plant, you will be deeply touched by the particular wonder of yarrow. I told you how the spirit uses sulfur to moisten its fingers when it wants to carry substances — carbon, nitrogen, and so on — to their proper organic destinations. Well, the way yarrow appears in nature, it is as if some plant-designer had used an ideal model in bringing sulfur into relationship with the other plant substances. You might say that in yarrow as in no other plant, the nature spirits reach the height of perfection in their use of sulfur. And if yarrow is brought into the realm of biological activity in the right way, its effect within the animal or human organism is to correct any weakness of the astral body. If we know this, we can trace the essence of yarrow still further, throughout the process of plant growth in nature. Yarrow is already a great asset when it grows wild in the country, along paths, or at the edge of fields where grain, potatoes, or other crops are being grown. Of course, it should not be allowed to become a nuisance, but it is never actually harmful, so under no circumstances should you try to eradicate it. Like some sympathetic people in human society who exert an influence just by their presence, and not by what they say, yarrow's mere presence in areas where it grows abundantly is extremely beneficial.

Now, here is what you can do: take the same part of the yarrow that is also used medicinally — the umbel-like inflorescences. If possible, it's best to pick the fresh inflorescences and then let them dry just a bit. You don't have to let them dry very much. If you cannot get the fresh yarrow, but only the dried herb, you should first try to moisten the inflorescences a little with some juice squeezed from the leaves. Even with dried leaves, you can get the juice you need if you make a decoction. And now you will see how we always stay within the living realm. After taking a handful or two of yarrow and compressing it somewhat, take the bladder of a deer and enclose the yarrow-substance in this as best you can, and then tie the whole thing shut. You now have a fairly compact mass of yarrow inside the bladder. Hang it up in the sunniest spot you can find, and let it stay there during the summer. When autumn comes, then take it down and put it in the ground — not too deeply — and let it spend the winter there. You thus have yarrow flowers — which can also have gone to seed a bit — enclosed for a year within the bladder of a deer and exposed to whatever may influence them, partly above ground and partly below ground. You will find that they take on a very characteristic consistency during the course of the winter. Once they are in this form, you can keep this material for as long as you want.

Then take this material from inside the bladder and add it to a manure pile, which can even be as big as a house. You don't have to put a lot of effort into this — the radiation will work even if you only mix it in a little bit. The radiant energy in it is so strong that it will influence the entire quantity of manure, or also liquid manure or compost, no matter how much it is divided up. (Materialists will believe us here, since they themselves talk about "radium"!.) The effect of this material derived from yarrow is so enlivening and refreshing that simply by using this treated manure in the ordinary way, a lot will be done to counteract the unavoidable exploitation of the land that comes about through raising crops. In this way, the manure once again becomes able to enliven the soil so that it can absorb and retain the extremely fine doses of silicic acid and lead and so on that come toward

the Earth. Again, this is something for the members of the Agricultural Circle<sup>4</sup> to experiment with. They will see that it really does work.

Now — since it is always preferable to work out of insight — there is the following question. We have gotten to know the yarrow plant: it is able to radiate its effects through large masses of manure because its own highly dilute sulfur content is combined with potassium in such an ideal way. But why must we put the yarrow specifically into the bladder of a deer?

Here we need to have insight into the entire process related to this bladder. A deer is a creature that is intimately related, not so much to the Earth as to the Earth's surroundings — to the cosmic aspect of the Earth's surroundings. That is why deer have antlers, which have the function I explained to you yesterday. What is present in yarrow is especially strongly preserved in the bodies of humans and animals by means of the process that takes place between the kidneys and the bladder. And this process is dependent on the material constitution of the bladder. As thin as it may be in terms of substance, in terms of its forces a deer bladder is almost a replica of the cosmos. A deer is involved with forces that are quite different from those of a cow, which are all related to the interior. By putting the yarrow into a deer bladder, we significantly enhance its inherent ability to combine sulfur with other substances. Handling yarrow in the way I have indicated is thus a fundamental means for improving manure — and one that always stays within the living realm. It's important to note that we never get into inorganic chemistry; everything stays within the realm of the living.<sup>5</sup>

Let's take another example. If we want to give our manure the possibility of absorbing vitality that it then can impart to the soil where the plants are growing, we must make the manure especially able to combine the elements that are necessary for plant growth. In addition to potash, these include calcium, various compounds of calcium. In the case of yarrow, we were dealing primarily with the effects of potash; if we want to draw in the effects of calcium as well, we need another plant. This plant may not arouse our enthusiasm as readily as yarrow, but it too contains homeopathic sulfur, which enables it to

attract the other substances it needs and incorporate them into an organic process. This plant is chamomile, *Chamomilla officinalis*.<sup>6</sup>

We may not simply say that chamomile is characterized by a high content of potash and calcium. Rather, the situation is as follows: Yarrow develops its sulfur forces primarily in the potash-forming process; it therefore contains sulfur in exactly the amount needed for working on potash. Chamomile, on the other hand, works on calcium in addition to potash, and thereby develops what can help to ward off the harmful effects of fructification and keep the plant healthy. So, the marvelous thing is that like yarrow, chamomile contains some sulfur, but in a different quantity because it has to work on calcium too.

Now we must go further. You will find that the results of spiritual research are always derived from the greater whole, from macrocosmic rather than microcosmic relations. We shall see this if we now trace the process that chamomile undergoes after having been ingested by a human being or animal. Here the bladder is of no particular significance; what is of great significance is the substance of the walls of the intestines. So if we want to work with chamomile as we did with yarrow, we must pick its beautiful, delicate, white-and-yellow flower heads and treat them just like we did the yarrow umbels; but we must stuff them into cattle intestines rather than in a bladder. Once again, this is a lovely thing to do, and does not require much. Instead of using the intestines for sausage casings, which is what is usually done with them, we simply make a different kind of sausage by filling them with chamomile flowers. Notice how in this instance too, we stay within the realm of the living.

After that, all that remains to be done is to expose this material to the natural influences in the right way. In this case, since we want it to be worked on by a vitality that is as closely related to the earthy element as possible, we need to take these precious little sausages — and they really are precious — and again let them spend the entire winter under ground. They should be placed not too deeply in soil that is as rich as possible in humus. We should also try to choose a spot that will remain covered with snow for a long time, and where this snow will

be shone upon by the Sun as much as possible, so that the cosmic-astral influences will work down into the soil where the sausages are buried. Then, when spring comes, dig up the sausages and store them or add their contents to your manure, just as you did with the yarrow. You will find that your manure not only has a more stable nitrogen content than other manures, but that it also has the ability to enliven the soil so that plant growth is extraordinarily stimulated. Above all, you will get healthier plants — really much healthier plants — if you fertilize in this way.<sup>7</sup>

To our modern way of thinking, this all sounds quite insane. I am well aware of that, but just think of how many things were originally rejected as crazy, yet after a few years became accomplished fact. I wish you could have read the Swiss newspapers when somebody first thought of laying train tracks up the mountains — you would not believe how they ridiculed that poor person! But a short time later, the mountain railways were there, and now it no longer occurs to anyone that whoever first thought of building them was crazy. It is just a question of overcoming people's prejudices.

As I said before, if these two particular plants are difficult to get, you could substitute something else, although it's really better not to, and the dried herbs work just as well. On the other hand, there is one plant whose beneficial influence on the manure is such that it would be next to impossible to find a substitute for it. We are often not very fond of this plant, at least not in the sense of wanting to fondle it, because the plant in question is stinging nettle. But stinging nettle is in fact the greatest benefactor of plant growth, and it can hardly be replaced by any other plant. If it is not available locally, you really must get the dried herb from somewhere else.

Stinging nettle is a real jack-of-all-trades; it can do many different things. It too contains sulfur, which, as I have already explained, plays an important role in assimilating and incorporating the spiritual. Stinging nettle also carries the radiations and currents of potash and calcium, but in addition, it has a kind of iron radiation that is nearly as beneficial for the whole course of nature as the iron radiations in our blood are for us.<sup>8</sup> Because it is such a good influence, the stinging nettle

we find growing wild really does not deserve our customary scorn. It should actually be growing all around our hearts, since the role it plays in nature by virtue of its marvelous inner structure and way of working is very similar to that of the heart in the human organism. Stinging nettle is indeed a great boon.

If it should ever become necessary to reduce a soil's iron content — please excuse me, Count Keyserlingk, if I become too local with my example — planting nettles in out-of-the-way spots can do a great deal towards freeing the upper layer of the soil from the influence of iron. Nettles like iron so much that they draw it out of the soil and into themselves, and although this does not get rid of the iron as such, it at least undermines its effect on the growth of other plants. Planting stinging nettles around here, therefore, would be of particular importance. I only wanted to mention this in passing to make you aware that the mere presence of stinging nettle can already be of significance for the plant growth in its surroundings.

Now, to improve your manure still more, take whatever stinging nettles you can gather and once again let them wilt slightly. Then compress them a bit and put them straight into the ground without any bladder or intestines, though you can use a thin layer of loose peat or something similar to separate them from the surrounding soil. Bury them right in the ground, but mark the place carefully so you do not just dig out plain soil when you come back for them. Let the nettles spend the winter and also the following summer in the ground; they need to be buried for a whole year. Then you will have a substantiality that is extremely effective.

When you add this to your manure — just like the other preparations — the effect will be to make the manure inwardly sensitive and receptive, so that it acts as if were intelligent and does not allow decomposition to take place in the wrong way or let nitrogen escape or anything like that. This addition not only makes the manure intelligent, it also makes the soil more intelligent, so that it individualizes itself and conforms to the particular plants that you grow

in it. Adding *Urtica dioica* in this form is really like an infusion of intelligence for the soil.

You see, modern methods of improving manure may sometimes give astonishing outward results, but ultimately they tend to turn all the first-rate agricultural products into mere stomach-fillers. They will no longer have real nutritive power for human beings. It is important not to be deceived by things that look big and swollen; what is important is that their appearance be consistent with real nutritive power.

Now, it can happen that plant diseases may appear on our farms. I want to speak about them right now in rather general terms. People today like to specialize, so they talk about specific diseases. In the pursuit of science, that's all well and good, because you do need to know what each disease looks like, but in the end it is much the same as with a doctor: being able to describe an illness is usually not very useful — it is much more important to be able to cure it. Bringing about healing requires us to work from totally different points of view than we do when we are describing diseases. We can achieve the greatest degree of precision in describing illnesses, and know exactly what is going on in the diseased organism according to the principles of modern physiology or physiological chemistry, and yet still not be able to cure anything. You cannot heal according to histological or microscopic findings; in order to heal, you must understand the broad interrelationships.

That is how it is in the plant world too. And since plants are simpler than animals or humans, healing can take place on a more general level. With plants you can use a kind of universal remedy. If this weren't the case, we would be in a difficult position, much as we often already are when we treat animals, which is something we still need to speak about. We are not in this position with human beings, because people can tell us what is hurting them, whereas animals and plants cannot. But with them, healing is a more general process. Now, not all, but a large number of plant diseases can be alleviated just by means of a rational method of manuring. What is needed is that the manuring add calcium to the soil. For the calcium to have a healing

effect, however, it has to be calcium from something living; we cannot evade the organic realm. It won't help at all to add ordinary lime or any other calcium compound that has fallen out of the organic realm.

Now, one plant that contains plenty of calcium is the oak. Seventy-seven percent of its substance consists of finely distributed calcium.<sup>9</sup> And oak bark, in particular, represents a kind of intermediate product between the plant and the living earth element, in the same sense as I already described the kinship between bark and living earth. Of the many forms in which calcium can appear, the calcium structure of oak bark is the most ideal. Calcium has the effect that I have already described. It creates order when the etheric body is working too strongly, so that the astrality cannot influence whatever organic entity is involved. Calcium in any form will kill off or dampen the etheric body and thereby free up the influence of the astral body, but when we want a rampant etheric development to contract in a beautiful and regular manner, without any shocks, then we need to use calcium in the particular form in which it is found in oak bark.

For this purpose we collect the oak bark that can be easily obtained; we do not need a great deal. Then we chop it up until it is of crumb-like consistency, put it into a skull from any one of our domestic animals — it hardly matters which one — and finally close up the skull, preferably with a piece of bone. Next we place the skull in a relatively shallow hole in the ground, cover it with loose peat, and set up some kind of a pipe or gutter so that as much rainwater as possible flows into the hole. You might even put the skull into a rain-barrel where water can constantly flow in and out. Then add some kind of plant matter that will decay, so that the oak bark in its bony container lies in this organic muck for the whole winter, or better still for the whole autumn and winter. Water from melting snow will do just as well as rainwater. When this material is added to your manure pile, it will truly provide the forces to prevent or arrest harmful plant diseases.

We have now added four different things. All this takes a certain amount of work, of course, but if you stop and think about it, it actually takes less work than all the fooling around in chemical laboratories that goes on in the name of agriculture, and which also has



to be paid for somehow. You will find that what we have discussed here is much more economical.

Now, we still need something else, something that will draw in the silicic acid from the whole cosmic surroundings. We need this silicic acid in the plants, but it's precisely with regard to the absorption of silicic acid that the soil is losing its strength over time. It is happening very gradually, so we don't notice it. People who look only at microcosmic things, not at the macrocosm, are not concerned about this loss of silicic acid, because they do not think it is significant for plant growth. But in point of fact, it is of utmost importance.

In this regard, there is something we need to know. What we are talking about is now less likely to be regarded by educated people as a sign of utter derangement than it would have been not too long ago. Today, the transmutation of elements is spoken about quite openly. Observation of many elements has tamed the lions of materialism in this instance. Still, certain things that are going on around us all the time are completely unknown. If they were known, it would be easier for people to believe such things as I have just been speaking about. I am perfectly aware that people who are caught up in current ways of thinking will object that I have not said anything about how to improve the nitrogen content of manure. But in fact, I have been talking about this all the time, namely when I spoke about yarrow, chamomile, and nettle, because in organic processes there is a hidden alchemy at work. In this hidden alchemy, potash, for instance, if it is properly functioning in the organic processes, can really be transformed into nitrogen; and even lime, if it is properly functioning, can also be transformed into nitrogen. As you know, all four of the elements that I discussed are involved in plant growth. Thus, in addition to sulfur, there is also hydrogen. I have already told you about the significance of hydrogen. Now there exists between lime and hydrogen a mutual qualitative relationship that is similar to the qualitative relationship that exists between oxygen and nitrogen in the air. Even a purely outward procedure like quantitative chemical analysis could reveal that there is a relationship between the association of oxygen and nitrogen in the

air, and the association of lime and hydrogen in organic processes. Under the influence of hydrogen, lime and potash are constantly being transmuted, first into something resembling nitrogen, and then into nitrogen itself. The nitrogen that comes about in this way is extremely useful for plant growth, but we must allow it to be produced by means of the methods I have described.<sup>10</sup>

Silicic acid, as you know, contains silicon. In a living organism, silicon too is transmuted into an extremely important substance, one that is not currently included among the chemical elements.<sup>11</sup> Silicic acid is needed to draw in the cosmic factor, and a thorough interaction must come about between the silicic acid in the plant and the potassium (not the calcium). We have to enliven the soil through manuring so that it can facilitate this interaction. We need to look for a plant whose own potassium-silicic acid relationship will enable it to impart this power to the manure, when again it is added to the manure in a kind of homeopathic dosage.

We can readily find this a plant — it is *Turaxacum*, the dandelion. Here again, just to have it growing on our farm is already beneficial. The innocent, yellow dandelion is a tremendous asset because it mediates between the fine homeopathic distribution of silicic acid in the cosmos, and the silicic acid that is actually used over the whole region. The dandelion is really a kind of messenger from heaven. But if we need this plant and want to make it effective in the manure, we have to utilize it in the right way. It must be exposed, of course, to the Earth's influence, to the Earth's winter influence, but in order to acquire the surrounding forces, we must also treat it just as we have the others.

Collect the yellow heads of the dandelion and let them wilt a little. Then pack them together and sew them up in a bovine mesentery,<sup>12</sup> and put them too in the Earth through the winter. When these balls are dug up in the spring, they will in fact be thoroughly saturated with cosmic influence, and can be stored until needed. This material can be added to the manure in the same way as before, and it will give the soil the ability to attract just as much silicic acid from the atmosphere and

from the cosmos as is needed by the plants. In this way the plants will become sensitive to everything at work in their environment and then be able themselves to draw in whatever else they need.<sup>13</sup>

Even plants, in order to grow properly, need to have a certain ability to sense and perceive. In the same way that I can pass by a dull and insensitive person without being noticed, so can everything within and above the soil pass by a dull and insensitive plant. What it does not perceive, it cannot put to use for its own growth. But if a plant is very delicately permeated and enlivened by silicic acid, it becomes sensitive to everything and can attract what it needs. However, it is very easy to weaken plants so they can only take advantage of what is present in their immediate environment, which is not good, of course. But if you treat the soil as I have described, the plants will be able to draw in what they need from a very wide area. They will then be able to use not only what is in their own field, but also what is in the soil of a nearby meadow, if they happen to need it. A plant can take advantage of what is in the soil of a neighboring forest, if it has been inwardly sensitized in this manner. Such an interplay can be brought about by giving the plants the forces that the dandelion makes available to them.

And so it seems to me that you should try to produce fertilizer by enriching the manure with these five ingredients — or appropriate substitutes — in the way I have suggested. Fertilizers of the future should not be prepared with all kinds of chemicals, but rather with yarrow, chamomile, nettle, oak bark, and dandelion. A fertilizer of this kind will in fact contain very much of what is actually needed.

And if you can still bring yourself to do one more thing, before using this treated manure, press the blossoms from the valerian plant, *Valeriana officinalis*, and greatly dilute the extract with warm water. The extraction can be done at any time and can then be stored. If this diluted valerian juice is applied to the manure in a very fine manner, it will stimulate the manure to relate in the right way to the substance we call phosphorus.<sup>14</sup>

By using these six ingredients, you will be able to produce an excellent fertilizer, from liquid manure as well as from solid manure or compost.<sup>15</sup>

## SECOND DISCUSSION

Koberwitz

Friday, June 13, 1924

QUESTION: *When you talked about the deer bladder, were you referring to the male red deer, the stag?*

DR. STEINER: Yes, I meant the male red deer.<sup>1</sup>

*Did you mean the annual or the perennial stinging nettle?  
Urtica dioica.*

*Should manure pits be roofed over in areas of heavy rainfall?*

The manure ought be able to withstand any ordinary amount of rainfall. There is no hard-and-fast rule — it's just as bad for it to get no rain at all as it is for it to be leached out by rain. In general, rainwater is good for manure.

*But shouldn't we cover the places where manure is stored to prevent the liquid manure from being lost?*

In a certain sense, manure needs rainwater. It might possibly be a good idea to keep some rain off by spreading peat over the manure, but it would not serve any purpose to roof the piles and keep the rain off altogether. The manure would certainly be the worse for it.

*if plant growth is promoted by the methods of manuring you indicated, are cultivated plants and weeds affected equally, or do we need to use any special methods to get rid of the weeds?*

That is a totally justified question, and I will be talking about weed control in the next few days. What I have mentioned so far is

conducive to plant growth in general, and it will not help get rid of weeds. However, it does make plants more resistant to parasites, so you do already have a means of controlling this kind of infestation. But since the general pattern of plant growth is also followed by weeds, weed control has nothing to do with the principles we have discussed up till now. We will talk about this subject later. These things are so interconnected that it would be best not to discuss any one aspect separately.

*What do you think about the Captain Krantz method of handling manure? It makes the manure odorless by relying on the warmth that is generated when the manure is piled in loose layers.*

I deliberately refrained from saying anything about things that are already being done along rational lines. My intention was simply to show how what comes from spiritual science can be used to improve any such method. Although I am sure there are many advantages to the method you mentioned, I also believe it has not been around very long, and it may turn out to be one of those things that are dazzling successes to begin with, but prove to be not so practical in the long run. Initially, when the soil is still stuck in its traditions, so to speak, almost anything will give it a boost. But when you apply the same method over a longer period of time, it is similar to what happens with medicines when they first enter the body: the most unlikely remedies can help at first, but after a while the therapeutic effect wears off. In this case too, it can take some time to realize that things are not working as you had hoped.

The spontaneous heating-up is certainly the most significant thing, and there's no doubt that whatever you have to do to make it happen is very good for the manure and will have positive results. However, it is possible that piling the manure loosely may not be so good for it. I also wonder whether it is quite true that the manure becomes completely odorless. If it actually does become odorless, that would be a sign that you are doing something right. This method has not been in use for very many years yet, so it's too soon to tell.

*Isn't it better to store the manure above ground than in pits?*

In principle it is good to pile the manure as high as possible, but the site itself shouldn't be too high. It is important to maintain a proper relationship to the forces that are below ground. The manure should not be stored on a hillock, but you can certainly pile it up from the ground level, and that will be the best height.

*Should we prepare compost in the same way if it is to be used on grapevines, which have suffered so much recently?*

Yes, but with certain modifications that I will mention when we talk about orchards and vineyards. As a general rule, what I said today is valid for any kind of fertilizing, for improving all your fertilizing materials. We still need to discuss how to adapt this specifically for pastures and hayfields, grains, orchards, vineyards, and so on.<sup>2</sup>

*Is it all right if the storage area for the manure is cobbled or paved?*

From everything we know about the structure of the soil and its relationship to manure, it would be a mistake to have your storage area paved. I cannot see any reason for it. The area underneath the manure and a little bit around it should not be paved, so that the manure can interact with the soil. Why do damage to the manure by separating it from the soil?

*Does it make any difference whether the ground underneath is sandy or clayey? Sometimes people cover the area with clay to make it impervious to water.*

The different kinds of soil will certainly have different influences, which will depend on their particular characteristics. If you have sandy ground under your manure piles, you will have to use some clay to make it less porous before you pile up the manure. But if your soil is definitely on the clayey side, you will want to loosen it up by mixing in some sand. For an intermediate effect, you can always take a layer of sand and a layer of clay. Then you will get both the earthy solidity and the watery influences; otherwise the water will just trickle away. A mixture of both kinds of soil will be especially good. For the same reason, you should avoid — if at all possible — building your manure

piles on loess soil or anything like that.<sup>3</sup> Such soils won't be very effective. In such cases it would be better to gradually build up a special base for the manure pile.

*With regard to growing the plants you mentioned — yarrow, chamomile, nettle — is it possible to introduce them into the area, if they aren't there already, simply by scattering the seeds? In our pasture management we have been assuming that both yarrow and dandelion were dangerous for cattle and have been trying to get rid of them along with the thistles. We are just in the process of doing this. Would we now have to plant them again along the edges of the fields, but not in the meadows and pastures?*

DR. STEINER: Yes, but in what way are they supposed to be harmful for the animals?

COUNT KEYSERLINGK: Yarrow is said to contain toxic substances, and dandelion is not supposed to be good for cattle.

DR. STEINER: You need to observe that carefully. In the open field, the animals won't eat it.

COUNT LERCHENFELD: In our area, it is just the opposite. Dandelion is considered good fodder for milking animals.

DR. STEINER: These things are sometimes no more than opinions; nobody knows whether they've actually been tried out. It is also possible — this would need to be tested — that in the hay these plants are not harmful. I think that if they were harmful, the animals would leave them, even in hay. Animals don't eat things that are bad for them.

*Hasn't yarrow been more or less driven out by heavy liming? Doesn't it need a damp, acidic soil?*

If you use yarrow from the wild, a very small amount of it will be enough for a huge estate. Its pronounced homeopathic effect is what I had in mind. Having the yarrow in the garden here, would be enough for the whole estate.

*I have seen how cattle in my pastures eat young dandelions eagerly until they start to flower. Once they come into flower, the cattle won't touch them any more.*

You must remember, as a general rule, that animals won't eat dandelions if they are bad for them; animals have excellent feeding instincts. Another thing to remember here is that when we want to promote some kind of process, we ourselves often use something that we would not use all by itself. For example, no one would eat baker's yeast as a food, but we still use it in making bread. Something that may be poisonous under certain circumstances — if taken in large doses — may have a most desirable effect under other circumstances. After all, most medicines are poisonous. It's how things are used that is important, not the substance. Thus, I don't think you need to be concerned about dandelions being harmful to your animals. There are so many strange notions around. It is really quite curious that Count Keyserlingk emphasizes how harmful dandelions are, while on the other hand Count Lerchenfeld talks about them being the very best fodder for milking animals. The effect cannot be different in two such closely neighboring areas. One of these two opinions must not be right.

*Is it perhaps the ground underneath that makes the difference? My statement was based on the opinions of veterinarians. Should we actually plant more yarrow and dandelion in our meadows and pastures?*

A very small area will be enough.

*Does it make any difference how long the preparations are kept in the manure after taking them out of the ground?*

Once they have been mixed in with the manure, it does not matter how long they stay there. But when you spread the manure on the fields, this should actually already have been done.

*Should the manure preparations all be put into the ground together, or should each one be buried separately?*

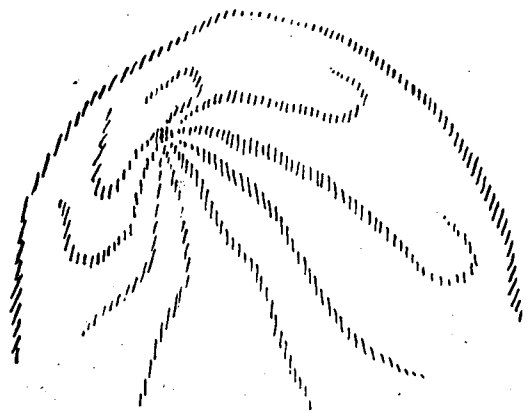
This is actually of some importance. For the sake of what's happening to them while they are in the ground, it's good if the preparations do not interfere with each other; they should therefore be buried some distance apart. If I had to do it on a small farm, I would choose places around the periphery, as far apart as possible. On a large estate, you can place them as far apart as you like.

*Is it all right to have plants growing in the soil on top of where the preparations are buried?*

That soil can do whatever it wants. In cases like this, it is actually quite good to have it overgrown with plants, even with cultivated plants.

*How should we put the preparations into the manure pile?*

I would suggest the following procedure. I would put them a quarter meter [10 inches] or deeper in a large pile of manure, so that what you put in is surrounded by the manure. It doesn't need to be a full meter deep, but the manure should completely surround the preparations. It works like this [Drawing 12]: If this is the manure pile, and here a bit of one of the preparations, then the rays — everything depends on the radiations — all go out like this. So it's not good if the preparation is too close to the surface. At the surface the radiation bends, it makes a distinct curve. It doesn't leave the pile if the preparation is surrounded by the manure. Half a meter is deep enough, but if it is too close to the surface, a lot of the radiant force will be lost.<sup>4</sup>



DRAWING 12 (COLOR PLATE 5)

*Is it enough to make just a few holes, or is it better to disperse the preparation as much as possible?*

It is definitely better to disperse it and not make the holes just in one location, otherwise the radiations disturb each other.

*Should we put all the preparations into the manure pile together?*

When you put the preparations into the pile, you can put them in side by side. They don't influence each other, they only influence the manure as such.

*Can we put all the preparations into a single hole?*

We could assume on theoretical grounds that the preparations would not interfere with each other, even if you put all of them in a single hole, but I hesitate to state this beforehand as a definite fact. You can place them nearby, but if you were to combine them all in one hole, they might in fact interfere with each other.

*What kind of oak did you mean?*

*Quercus robur.*

*Does the bark have to come from a live tree, or can it come from a felled tree?*

From a live tree if at all possible, especially from one in which you can assume that the oak resin is still quite active.

*Is the entire bark needed?*

Only the surface, the outermost layer of bark, which crumbles when you remove it.

*Is it absolutely necessary to stay within the topsoil when burying the manure preparations, or can the cow horns also be buried deeper?*

It's better to stay within the fertile layer. In fact, you can assume that if they are buried in subsoil, what you get out of them won't be as good. A deeper topsoil layer, of course, would be ideal. The spot

with the deepest layer of topsoil will certainly be the best. You won't get any useful results below the topsoil.

*If they're buried in topsoil, they will always be subject to frost. Won't that harm them?*

The time when they are exposed to frost is precisely the time when because of this frost the Earth is most intensely exposed to the cosmic influences.

*How should we grind the quartz or silica? With a small mill, or with a mortar and pestle?*

It's best to do it in a mortar to begin with, and you will need an iron pestle. Grind it to a very fine mealy consistency. If you use quartz, you will first need to grind it as far as possible with the mortar and pestle, and then grind it some more on a glass surface. It has to be a very fine powder, which is very difficult to achieve with quartz.<sup>5</sup>

*Farming experience shows that well-fed cattle tend to put on fat, so there must be some connection between what they actually eat and what they absorb as nourishment from the atmosphere.*

Consider carefully what I said: With the consumption of food, it is the forces developed in the body that are the important thing. For an animal to develop sufficient forces to be able to absorb and assimilate substances coming from the atmosphere, it has to be getting the right food. Perhaps this comparison will help. If you need to put on a very tight glove, you can't simply stuff your hand into it; you first have to stretch and enlarge the glove with a piece of wood or something. It is the same in nutrition: the forces that receive from the atmosphere what does not come from the food, must first be made more supple. By means of the food the organism is stretched and enlarged, and thereby enabled to absorb more from the atmosphere. This can even lead to hypertrophy, if too much is absorbed. You then pay for this with a shorter life span. There is a happy medium here between too much and too little.

## LECTURE SIX

Koberwitz

Saturday, June 14, 1924

Over the past few days we have acquired some insights into the growth and development of plants and also of animals, and these insights will now provide a basis for our further considerations. We need now to take at least a brief look at some spiritual-scientific ideas that relate to plants and animals as agricultural pests, and also to what are called plant diseases. In fact, very little can be said about these things in general terms — they can only be studied in concrete detail. What I will be doing, therefore, is giving examples, which may help you take things further if they serve as points of departure for experiments.

I would like to begin by dealing with weeds. For us, the definition of a weed is less important than the insight into how unwanted plants can be eliminated from specific areas. Indeed, do you know how people sometimes get strange impulses harkening back to their student days? Well, in the grip of one of those impulses, I took a half-hearted look in a couple of textbooks to see how they defined weeds. Most authors I found try to do it by saying that a weed is anything that grows where you don't want it to. This sort of thing does not bring us much closer to the essence of the matter. And in fact we will never have much luck in finding the essence of a weed, simply because in the eyes of nature a weed has just as much right to grow as any plant we consider useful. We have to look at these things from a somewhat different point of view. The question for us is how we can keep some specific plant from growing in a certain area where it grows naturally under the prevailing

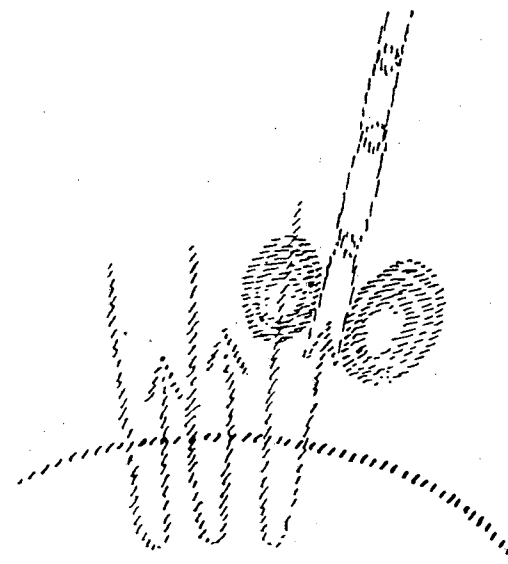
conditions. We cannot answer this question without taking into account the things we've dealt with in the past few days.

We have seen the need to make strict distinctions among the forces active in plant growth. On the one hand, there are the forces that actually originate in the cosmos, but which are first absorbed into the Earth and then work on the plants from there. These forces — which as I indicated essentially originate from the cosmic influences of Mercury, Venus, and the Moon, but which work in a roundabout way via the Earth rather than directly from the planets — these are the forces we need to take into account when we trace how one generation of plants leads to the next. On the other hand, in everything plants acquire from the periphery, from what is above the Earth, we need to look to the various effects that the distant planets transmit to the air, and which are taken up in that way. Furthermore, we can say that everything coming from the near planets — in the way of forces working into the Earth — is heavily influenced by the lime in the Earth, while everything coming from the distant periphery is influenced by the silica. And even when the silica influences proceed from the Earth itself, they still transmit what comes from Jupiter, Mars, and Saturn, and not what comes from Moon, Mercury, and Venus.

Nowadays we are not in the habit of taking these things into account, but we're also having to pay for it. In one recent instance, ignorance of the cosmic influences — both insofar as they work through the air, by way of everything above ground, and also insofar as they are mediated by the Earth from below — such ignorance had to be paid for in many parts of the civilized world. In these places, everything that used to be done out of the old instinctive science had run out. The soil was exhausted and the agricultural traditions were exhausted too, even though sometimes the peasants were still able to help. What happened may not be a concern to you, but it affected many, many people. Far and wide, vineyards were infested with grape phylloxera,<sup>2</sup> and there was practically nothing anyone could do about it. I still remember how the editors of an agricultural periodical in Vienna in the 1880's were bombarded with requests to find a means of

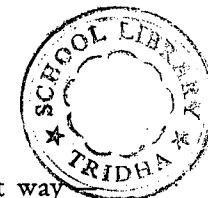
combatting the grape phylloxera, and how they were at a complete loss as to what to do when the infestation became acute. These things cannot be dealt with effectively by the science available today. The only effective way to deal with them is to delve into what can be learned along the lines we have indicated.

Let me show you this schematically [Drawing 13, white]. Suppose this is ground level, and this is what works in from the cosmos from Venus, Mercury, and Moon, and which then radiates back so that it works from below upwards. What works into the ground in this way, brings the plants to produce what grows in a single year and then culminates in seed formation. Out of this seed there then comes a new plant, and then a third plant, and so on [Drawing 13, yellow]. Everything that comes from the cosmos in this way, flows into the plant's ability to reproduce, into the succession of generations.



DRAWING 13 (COLOR PLATE 6)

On the other hand, everything that comes in a different way from above the surface of the Earth — comes from different forces,



from the forces of the distant planets. Let me sketch it in: Here is what transforms itself in the plant in such a way that the plant expands outward and looks nice and plump [Drawing 13, red]. This is what we can remove for our nourishment, because there is a continuous stream building it up again. The parts we eat — the fleshy parts of apples or peaches, for example — all come from the effects of the distant planets. Knowing this, we can tell what we have to do in order to influence plant growth in a particular direction. Taking these different forces into account is the only way to gain insight into how to affect the growth of plants.

Now a large number of plants, especially the ones we usually call weeds — even though some of the most powerful medicinal plants are found among them — are very strongly influenced by what we can call the lunar effects. It is common knowledge that the surface of the Moon reflects the rays of the Sun, directing them back toward the Earth. We see these reflected rays of the Sun because we catch them with our eyes — and the Earth catches them too. The rays of the Moon are reflected Sun-rays, but the Moon has imbued them with its own forces, and so they strike the Earth as lunar forces, and have been doing so ever since the Moon separated from the Earth. This lunar force from the cosmos has an intensifying effect on everything earthly. When the Moon was still united with the Earth, the Earth was indeed much more alive and fruitful. The Earth is more mineralized at present, and is only barely strong enough to bring about growth in living things. Ever since the Moon separated itself, however, it works to intensify the normal condition of the Earth, so that growth can be enhanced to reproduction.<sup>3</sup>

When a living being grows, it gets big. The force at work in growth is also at work in reproduction. In the case of growth, however, it doesn't go far enough to produce a separate organism; instead it simply brings forth cell after cell. Growth is a weaker form of reproduction, a reproduction that remains within the organism.<sup>4</sup> And reproduction is an enhanced form of growth. By itself, the Earth can impart the weaker form of reproduction — that is, growth — but without the Moon it cannot produce the enhanced growth. This

requires the cosmic forces that shine down on the Earth from the Moon, and in the case of some plants, from Mercury and Venus as well.

As I said before, we usually imagine that the Moon simply takes up the rays of the Sun and reflects them onto the Earth. In other words, when we consider the effects of the Moon, we usually think only of the sunlight. But that is not the only thing that comes toward the Earth. Along with the moonbeams, the entire reflected cosmos comes toward the Earth. The Moon reflects everything that comes toward it. In a certain sense, the whole starry heavens are reflected by the Moon and stream toward the Earth, although you couldn't prove it by any physical means available at present. It is indeed a very powerful cosmic organizing force that radiates down from the Moon into the plants, so that the plants are also enabled to form seeds, so that the force of growth can be enhanced to become the force of reproduction.

Now, for a given location on Earth, all this is available only at full moon. At new moon, that area does not receive the benefit of the lunar influences. What the plants received at the last full moon will persist, but that's all. We could achieve significant results if already at planting time, for instance, we were to utilize the Moon to support early germination, if we were to sow according to the phases of the Moon as people in India did well into the nineteenth century. But nature is not so cruel as to punish us for the slightly inattentive and discourteous way we treat the Moon with regard to sowing and harvesting. We have full moon twelve times a year; this suffices to ensure that there are always enough full moon effects, that is, enough of the forces that promote fruit formation. If we undertake any fertility measures at new moon instead of at full moon, they simply wait in the Earth until the next full moon, disregarding our human error and taking their cue from nature. Thus, people use the Moon without knowing it; but they don't get any further.<sup>5</sup>

You see, under such circumstances, the weeds demand their rights just like the cultivated plants. We get everything confused because we are unacquainted with the forces that regulate growth. We must enter



into them. Once we do, we realize that the fully developed lunar forces work for the reproduction of every kind of plant life. In other words, they encourage what shoots up from the root, right up into the seed-formation. We would get the best stand of weeds if we were simply to let the beneficent Moon have its effect on them and did not hinder it in any way. The weeds would reproduce and multiply, especially in wet years when the lunar forces work best.

However, when we take these cosmic forces into account, we will realize the following: If we prevent the Moon from exerting its full influence on the weeds, if we allow them to be influenced only from outside by the direct, non-lunar influences, their proliferation will be curbed. They will not be able to reproduce. Thus, what we need to do, since we can't simply switch off the Moon, is to treat the soil so that it will become unsuitable for absorbing the lunar influences. And not only the soil, but also the plants, these weeds, can acquire a certain reluctance to grow in soil that has been treated in a certain way. If we can accomplish that, we'll have what we want.

So, if we see weeds making headway in a given year, we must simply accept the fact and calmly resolve to take action. We must gather a number of seeds from these weeds, since the force I have been talking about is ultimately enclosed in the seeds. We then light a fire — a simple wood fire is best — and burn the seeds and carefully collect whatever ashes are left.<sup>6</sup> We will not get very much of this ash in this manner, but there — literally concentrated in the ashes of these seeds — we now have the opposite force to what is developed in the attraction of the lunar forces. We then take this little preparation, which we've made in this way from the various weeds, and scatter it over our field. These things have a large radius of influence, so we don't even need to be terribly careful about this. We will notice already by the second year that there are far fewer of the kinds of weeds we treated in this way, and that they are no longer growing as well. And, since there is a cycle of four years with many things in nature, we'll see after the fourth year that those weeds that we have treated by scattering this pepper each year, will not be found in this field.

You see, here you have an example of the fruitful application of the effects of smallest entities, which have now been demonstrated scientifically by our Biological Institute.<sup>7</sup> A great deal could be achieved in this way. If you take into account these influences which are totally ignored today, you can have control over any number of things. For instance, you can feel quite free to plant as much dandelion as you need for the purposes I mentioned yesterday, but you can also burn its seeds and scatter the pepper over your fields. You would then be able to have the dandelions exactly where you wanted them, yet keep your treated fields free of them. Although people today will not believe it, things like this used to be known and mastered out of an instinctive agricultural wisdom. In those days, because people did such things instinctively, they could plant together in quite limited areas everything they wanted.

In all these instances, I am simply giving you indications to serve as starting points for applying these things in actual practice. Since people these days are of the opinion — I don't want to call it a prejudice — that everything has to be verifiable, well, you should go ahead and try to verify them. If you do the experiments properly, they will surely be confirmed. But if I had a farm myself, I would not wait for the confirmation; I would start right away, because I am quite sure these things work. As far as I am concerned, spiritual-scientific truths are true in and of themselves, and do not need to be confirmed by other circumstances or external methods. Our scientists have all made the mistake of looking to external methods, of wanting to verify spiritual-scientific truths by external methods. This has happened even within the Anthroposophical Society, where people should have known that things can be true of themselves. But in order to get anywhere nowadays, we have to verify these things outwardly, we have to compromise. A compromise is necessary here, but in principle it's not necessary. For how do you know inwardly that something is true? You know it by virtue of its inner quality, you know it for certain, as certainly as you know, for instance, that if it takes fifty people to manufacture something, and you decide you want to produce three

times as much, that you need a hundred and fifty people. Of course some smart aleck can come along and say: I don't believe that a hundred and fifty people will make three times as much, we'll first have to put that to the test. It can then happen, under certain circumstances, that you are repudiated by experience, if actually experiment. Suppose you let whatever is involved be done first by one person, then by two, then by three, and then you determine — statistically — how much the three have produced. Now, if the three people spent all of their time talking with each other, then they will have gotten less done than one person. In that case, the assumption you made was false. The experiment can yield a contrary result — but that proves nothing. If you are proceeding carefully, you must also examine this contrary result quite exactly. Then what is inwardly true will also be confirmed outwardly.

We have spoken in quite general terms about weeds, but this will not be as possible when it comes to animal pests. Let me choose here an example that can be especially characteristic, in order that experiments can be made to show how these things are confirmed in practice.

Let us take the farmer's best friend, the field mouse. What great lengths people go to in trying to get rid of field mice! You can read in agricultural books that people tried all kinds of phosphorus preparations, for instance, and then also a combination of strychnine and saccharin. Even more drastically, it has been suggested that the field mice be infected with typhus, which can be done by setting out a bait of mashed potatoes inoculated with certain bacilli harmful only to rodents. Such things have been done, or at least recommended. People have tried all kinds of rather inhumane methods of doing in these innocent-looking little animals. I think even the government has had to intervene, because if you are using one of these methods, it does no good unless your neighbor does it too — the mice will just come over from the field next door. The government has to be called in to help so that everyone is forced to get rid of mice in the same way. The government is not interested in modifying its regulations; regardless of whether the method chosen is right or not, everybody has to go along with it. The government is not interested in anybody's promises — the

issue must be decided for everyone, everything must be done uniformly. Uniformity, after all, is the government's ideal.<sup>8</sup>

All of this experimentation and regulation is very superficial. You always get the feeling that the experimenters themselves aren't quite happy about it, because in the end the mice always come back. Now in our case too, what we need to do is not something that can really be restricted to a single farm, though even there it will help. It won't be a full success, however, unless you can share your insight and persuade your neighbors to do these things too. I am convinced that in the future we will have to rely much more on shared insights than on regulations enforced by the police. That will be a real step forward for society.

Now, what you have to do is catch a fairly young mouse and skin it. There are always plenty of mice around, but for this experiment it must be a field mouse. It's important to obtain this mouse-skin in the period when Venus is in the sign of the Scorpion.<sup>9</sup> Those old-time farmers with their instinctive science were not so foolish after all, because as soon as we leave the plant kingdom and turn to the animals, we come to the zodiac, which means "animal circle." When you are trying to accomplish something in the plant world, you can stay within the solar system, but that is not enough when it comes to animals. There we need concepts that take into account the fixed stars, especially the fixed stars in the zodiac.

With plants, the effect of the Moon by itself is just strong enough to push the growth process over into reproduction, but in the animal kingdom the Moon's effect has to be supported by Venus. With animals we don't need to give much consideration to the effects of the Moon, because they preserve the lunar forces within themselves and emancipate themselves from the Moon. In other words, the forces of the Moon are developed and available in the animal kingdom even when it isn't full moon; the full moon force in the animal is emancipated in regard to time.<sup>10</sup> But this is not the case with respect to the other planetary forces, and this is what concerns us now.

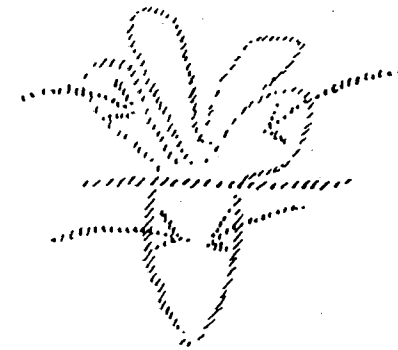
You must burn the skin of the mouse when Venus is in the Scorpion, and carefully collect the ash and anything else that is left

over. There won't be much, but if you catch a number of mice, you will get enough. What is destroyed through fire at the time when Venus is in the Scorpion, contains the negative of the field mouse's reproductive force. Then take the pepper you have made in this way and scatter it on your fields. If this is difficult to do in certain cases, you can make the pepper more homeopathic — you don't need a whole plateful. If the pepper has properly gone through the fire when Venus and Scorpion are in peak conjunction, then in this pepper you will have a potent means of making the mice avoid the fields where it has been strewn. But these animals have a lot of nerve — they'll come right back and settle down in any unpeppered areas. In other words, although the effect radiates quite far, it can happen that one is not quite thorough enough. However, if everyone in the neighborhood does it, the results will certainly be dramatic. I venture to say you might even develop a taste for doing such things and come to enjoy them. Farms, like certain foods, taste better with a little pepper!

It is important to get to the point where you can reckon with the effects of the stars without being the least bit superstitious. A lot of things that used to be a matter of knowledge have now degenerated into superstition, and it does no good to warm them up again. We have to start over again from knowledge, and it must be knowledge acquired in a spiritual way and not just by means of the physical senses. Now, what I have just described is how we can treat the soil to combat those field pests that can be reckoned among the higher animals. Mice are rodents, so they are considered higher animals. But this method will have no effect against insects, because insects and other lower animals are subject to a totally different set of cosmic influences.

I am going to tread on thin ice now and in connection with what I have been talking about, use the sugar-beet nematode as an example, in order to speak about something current and local.<sup>11</sup> The first sign of its presence are the well-known swellings of the rootlets, and also the fact that the leaves remain wilted in the morning. That is the outer indication. We must be clear that this leafy middle region — which is what undergoes a change in this case — absorbs the cosmic influences from the air, but that the roots absorb the forces that come into the

plant from the cosmos by way of the soil. What happens when nematodes appear is that the process of absorbing the cosmic forces, which should otherwise be taking place in the leafy part of the plant, is forced downward into the region of the roots. Indicated diagrammatically [Drawing 14] — if this is the surface of the soil and this is a nematode-infested plant — the cosmic forces that ought to be working up above are actually working here below. The real phenomenon is that certain cosmic forces slide too far down, and this is what causes the change in the plant's outward appearance. The cosmic forces that nematodes need for their survival are therefore available down in the ground where the nematodes have to live. These little thread-like worms would otherwise have to live up in the leaves, but since the soil is their natural habitat, they cannot do that.



DRAWING 14 (COLOR PLATE 6)

Certain living things — or actually all living things — can only live within a certain range of conditions. Just try living in air that is 70° Celsius, or minus 70° Celsius — you will find that you are totally dependent on a certain temperature range; above or below this range, you can no longer survive. Nematodes have similar limitations. They can only live in the soil, and only if cosmic forces are present there at the same time. Otherwise they die out. Each living thing requires quite

specific conditions for its survival. The human race would die out too, if the right conditions weren't present.

For creatures that live in the particular way that nematodes do, it is crucial that the cosmic influences — which should otherwise be active only in the surroundings of the Earth — enter into the Earth. These cosmic influences have a four-year cycle. With nematodes we are dealing with something quite abnormal, something which we can also study — since the same forces are involved — by looking at the cockchafer grubs that appear every four years. The forces that give the Earth the capacity to develop the potato sprouts, are the very same ones the Earth acquires for developing the cockchafer grubs, which appear among the potatoes every four years. Although this four-year cycle is not apparent with the nematodes, it does appear in what you have to do to counteract them.<sup>12</sup>

With the insect you must not take just part of it, as with the mouse, but rather the whole insect. A harmful root-dwelling insect like this is in its entirety a result of cosmic influences — it only needs the Earth as a substratum. Here you need to burn the whole insect. Burning it is the best and fastest way to go. You could also let it decay, but it is difficult to collect the end products of decomposition, although in some ways they might be better. In any event, you will certainly accomplish your objective by burning the whole insect. You may need to dry and store the insects, however, since the burning must be done when the Sun is in the sign of the Bull, which is exactly opposite the position Venus must be in when you make the mouse-skin pepper. The whole insect world is related to the forces that develop as the Sun moves through the Waterman, Fishes, Ram, [Bull], Twins, and on into the Crab, although by the time it gets to the Crab, these forces are quite weak, as they also are when it is passing in front of the Waterman. While the Sun is moving through this part of the heavens, it is radiating forces that have to do with the insect world.

People have no idea that the Sun is actually a very specialized creature, and that it is not at all the same thing when in the course of the year or the day it shines down on the Earth from the Bull, or when it shines down from the Crab, and so on. It is constantly changing.

And in fact it is rather absurd, although forgivably so, to speak of the Sun in general. We ought actually to say, "Ram-Sun," "Bull-Sun," "Crab-Sun," "Lion-Sun," and so on. In each case the Sun is a quite different being, whose nature depends on the combined effects of its daily as well as its yearly course, which are determined by its position in the vernal point.

So, if you go through with this and make this insect pepper, you can then scatter it over your fields of root crops and the nematodes will gradually become powerless. After the fourth year you will certainly find that they have become quite powerless. They cannot survive; they shy away from life if they have to live in soil that has been peppered in this fashion.

In a remarkable way, we have here before us what in earlier times was known as star knowledge. The knowledge of the stars that we have today only serves as a means of mathematical orientation. It's no longer much good for anything else. But that was not always the case. In ancient times, people saw something in the stars that could serve as a guide for their earthly life and work. That science has now been completely lost.

You see, in this way we now also have a possibility of keeping harmful animals and insects at bay. It is important to develop a relationship to the Earth where we know — on the one hand — that it is right that the Earth is enabled by the lunar and watery influences to bring forth plants. On the other hand, however, what is in the plant, what is in every living thing, also carries in itself the germ for its own destruction. Just as water is indispensable for fertility, so is fire a destroyer of fertility. Fire consumes fertility. Therefore, if something that is ordinarily treated with water in order to promote fertility, is instead treated with fire, then within the household of nature you bring about the opposite — namely destruction. That is what has to be taken into account here. Under the influence of Moon-saturated water, a seed develops fertility and proliferates; under the influence of Moon-saturated fire — or fire saturated with any other cosmic force — the same seed spreads a force of destruction, as we've seen.

It is really not so strange that we can reckon here with strongly spreading forces, if we also take the effects of time into account quite precisely. After all, the force in the seed is a force that spreads out, and this works on therefore also in the destructive force. Just as the seed has an inherent tendency to spread out, so does the pepper that we produce from it. I call it "pepper" simply because of what it looks like — most of these things do resemble pepper.<sup>13</sup>

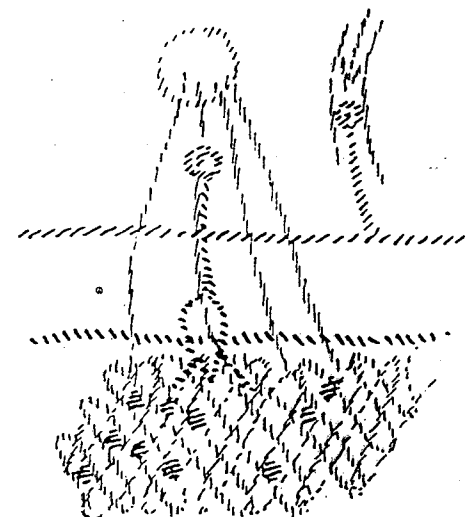
Now, we still need to take a look at the so-called plant diseases. Actually, they should not be called plant diseases, because abnormal processes that occur in plants are not diseases in the same sense as they are in animals. (We will understand this difference better when we come to talk about the animal kingdom.) Most of all, plant diseases are not the same as disease processes in human beings. Actual illness is not possible without the presence of an astral body, which in an animal or a human being is connected with the physical body by means of the etheric body. There is a certain standard of normalcy for this connection, and most illnesses come about when the astral body unites unusually intensely with the physical body or some particular physical organ; that is, when the etheric body does not provide enough padding, so that the astral body pushes its way into the physical body more strongly than usual. Now, since a plant does not contain an actual astral body, the particular way of being ill that is possible with animals and humans simply does not appear with plants. We must be quite aware of this fact, and then try to understand what actually can cause plants to become ill.

From what I have said so far, you will have gathered that the soil around plants has a certain inherent vitality. Accompanying this vitality are all kinds of growth forces, faint suggestions of reproductive forces, and also all the forces working in this direction under the water-mediated influence of the full moon. Although these forces in the soil are not intense enough to appear as actual plant forms, they are present with a certain intensity all around the plants.

There are several significant relationships involved here. First of all you have the soil, and then the soil saturated with water. Then you also have the Moon. By letting its rays stream into the soil, the Moon

makes the soil inherently alive to a certain extent; it induces waves in the etheric life of the soil. When the soil is saturated with water, it's easier for the Moon to do this, when the soil is dry, it's more difficult. The water is actually only the mediator. To be sure, what must be enlivened is the solid earth, the mineral, but water, after all, is also something mineral. A sharp boundary, of course, does not exist here. So, we also have the lunar influences in the soil.

It can easily happen, however, that the lunar influences in the soil become too strong. Suppose you have a very wet winter followed by an equally wet spring. The lunar force will then penetrate too strongly into the earthy element and the soil will become too strongly enlivened. I will indicate this over-enlivening of the soil with these little red dots [see Drawing 15]. If these little red dots weren't there, if the soil had not been over-enlivened due to the Moon, the plants growing above would develop normally, up to and including the process of going to seed. Imagine wheat, or something like that, growing and growing until it eventually forms seeds. If the Moon imparts the right degree of vitality to the soil, this vitality works upward so that these seeds come into existence.



DRAWING 15 (COLOR PLATE 6)

Let us assume, however, that the Moon's influence is too strong, that the soil is overly enlivened. In this case, the vitality works up too strongly from below, and something that should occur only in seed formation starts to happen earlier. When the vitality is too strong, it doesn't reach all the way to the top; its very intensity makes it start working lower down. Thus, because of the effect of the Moon, there is insufficient force for seed formation. The seed incorporates a kind of dying life into itself, and through this dying life a kind of second ground-level is formed above the level of the soil. Although there is no actual soil up there, the same influences are present. As a result, the seed, or the upper part of the plant, becomes a kind of soil for other organisms. Parasites and all kinds of fungi appear — blights and mildews and the like. What wants to work upward out of the soil is kept from reaching the right height because of the overly strong lunar force. It is remarkable that this happens when the lunar forces are too strong rather than too weak, but that's the way it is. A healthy seed-forming capability is absolutely dependent on the lunar forces being normal rather than too strong. Theorizing and speculation, rather than perception, might lead to the opposite conclusion, but that would be wrong. Direct perception reveals what I have just described.<sup>14</sup>

So what should we do now? We need to relieve the soil of the excessive lunar force; we need to find some way of reducing the water's mediating capacity, of giving the soil more earthiness so that the water that is present does not absorb the excess lunar influence. We accomplish this — though outwardly everything remains the same — by making a fairly concentrated tea out of *Equisetum arvense*, which we then dilute and use as a kind of liquid manure on the fields where we want to combat blight and similar plant diseases. Once again, very small amounts, a kind of homeopathic application, will be sufficient.

This is an instance where you can clearly see how the different fields of practical endeavor should interact. When you understand the remarkable effect that *Equisetum arvense* has on the human organism via the kidney-function, you will have a guideline for working. You can't speculate about these things, of course, but this gives you a guideline for testing how equisetum works when it is made into what

I called a kind of liquid manure. When you spray it out — you don't need an apparatus here — it will work over wide areas even if you spray only a little bit. You will find that it is an excellent remedy, although "remedy" is not quite the right word since plants cannot actually get sick. It is not really a healing process, it is simply the opposite of the process I described earlier.<sup>15</sup>

In this way, if we acquire insight into the various aspects of nature's workings, it is entirely possible to take hold of the processes of growth — and, as we shall see later, not only plant growth but also the normal and abnormal growth of animals. Only at this point does real science begin. The type of experimentation current today is not real science, it is merely a recording of individual phenomena and isolated facts. Real science begins only when we are able to take hold of the effective forces.

The plants and animals on Earth, even the parasites of the plants, cannot be understood in isolation. As I said already in the first lecture, it is nonsense to seek within the compass needle itself, the reason why it always points to the north [Drawing 16]. That is not done; the whole Earth is considered. When a magnetic north pole and magnetic south pole are assigned, the whole Earth is used in the explanation. But just as we have to look at the whole Earth when we want to explain how a compass needle behaves, so must we also consult the whole universe when it comes to understanding plants. It is



DRAWING 16  
(COLOR PLATE 6)

not enough to look only at the plant, animal, or human kingdoms. Life comes from the whole universe, not merely from what the Earth provides. Nature is a unity, with forces working in from all sides. Those whose eyes are open to these manifest forces will be able to understand nature. But what does today's science do? It takes a little glass plate and puts a carefully prepared something-or-other on it, gets rid of everything else and peers at it through something called a microscope. That is the exact opposite of what we ought to be doing

if we want to comprehend the full dimensions of the world. It is bad enough to be shut up in a room, but now we shut out the whole glorious world with this tube. Nothing remains but what we see through the lens of the microscope. This is what we've gradually come to. But when we are able to find our way back to the macrocosm, then we will once again begin to understand something about nature — and about many other things too.

### THIRD DISCUSSION

Koberwitz

Saturday, June 14, 1924

QUESTION: *Can the method you suggested for nematodes also be applied to other insects? I mean, to any kind of pest? Is it really permissible to use these methods to go ahead and destroy plant and animal life over large areas without any misgivings? Serious abuses could arise. Surely some kind of limit needs to be set so that someone can't just spread destruction all over the globe.*

DR. STEINER: Well, with regard to its being permissible, just imagine if it weren't. (I want to leave aside for a moment the ethical question, the issue of occult ethics.) What would happen in that case, as I have already indicated, is that agriculture in the civilized regions of the world would become worse and worse, and near-famine and high prices would cease to be isolated local phenomena and become the general rule. This will happen in the not-too-distant future, so our only options are either to let civilization go to ruin, or to try to do things in such a way that a new fertility can come about. Faced with this need, we don't really have the option of debating whether these things are permissible or not.

Nevertheless, from a different point of view this question is quite valid. It's important to think about how to create some kind of safety valve against abuse. If these things become common knowledge, of course they could be abused. That is obvious. Still, I would like to point out that there were long epochs of civilization where things like this were known and very widely practiced, and yet it was possible to restrict access to responsible sectors of humanity so that they were not abused. Serious abuses of these things did occur back at a time when

much more severe abuses were possible, due to the fact that the forces in question were active more widely. That was the case during the later periods of the Atlantean evolution, where serious abuse did indeed take place, leading to tremendous catastrophes.<sup>1</sup>

On a general level, I can only say the following: It is certainly justifiable to limit knowledge of these things to a restricted circle, to not let it become generally available, but in this day and age this is almost impossible. Knowledge can't be kept within small groups nowadays; they invariably tend to let it out in one way or another. Before the invention of the printing press, it was easier, and it was easier still when most people did not know how to write. But now, whenever you give a lecture, no matter how small the audience, the issue of where to find a stenographer always comes up. Indeed, I never like to see stenographers. I have had to get used to them, but it would be better if they were not there — I mean as stenographers, of course, not as people.

But on the other hand, do we not also have to reckon with something else, namely, with the necessity of moral improvement in all aspects of human life? That would be the panacea. Admittedly, if you look at certain contemporary phenomena, there is reason to be pessimistic; but with regard to moral improvement, this should never lead us to become mere spectators. We should have thoughts that are filled with impulses of will, and we should always be looking for what we can do to raise the general level of human morality. This too could flow from anthroposophy, and a Circle such as we have discussed could certainly act as a kind of remedy against such abuses.<sup>2</sup>

In nature too, it is certainly the case that good things can become harmful. Just think, if we didn't have the lunar forces down there, then we also couldn't have them up here. But they must be active here — it's just that something that is eminently desirable and necessary in one place, may be harmful somewhere else. What is moral on one level may be decidedly immoral on another. The Ahrimanic influence in the sphere of the Earth is only harmful because of where it is; when it works in a sphere that is only slightly higher, its effect is definitely beneficial.<sup>3</sup>

But to answer your first question, you are right — the method I indicated for nematodes applies to insects in general, to all the lower animals, which are largely characterized by a ventral nerve-cord instead of a spinal cord. Where there is a spinal cord, you need to skin the animal. Where there is a ventral cord, you need to burn the whole animal.

*Did you mean the wild chamomile?*

This chamomile — the one that has petals turned down like this [Drawing 17]. It has petals directed downwards rather than upwards. The *Chamomilla officinalis* that grows wild by the roadside.<sup>4</sup>



DRAWING 17 (COLOR PLATE 6)

*Should we use the flowers of the stinging nettle?*

Yes, but take the leaves too — take the whole plant when it's in flower, but not the roots.

*Can we use the dog chamomile [Hundskamille] that grows in the fields?*

That kind is closer to the right one than the garden chamomile that's being passed around. Don't use that one. But the one you refer to, which is also used for chamomile tea, is much more closely related than this one here. You could use that one.<sup>5</sup>

*The chamomile that grows along the railroad track here is the one you mean, isn't it?*

Yes, that's the right one.

*Does what you said about destroying weeds also apply to aquatic weeds, such as water-weed?<sup>6</sup>*

It also applies to things that come from the swamp or the water, also to the aquatic weeds. What you do in this case is simply sprinkle the pepper on the banks.



*Can the methods used against aboveground parasites also be used against underground parasites, against cabbage clubroot for instance?*<sup>7</sup>

Absolutely.

*Can these methods for alleviating plant diseases be applied to vineyards too?*

I can only say that I am convinced that the vineyards could have been protected if people had gone about it in the way I have indicated. It has not been tried out yet, however; little occult research has been done in this area, also not by me.

*What about downy mildew?*

That can be treated just like any other blight.

*Is it actually right for us as anthroposophists to resuscitate the production of grapes for wine?*

In many instances today all anthroposophy can do is point out how things are. The question of how things *ought* to be is a difficult one nowadays. I once had a good anthroposophical friend who had extensive vineyards, but who used a sizable share of the annual profits from them — not a huge share, but a good-sized one — to send out postcards all over the world, advocating abstinence. On the other hand, I also had a friend who was a strict teetotaler, who was very generous to the anthroposophical movement throughout his life, but who was also responsible for all those posters on the streetcars advertising "Sternberger Cabinet" [a fancy wine]! That's where the practical questions get tricky. Certain things are not possible nowadays. That's why I said we should certainly take cow horns and use them, but that to become bull-headed in our opposition to various things could be very harmful to the cause of anthroposophy.

*Couldn't something else be substituted for the stag bladder?*

It is true that stag bladders may be hard to get — but a lot of difficult things get done in this world! Of course, you could experiment and see whether the stag bladder could be replaced by something else.

I can't say at the moment. It is entirely possible that somewhere there is another suitable kind of animal — perhaps indigenous to some corner of Australia. That's possible, but among the animals native to Europe, I cannot think of anything else. And it couldn't possibly be anything other than an animal bladder. I wouldn't recommend that you immediately start looking for substitutes.

*Is the constellation always the same when it comes to getting rid of insects?*

That is something that has to be tried out. As I said, the whole sequence from the Waterman through the Crab would need to be considered, and the constellation may vary significantly among the different lower animals. You will have to try it out.

*With regard to getting rid of field mice, did you mean Venus in the astronomical sense?*

Yes, the one we call the evening star.

*What did you mean by "when Venus is in the Scorpion"?*

That means any time when Venus is visible in the sky with the constellation of the Scorpion in the background. Venus has to be behind the Sun.<sup>8</sup>

*When the upper parts of potato plants are burned, does this affect the growth of the potatoes?*

The effect is so slight that you can disregard it. There is some effect, there is always an effect of some kind whenever you do anything with any organic remains — and it affects the entire field, not just the individual plants — but in this case it is so slight that for practical purposes it can be disregarded.

*What did you mean by "mesentery"?*

I mean the peritoneum. To my knowledge, the mesentery means the peritoneum.<sup>9</sup>

*Is that the same thing as tripe?*

No, it's not. It's the peritoneum.

*How should we distribute the ashes over the fields?*

You can take what I said quite literally: it is just like sprinkling pepper. It has such a wide radius of activity that it's enough if you simply walk over the fields and sprinkle it around like so.

*Do the preparations work on fruit trees in the same way?*

In general, everything I have said up to now may also be applied to fruit crops. There are a few other things still to consider, but I will tell you about them tomorrow.<sup>10</sup>

*In farming we usually apply the barn manure to the root crops. Is the prepared manure the right thing also for the grains, or do they require some special treatment?*

For the time being, you can go on manuring as usual — it's only a matter of supplementing this with the things I've described. With regard to things I haven't touched on, don't immediately assume they're all bad and that you have to completely change them. Things that have stood the test of time should be continued, and what I have indicated should only be added. I should just mention, however, that the effect of what I've indicated will be considerably modified if you use manure that includes a lot of sheep or pig manure. The effect will be much less striking if you use too much sheep and pig manure.

*How is it when inorganic fertilizers are used?*

People will discover that this business of using inorganic fertilizers is something that must eventually stop altogether. Any mineral fertilizer gradually reduces the nutritive value of whatever is grown on the fields where it is used; that is a completely general law. Just the measures I have indicated, however, if you now carry them out, will make it unnecessary to manure more than once every three years. Perhaps you will only need to do it every four to six years. You will be able to do without artificial fertilizers altogether, if only because

they will become an unnecessary expense. Artificial fertilizer is something that won't be needed anymore, so in time it will disappear again.<sup>11</sup>

Nowadays we take into account much too short spans of time. In a recent discussion on beekeeping, for instance, an up-to-date beekeeper came out all in favor of breeding queens industrially, of selling the queens and distributing them widely, rather than having the individual beekeepers raise them themselves. I had to say: Of course, you are correct! But if not in thirty or forty years, then certainly in forty or fifty years you will find that this has ruined beekeeping.<sup>12</sup>

That is why these things have to be taken into account. Everything is being mechanized and mineralized nowadays, but the fact is that what is mineral should work only in the way it does in nature. Unless you incorporate it into something else, you shouldn't introduce anything that is mineral or totally lifeless into the living soil. This will not be feasible by tomorrow, but by the day after tomorrow it will certainly become a matter of course.

*How should we catch the insects? Could they be used in the larval stage?*

With the insects you can use both the larvae and the adults, but the constellation may change. As you go from the winged stage to the larva, you will need to move from Waterman towards the Crab. The right constellation for the mature insects will be closer to the Waterman.

## LECTURE SEVEN

Koberwitz  
Sunday, June 15, 1924

In the time we have remaining, I would like to supplement what we have already considered with something about raising animals and growing fruits and vegetables. These too are branches of agriculture that are impossible to consider properly unless we do everything possible to gain insight into the true state of affairs. We will do that today, and then continue with practical suggestions and applications tomorrow.

I need to ask you to bear with me in pursuing some things that may seem somewhat remote, because today these things are like a completely unknown territory, even though they were quite familiar in times when farmers had a more instinctive insight. Nowadays we tend to look at the beings of nature — the minerals, plants, and animals (we'll leave out human beings for the moment) — as if they stood there in isolation. We're in the habit of looking at a plant all by itself; then we go on to look at a plant species by itself, and then at another species next to it. Everything we are supposed to know about these things is neatly pigeonholed into separate species and genera. But that is not how things are in nature. In nature, and actually throughout the universe, everything is in mutual interaction with everything else. In this materialistic age of ours, we follow up only the coarser kinds of interplay — when one thing gets eaten and digested by another, for instance, or when the manure from animals is spread on the fields. These coarser interactions are the only ones we investigate.

However, there are also more subtle interactions that are brought about by finer forces and finer substances — by the warmth, by the

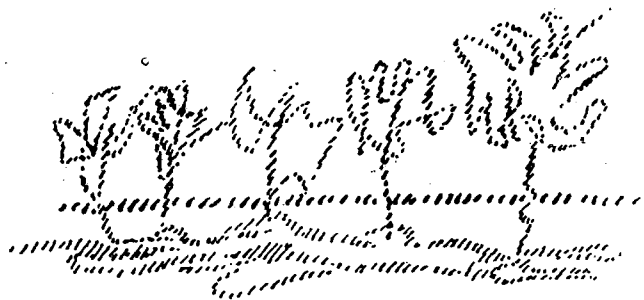
chemical-ether that is constantly at work in the atmosphere, by the life-ether. And there are some areas of agricultural endeavor where we will make no progress at all unless we take these subtler interactions into account. In particular, these more intimate interactions in nature must be considered when we are dealing with the association of plants and animals on a farm. We need to look not only at the animals that are obviously very close to us, such as cattle, horses, sheep, and so on; we also need some understanding, for example, of the colorful and varied insects that hover around the plants at certain times of year, and of the bird-life on the farm. People have no idea of the extent to which farming and forestry have been affected by the fact that certain species of birds have been driven out of certain areas by modern conditions. We need to shed light on things like this once again, but from a spiritual-scientific perspective, in other words, from a macrocosmic perspective. So now we can use some of what we have learned during the past few days to come to further insights.

In looking at a fruit tree, whether it's a pear or an apple or a plum tree, you can tell already from its outer appearance that it is something totally different from any type of herbaceous plant. We must determine the exact nature of the difference, otherwise we will never understand the role played by fruit within the household of nature. I am speaking now about the kind of fruit that grows on trees.

Let us look at a tree with an eye to what it is within the totality of nature. If we look at it with understanding, the only parts that we can consider plant-like are the thin green stems, which bear leaves, flowers, and fruits. These shoots grow out of the tree in the same way as herbaceous plants grow out of the soil. As far as what is growing on its branches is concerned, the tree is the soil. It is mounded-up soil, soil that is simply in a more living condition than the soil in which our herbaceous plants and grains are growing. To understand a tree we must consider, on the one hand, its thick trunk and also its limbs and branches. On the other hand, there are the actual plants — the leaves and flowers that grow out of it. These plants are rooted in the twigs and branches of the tree just as other plants are rooted in the Earth. The question is, are these plants, these more or less parasitic growths

on the tree, really rooted? Since there are no actual roots to be found in the tree, we must say that these plants that unfold their leaves, stalks, and flowers up there, have lost their roots. But plants are not complete without roots, they must have roots; so where are they?

In fact, the roots are there — they are just not visible to coarse outer perception. In this case, you must not want merely to see the root, you must comprehend it. Perhaps this comparison will help: Suppose I plant a lot of herbaceous plants very close together in the ground, and suppose that their roots start to grow together, twining around each other until they merge into a single mass of roots. You can imagine that this tangled mass would not be content to remain unorganized; it would consolidate into a unity, and the sap of the different plants would start to flow together down below. In this newly unified root mass, you would not be able to distinguish where the roots of the individual plants stopped or started. They would have developed a common root system. This may not happen in reality, of course, but it does help us understand what is going on. Here is the soil [Drawing 18]; I set all my plants into it . . . and now down here the roots all grow together and form a unified layer. You cannot tell where one root stops and another starts.



DRAWING 18 (COLOR PLATE 7)

What I have sketched for you here hypothetically, is what is actually present in the tree. The plants that grow on the tree have lost their roots; you could even say they have more or less separated

themselves from their roots and only remain connected with them etherically. What I have sketched here hypothetically is the tree's cambium layer. The only way to look at the roots of these plants is to imagine that they have been replaced by the cambium. Although the cambium does not look like roots, it is the layer that constantly produces new cells for continued growth, just as if the herbaceous plant-life above would be growing from a root down below. The cambium layer is the actual growth region; it can create new cells, whereas the other layers of the tree aren't able to do that.

Thus, in the tree, we can see how the solid, earthy element has in fact raised itself up, how it has grown up into the air, and why it therefore requires more internalized vitality than ordinary soil, which only has ordinary roots in it. Now we begin to understand the tree! We begin to understand it as a remarkable entity that exists in order to create a separation in the "plants" that grow on it. It separates their stems and flowers and fruits from their roots, and retains only a spiritual connection, an etheric connection.

This is the macrocosmic approach we need to take in order to understand the growth of plants. But we need to go still further and ask what happens when a tree comes into existence. With respect to the air and outer warmth, what grows up there on the tree, is something totally different from the herbaceous plants that grow out of the soil. A whole different world of plants exists up there. They have a much more intimate relationship to the surrounding astrality, which is given off in the air and warmth so that the air and warmth can become mineralized in accordance with the needs of animals and human beings.<sup>1</sup> The plants growing on the ground are surrounded by a hovering cloud of astrality, as I have described, but here in the treetops the astrality is much more dense. Our trees are concentrations of astral substance; they are pronounced gatherers of astral substance.

This is actually the easiest area, I would like to say, in which to achieve a degree of higher development. If you make an effort, you can easily develop esoteric perception here. You won't exactly become clairvoyant, but you can very easily become clairsentient with regard to smell. Cultivate a sensitivity to the different fragrances that come

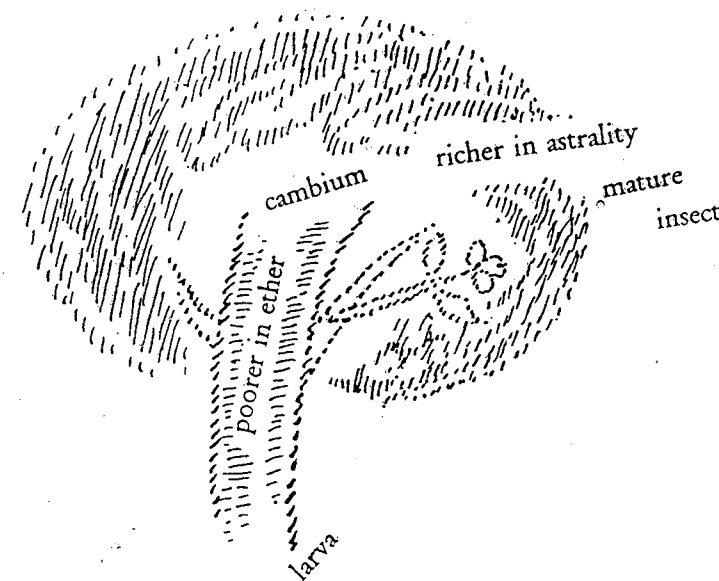
from plants growing on the ground, and those that come from orchards in bloom, or even from woodlands. Then you will be able to tell whether the atmosphere around a plant is poor in astrality — as can be smelled around the herbaceous plants growing on the ground -- or rich in astrality, as can be experienced in the lovely scents wafting down from the treetops. If you make a habit of cultivating your sense of smell, and can distinguish between the smell of plants growing near the ground and the smell of trees, you will have acquired clairsentience for astrality that is thinner in the first case and denser in the second. It is easy for farmers to become clairsentient with regard to smell, although in recent times they have not put this ability to use as they did in the days of instinctive clairvoyance. As I say, a farmer can certainly become clairsentient with regard to smell.

In order to see where this leads, we need to ask ourselves: What stands in polar opposition to the astrality around the tree, which these "parasitic" plants bring about? What does the cambium actually do?

You see, the tree makes the spiritual atmosphere around itself richer in astrality. What happens, then, when something resembling a herbaceous plant grows up there in the tree? The tree has is a certain inner vitality or "ethericity," a certain intensity of life; but the cambium acts to damp down this vitality to a more mineral level. In other words, while a rich astrality comes about outside the tree, the effect of the cambium is to bring about a poverty of ether on the inside. In comparison to herbaceous plants, trees are inwardly poorer in ether. A poverty of ether arise here [see Drawing 19]. This poverty in turn influences the trees' roots, which become much more mineralized than the roots of herbaceous plants. And, because their roots are more mineralized, these withdraw some of the ethericity from the soil around them. The soil around trees is therefore more dead than it is around herbaceous plants. It is important to keep this clearly in mind.

A phenomenon like this always has a deeper significance within the household of nature. If we look around, we can discover the significance of the astral richness around a tree's crown and the ether-poverty around its roots. The rich astrality wafting though the trees provides the life-milieu for the fully developed insects. And the ether-

poverty down below — which naturally extends throughout the tree, since as I described yesterday in relation to human karma,<sup>2</sup> spiritual things always extend their influence over the totality — this ether-poverty works on the insect larvae. If there were no trees on Earth, there would also not be any insects. Trees make it possible for the insects to exist. The insects fluttering around the aboveground parts of the trees and all through the forest depend on the forest for their life; and their larvae too are alive because the forest is there.



DRAWING 19 (COLOR PLATE 7)

This is a further indication of the intimate relationship that exists between everything root-like and the underground animal world. Trees are the best example of what I've just explained; that's where it is most evident. But what is so clear and striking in the case of trees, is actually present in varying degrees in all plants. Within every plant there is a certain tendency to become tree-like. In every plant, the root and its surroundings try to release the ether, while everything that grows

upward tries to attract and condense the astrality. The desire to become tree-like is actually present in every plant. Thus every plant has the same relationship to the insect world that I described as being particularly characteristic of trees. But in addition, this relationship to insects widens out to include the animal kingdom as a whole. In times past, the insect larvae, which can only survive on Earth because of the presence of tree roots, evolved into other types of animals, which resemble them. These animals spend their entire life in a kind of larval state, but they free themselves from the dependency on tree roots in order also to establish a connection to the roots of the herbaceous plants.

As we shall now see, the remarkable thing about this is that certain subterranean animals — albeit only very distantly related to the larvae — are able to regulate the etheric vitality in the soil when it increases too much. When the soil becomes too alive and exuberant, these underground animals make sure that the excess vitality is released. Their special importance for the soil lies in their ability to serve as regulators or safety valves for the underground vitality. These wonderful little animals are the earthworms. It would be important to study the relationship of the earthworms to the soil, because it is the earthworms which make sure that just enough ethericity is left in the soil to support plant growth.

So, down in the ground we find earthworms and other creatures vaguely reminiscent of larvae. And indeed in certain soils — which can be recognized just by looking — it would be good to encourage the earthworms. Then you would see how beneficial it can be to control this underground animal world, not only for the vegetation, but also, as we shall see, for the animals.

Now again, there is a distant resemblance between the mature insects that fly and certain other animals, namely, the birds. In the course of the Earth's evolution, something wonderful took place between the insects and the birds. To put it pictorially, one day the insects said: "We do not feel strong enough to manage the astrality hovering around the trees, so we are going to leave most of it for you birds. Instead, we will flutter around the other plants and make use of

their desire to become tree-like." That is how a real division of labor between the birds and the butterflies came about in nature. These winged creatures work together in a quite wonderful way, sharing the work of distributing the astrality wherever it is needed in the air above the Earth's surface. If you took away all the flying creatures, this astrality would fail to fulfill its proper role, and you would notice a certain stunting of the vegetation. Winged animals and everything that grows upward into the air belong together; it is impossible to imagine one without the other. That's why on a farm we also need to have the insects and birds fluttering around properly. Farmers must understand something about fostering insect-life and bird-life, because everything in nature is interdependent — everything. I have to emphasize this again and again.

We need to keep these things vividly in mind because they are very important for our insight here. The right astralization of the air is brought about by the world of flying creatures, and this astrality is in interaction with the wooded areas, which direct it in the right way, just as in our body certain forces direct our blood in the right way.<sup>3</sup> The effect of a forest is felt over a very large area, and in areas with no woods, this function must be performed by something else. We must realize that in areas where fields and meadows alternate with woods, the vegetation is subject to quite different laws than in vast treeless regions.

You can tell that some regions of the Earth were heavily forested before human beings had anything to do with this — for in certain matters nature is still wiser than people are — and it's safe to assume that if forests are naturally present in a given area, that their presence has certain advantages for the herbaceous and grassy vegetation of the surrounding farms. In such areas, we should be insightful enough not to cut down all the forests, but rather to take good care of them. However, since the Earth is also slowly changing due to all kinds of climatic and cosmic influences, we should also have the courage — if we see the vegetation on our farms is becoming stunted — to expand the wooded areas in the vicinity, instead of merely doing all kinds of experiments on and with the fields. On the other hand, if we notice

that the plants are growing rampant and lack the strength to form seeds, we should take steps to clear certain areas in the woods. In areas naturally destined to be wooded, regulating the woodland is simply part of farming, and must be regarded in its full spiritual significance.

Now we can continue and say that while the world of insects and birds — everything that flutters and flies — is in interaction with the astrality, the world of the worms and larvae is in interaction with the lime in the soil, with the mineral aspect of the soil. The subterranean world of worms and larvae is in interaction with the soil's mineral aspect, in particular with lime, and in this way the etheric is led off, as I described a few days ago from a different point of view. This is lime's function, but it exercises it in cooperation with the world of the larvae and insects.

You see, if we take what I have presented here a bit further, we come upon other things, which in the days of instinctive clairvoyance were applied quite correctly, simply out of an instinctive feeling. I would not trust myself to apply them with that same certainty; we have lost our instinctive grasp of these things because our intellect has exterminated our instincts. That people have become so intellectual and clever, is due to materialism. In the days when people were not so intellectual, people were less clever but much wiser. They knew out of their feelings how to do things that we must now learn to do consciously — by means of anthroposophy, which is not clever but rather strives toward wisdom. We need to approach an all-encompassing wisdom once again, and not be content merely to rattle off the words: "The human being consists of physical body, etheric body," and so forth, which can be memorized like a recipe. That is not the point at all. What is important is that the knowledge of these things be introduced everywhere, that we recognize these things in everything we meet. If we become clairsentient in the manner I explained, we will be guided to recognize the way things in nature really are.

As our perception becomes sharpened, we will discover, for instance, that the bird world can become harmful if there are no coniferous forests nearby to make good use of what the birds

accomplish. And once this peculiar relationship between the birds and the conifers is recognized, then another relationship becomes apparent. To begin with, it is a very delicate and subtle relationship like those I have mentioned, but it can also become more coarse. It is the relationship between the mammals and all those plants that stop short of becoming trees, yet also do not remain as small plants — the bushes and shrubs in other words; hazelnut shrubs, for instance. For the benefit of the mammals on a farm it is a good idea to plant bushes and shrubs throughout the landscape. These shrub-like plants exert a favorable influence simply by their presence, for everything in nature is in mutual interaction. But let us pursue this further! Since animals are not as silly as people, they notice this relationship very quickly, and once they have become aware of their inborn love for shrubs, they like to receive them as fodder, and they eat them in just the right amounts to have a wonderfully regulatory effect on everything else they eat.

If we trace these intimate relationships in nature in this way, we can also acquire insight into the nature of pests. Just as the coniferous forests have an intimate relationship to the birds, and the bushes have an intimate relationship to the mammals, so do all the fungi have an intimate relationship to the lower forms of animal life, to the bacteria and similar creatures, particularly the harmful parasites. The harmful parasites go hand-in-hand with the fungi and appear wherever fungi are present; in this way plant diseases arise and also coarser abnormalities. But if, in addition to woodland, we also manage to have some wet meadows near the farm, these meadows will prove very helpful to the farm by providing a good soil for the mushrooms. We should actively encourage the mushrooms and toadstools to grow in these meadows. You will then experience the remarkable fact that if you have even a small area where mushrooms are growing, their relationship to the bacteria and other parasitic creatures will keep these creatures away from everything else. The mushrooms have a much stronger relationship to these creatures than the other plants do. In addition to what I already described for combatting such plant pests, it is also quite possible to keep harmful microorganisms away from the farm simply by establishing some wet meadows.

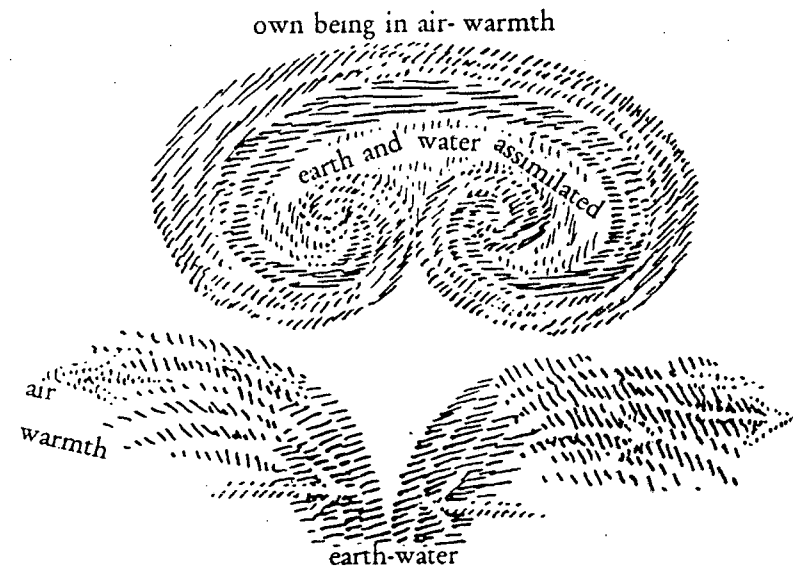
The correct balance of woods, orchards, bushes, and meadows — with their natural growth of fungi — is so essential to good farming that your farm will really be more successful even if this means a slight reduction in your tillable acreage. There is no true economy in using so much of your land that all the things I've mentioned disappear. The resulting loss in quality will far outweigh the advantage of being able to cultivate a larger area at the expense of the other things. Without this kind of insight into the interconnections and interactions of nature, it is really almost impossible to engage in an enterprise like farming, which is so closely bound up with nature.

Now, there is still time to consider certain points that will bring home to us the fundamental relationship between plants and animals. What is an animal, actually? And what actually is the plant world? (With plants we can speak in more general terms.) We need to discover the essential relationship here, if for no other reason than to understand how to feed our animals. We can only feed them properly if we do so with an understanding of the proper relationship between plant and animal. So, what are animals?

You can certainly study animals by dissecting them and viewing the delightful forms of their skeletons, which you can even study in the way I pointed out earlier. You can certainly also study their muscles and their nerves, but all this will not help you understand the real significance of animals within the household of nature. This can only be understood by looking at the aspect of an animal's environment with which it interrelates most directly and intimately. In its nerve-sense system and part of its respiratory system an animal assimilates directly from its environment everything that comes via air and warmth. As a being in and of itself, an animal is essentially a direct assimilator of air and warmth through its nerve-sense system. We can represent an animal schematically like this [see Drawing 20]: In relation to everything that surrounds it, in its nerve-sense system and part of its respiratory system, an animal is an entity that lives an unmediated existence in air and warmth. It has a direct relationship to air and warmth, and its skeletal system is actually formed out of warmth, because the warmth mediates the influences of the Moon and the Sun.

Its musculature is formed out of the air, by the forces of the Sun and the Moon working via the air.

On the other hand, an animal cannot relate to and assimilate earth and water in the same direct way. It has to take earth and water inside its body; it has to have a digestive tract going from outside in. An animal assimilates earth and water by means of what it has become through air and warmth, that is, by means of its metabolic system and part of its respiratory system. The respiratory system passes over into the metabolic system, and the animal assimilates earth and water with part of its metabolic system and part of its respiratory system. In other words, an animal has to exist already, thanks to air and warmth, in order to assimilate earth and water. That's how an animal lives in the realms of earth and water. Of course, the assimilation I have just mentioned is more an assimilation of forces than of actual substances.



DRAWING 20 (COLOR PLATE 7)

In contrast, let us now consider what a plant is. A plant, in fact, has the same kind of direct connection to earth and water that an animal has to air and warmth. Through a kind of breathing, and



through something remotely akin to a sensory system, a plant assimilates earth and water directly, just as an animal assimilates air and warmth directly. Thus, a plant lives an unmediated existence in earth and water, just as an animal lives in air and warmth.

Now, after seeing how a plant lives directly with earth and water, just as an animal lives with air and warmth, you will go on to say that a plant must assimilate air and warmth within itself, just like an animal does earth and water. But that is not the case. You cannot simply draw conclusions by analogy if you want to get at the spiritual truth here. In actual fact, while animals take in earth and water and assimilate them inside themselves, plants *give off* air and warmth, inasmuch as they experience them together with the soil. Air and warmth do not go *into* the plant, at least not to any great depth; instead of being consumed by the plant, they are given off — and this giving-off process is the important thing [see Drawing 20].<sup>4</sup>

As organisms, plants are the exact opposite of animals in all respects. Giving off air and warmth holds the same significance for a plant as taking in nourishment does for an animal. A plant lives by giving off air and warmth in exactly the same sense that an animal lives by taking in nourishment. This is what might be called the virginal nature of plants, that they don't want to greedily claim anything for themselves, but instead actually give to the world what the animals take from it. Plants give, and live by giving.

If you observe this give and take, you will understand something that played a great role in the old instinctive knowledge of these things. "In the household of nature, plants give, and animals take" — this statement is now made on the basis of anthroposophy, but in former times it was well known through instinctive clairvoyant insight into nature. A lot of these things remained available to sensitive people right down into recent times. Goethe, for instance, often uses the saying, "Everything in nature lives by giving and taking" — you'll soon come across it if you go through his writings.<sup>5</sup> He was simply borrowing it from old customs and traditions and did not quite correctly understand it any more, but felt that it described something true about nature. People who came after him no longer understood anything about it,

not even what Goethe himself had meant. He also spoke about giving and taking in connection with breathing, insofar as it interacts with the metabolism. His use of this expression was clear and at the same time unclear.

We have seen now how forests, orchards, and bushes serve as aboveground regulators, so that the plant growth is properly ordered. Below the Earth's surface, larvae, worms, and other lower forms of animal life join forces with lime to act as a similar regulator. This is the way we should approach the interrelationship of our field crops, orchards, and cattle — and we should take our cue from this when it comes to actual practice. In our final session together, we will try to get far enough so that our friends in the Experimental Circle can work out things from there.

## LECTURE EIGHT

Koberwitz

Monday, June 16, 1924

In this last lecture, I hope to round off the course as much as possible and also give some practical advice. In the question and answer session to follow, we will still be able to add a few things according to your particular needs. The practical matters that we will be dealing with today are not easily expressed as general formulas or the like, since they are subject to a great deal of individualization and personal discretion. And that is why it is so important to acquire spiritual-scientific insights into the subject; they enable us to adapt our practices to individual situations in an intelligent manner.

Just think how little insight exists today in the extremely important area of animal nutrition. And in fact, this state of affairs does not improve much, no matter how many indications are given about what should be fed. I am convinced that it could be greatly improved, however, if agricultural education were to place more emphasis on gaining insight into the fundamental nature of animal nutrition. I would like to make a start in that direction today.

As I have already pointed out, what food signifies for animals and human beings is always completely misunderstood. The important point is not the crude process whereby foodstuffs are taken up from outside and then deposited in the body, as people always imagine, even if they also imagine all kinds of transformations along the way. Basically, people imagine that first the food is there outside, then the animal eats it, and then what the animal can use is deposited inside the body, and what it cannot use is excreted. As a consequence, people are concerned about not overburdening the animal's digestion, and about

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giving it nourishing fodder that contains as many nutritive substances as possible. And people who are fond of making materialistic distinctions certainly also distinguish between actual nutrient substances and other substances that support the body's so-called "combustion process." All kinds of theories, with all kinds of practical consequences, are based on these ideas. As you can imagine, some of them work and some of them don't; or they work only for a while and then have to be modified. What else can you expect?

People talk about a combustion process going on inside the body, but this is nonsense, of course. When some substance or other combines with oxygen inside an organism, that process is totally different from a combustion process. Combustion is a process in non-living nature. Just as a living organism is something different than a quartz crystal, so too is what is designated as combustion within the organism something different than the dead process of combustion that takes place outside; in the organism it is something alive and even sentient.

When people talk about combustion going on inside the body, this causes untold mischief, even though they may only be expressing themselves sloppily. Sloppy talk is harmless as long as people have the right idea in mind and do things even halfway appropriately out of instinct or tradition. But when what I've often called "psychopathia professoralis" starts to take over, it turns this sloppy talk into all kinds of ingenious theories. Then when people start to act in accordance with these theories, they totally miss the mark. What they talk about becomes something totally different from what is really going on in plants and animals. It is a typically modern phenomenon for people to do things that are totally at odds with what is happening in nature. That is why we need to spend a bit of time looking at what's really involved here.

Let us consider something we talked about yesterday, namely, that a plant has a physical body and an etheric body and is surrounded by astrality. The plants themselves don't reach the stage of astrality, but it hovers around them. When a plant enters into a particular connection with this astrality, as is the case in fruit formation,



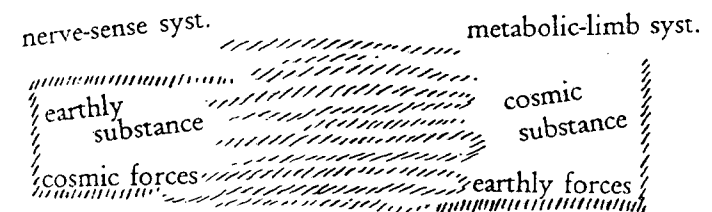
something nourishing is produced, something which can then support the astrality that is in the animal or human organism. If you really understand this process, you will be able to tell simply by looking at a plant — or anything else — whether or not it is capable of supporting one thing or another in the animal organism. But now I think we need also to look at the other pole, for something of great importance exists there. I have already touched upon this, but it needs to be specially emphasized again here, because we are trying to establish the principles involved in feeding animals. Since that is what concerns us now, let us take the animal as our starting point.

There is not such a clear-cut threefoldness in the animal organism as there is in human beings.<sup>1</sup> In animals, both the nerve-sense system and the metabolic-limb system are clearly defined and distinct from one another, but in many animals the middle, rhythmic system is indistinct; some of what originates in the sensory system gets into the rhythmic system, and so does some of what originates in the metabolism. Therefore, we need to speak differently about animals than we do about human beings. With human beings, it is quite correct to talk about a threefold organism. With animals we can refer to the nerve-sense system localized primarily in the head, and the metabolic-limb system localized primarily in the hind end of the body and the limbs. But in the middle, the metabolism and the nerve-sense system both become more rhythmical than in human beings; they flow into each other. Thus the rhythmic system in animals does not become so independent; it is more like an unclear reverberation of the two polar extremes. In the case of animals, we should actually be talking about a twofold organism, in which the two systems meet and mingle in the middle [see Drawing 21].

Now, everything in the way of substance in the head system consists entirely of earthly matter. (This is also true of humans, but let us stay with animals for the time being.) Earthly matter is already being channeled into the head system during the embryonic period. The embryo has to be organized in such a way that its head acquires its substances from the Earth. So, earthly substance is to be found within the head. On the other hand, the substances of our metabolic-

limb system — everything constituting our intestines, limbs, muscles, bones, and so forth — does not come from the Earth, but from what is absorbed out of the air and warmth above the Earth. That is cosmic substantiality. It is important not to look at a hoof as if it were formed from physical material that has been consumed by the animal and then made its way into the hoof and been deposited there; that is simply not true. The cosmic matter in the hoof is absorbed through the senses and through breathing. And what the animal eats is simply there to develop its forces of movement, so that the cosmic factor can be driven into its metabolic-limb system — right into its hoofs, for instance. These parts of the body are filled with cosmic substantiality.

With respect to the forces, however, the reverse is true. In the head we have to do with cosmic forces, since the cosmos is perceived with the senses, which are located primarily in the head. In the metabolic-limb system, on the other hand, we have to do with earthly forces; with cosmic substances, but earthly forces. Just think how we are constantly engaged with earthly heaviness when we walk, how in fact everything we do with our limbs is connected with the Earth.<sup>2</sup>



DRAWING 21 (COLOR PLATE 8)

If you are going to use cattle as draft animals, it is really quite important to feed them in such a way that they take in as much cosmic substantiality as possible, and also to make sure that the fodder passing through their stomachs provides plenty of forces to guide this cosmic substantiality into their limbs, into their muscles and bones. Similarly,

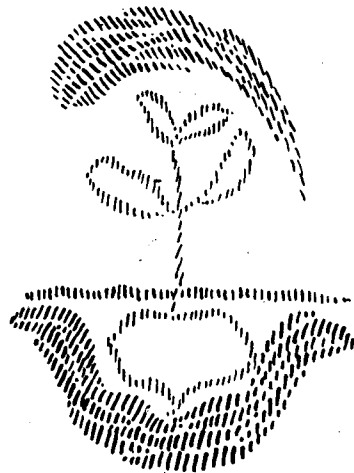
you must know that the substances used by the head have to be derived from the fodder itself, and that the fodder digested in the stomach has to be guided into the head. In this respect it is the head, and not the big toe, that is directly dependent on the stomach. And you must understand that the head can assimilate the nourishment it receives from the body, only if it can also obtain the forces from the cosmos.

That is why it is important to not keep animals confined in dark stalls where no cosmic forces can reach them, but to let them out to pasture and give them opportunities to interact with their surroundings through their senses. Just picture an animal in some dark and airless building, standing in front of a feeding trough that contains whatever human wisdom has doled out. If it never has the opportunity to be outdoors, this animal will be very different from an animal that can roam freely and use its senses — its sense of smell, for instance — to seek out the cosmic forces. It will be very different from an animal that actively searches for its own food. The animal left in front of the trough will not immediately show that it has no more cosmic forces; it still inherits some, but this deficiency will gradually become apparent in its descendants. These animals will become weak because of their head; that is, they will not be able to nourish their bodies because they will be unable to absorb the cosmic substances that their bodies require.<sup>3</sup> These things will show you that what is important is not to come up with generalities about what to feed in this or that instance, but rather to understand what value particular feeding methods have for the animal's entire being and constitution.

Let's go on now. We have seen that the head contains earthly substantiality. Thus, if you consider an animal's noblest organ — its brain — there you have earthly substantiality. Our own brain also contains earthly substantiality; the forces are cosmic, but the substances are earthly. Now, what is the purpose of this brain? It serves as a foundation for the ego. Animals, however, do not yet have an ego. Let us be sure we get this right: The brain serves as a foundation for the ego, yet the animal has no ego — its brain is only on the way to ego-formation, while in human beings the process goes much further. So, how does the brain come about?

Consider the body's organic processes. Everything that goes on in there, everything that appears in the brain as earthly matter, is actually an excretion from these organic processes. Earthly matter is excreted in order to serve as a foundation for the ego. Now, on the basis of the process in which foodstuffs are consumed, digested, and distributed by the metabolic-limb system, a certain amount of earthly matter is able to reach the head and the brain, and in this way a certain amount of earthly substance is actually deposited in the brain. But the foodstuffs are not only deposited in the brain, they are also excreted by the intestines along the way. Whatever cannot be further assimilated is deposited in the intestines. And here we encounter a relationship that you may find paradoxical, but we cannot ignore it if we want to understand either the animal or the human organization. What is the brain mass, actually? The substance of the brain is simply intestinal content taken as far as possible, whereas premature brain deposits pass out through the intestine. The contents of the intestine, as regards their processes, are very much related to the contents of the brain.<sup>4</sup>

It would be crass to say that what is present in the brain is simply a more highly developed manure pile, but objectively this is quite correct. The manure is transformed by means of the organic process into the noble substance of the brain, where it becomes the basis for the development of the ego. With human beings, as much as possible of the "gut manure" is transformed into "brain manure," because human beings have their ego on Earth. With animals, less is transformed, so more is left behind in the gut manure, which is then used as fertilizer. More ego is left behind as potentiality. Because animals don't reach the ego stage of development, animal manure contains more ego-potential. Animal manure and human manure are two completely different things. Animal manure still contains ego-potential, and so we discover that when we fertilize, when we bring manure to the plant roots, we are bringing ego to the roots. If we draw a complete plant — with the roots down here and the leaves and blossoms up here [Drawing 22] — we find that the astrality develops up here in interaction with the air, and that the plant's ego-potential develops down here in interaction with the manure.



DRAWING 22 (COLOR PLATE 8)

A farm of this kind is truly a living organism. Up above, through the presence of forest and orchard, it develops its astrality. When the animals feed properly on what is above the Earth, they then develop the proper ego-forces in their manure, which in turn allow the plants to properly grow out from their roots in alignment with the force of gravity. This is a wonderful interaction, and we must try to come to an ever better understanding of it.

Because of this interaction, you see, a farm is a kind of individuality, and you will soon realize that your animals and plants should participate in this as much as possible. Nature is impaired in a certain sense if the farm animals are eliminated and fertilizer is brought in from Chile, instead of manure being supplied by the animals on the farm.<sup>5</sup> You then step out of what used to be — and should continue to be — a self-contained cycle. You must arrange things so that the cycle becomes self-sustaining. You must simply have the right number and

kinds of animals on a farm so that you get enough of the right manure. And you must also make sure that you plant what your animals will instinctively search out and want to eat.

Setting up experiments naturally becomes very complicated here, because they have to be individualized. What we must do, therefore, is establish general guidelines on how to set up such experiments. After many experiments, practical rules will emerge, but they will all have to be derived from our primary guiding principle, which is to make each farm so self-contained that it can become self-sustaining, albeit not completely. Why not completely? Because studying things objectively in the sense of spiritual science does not turn people into fanatics, and under present economic conditions it is impossible to achieve this completely. Nevertheless, as far as is possible, we should try to achieve it.

So, by now we should be able to discover in concrete terms how the animal organism relates to the plant organism — that is, to the plant as fodder. Let us consider this first in quite general terms.

Look at the root. As a rule, the root develops within the soil, which the manure has permeated with incipient ego-force. Simply by virtue of how it exists in the soil, the root absorbs the incipient ego-force, and this process is helped if it can find the right amount of salts in the soil. Let's assume that we do not know anything about roots except what we have just considered. From this alone we can see that roots will be the form of nourishment that will most easily find their way to the head, when they have entered the body through the digestive system. Therefore, when we want to provide actual material substances for the head, we ought to provide roots as fodder, so that the cosmic forces working through the head will find the right material for their formative, sculptural activity. You can imagine someone putting it like this: "I must give root fodder to an animal that needs substances conducted to its head, so that it can become as active as possible in its senses, so that it can develop a cosmic relationship to its cosmic surroundings." Don't you think immediately of the calf and the carrot? When a calf eats a carrot, you have brought the whole process to completion. If you know what things look like and how they grow,

making a statement like this will lead you directly to what ought to be done. You simply need to know how this process works.

Let us continue. Once the substance has really been guided into the head, once we have fed the calf with the carrot, then the reverse process must be allowed to begin. In other words, the head must now be able to work as force, as will, and thus also be able to engender forces in the organism, so that these in turn can be worked into the organism. It is not enough for the carrot manure to be deposited in the head; from what is deposited there, that is, from what is in the process of being broken down, force-radiations must enter into the body. In other words, you need a second kind of fodder, which will let a particular part of the body — in this case, the head — work upon the rest of the body in the right way, after it has itself received what it needs.

So, suppose I've supplied the carrots, and now I want the body to be properly permeated with forces that can develop from the head. I need something that naturally has a ray-like form, or else something in which this radiating tendency is gathered together and concentrated. So

what do we need? In addition to carrots, we need a second kind of fodder from a plant with a raying-out tendency that is then gathered together again. What comes to mind is flaxseed and things like that. If you feed a calf a combination of carrots and flaxseed — or some other pair of complementary fodders such as new hay and carrots — you will get something that will regulate the entire organism and set the animal on its proper path of development.

We must try to give young cattle the kinds of fodder that promote the ego-force, and also promote what proceeds from above down-

wards, the astral filling-out. This applies particularly to anything which has long stems and is simply left to its own development; in other words, to anything long-stemmed that turns into hay [Drawing 23]. Thus, in looking not only at this particular issue, but also at the farm as a whole, we must be aware of what happens to each single thing as

DRAWING 23  
(COLOR PLATE 8)

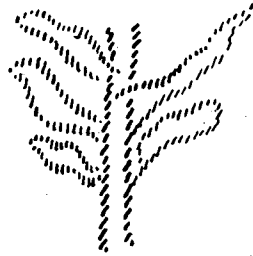


it makes its way either from the animals into the soil, or from the plants into the animals.

Let's carry on and look at an animal that needs to be strong in the mid-region, where the head or nerve-sense system develops in the direction of the respiration, and where the metabolic system develops in the direction of the rhythmic system; that is, where the two interpenetrate. Which animals need to be strong in this region? The dairy animals must be strong in this particular area, in order for milk production to take place. To ensure good milk production, we have to make certain that there is a proper interaction between the stream flowing from the head toward the tail, which is primarily a stream of forces, and the stream flowing from behind toward the front, which is primarily a stream of substances. If the stream flowing from behind forward is worked through as thoroughly as possible by the forces flowing from front to back, then you will get good milk and a lot of it. This good milk is particularly a product of the metabolic process; it is a substance whose preparation has made it very similar to the sexual metabolic process, although it has not gone through the sexual system itself. Milk is simply a transformed sexual gland secretion, a substance on the way to becoming a sexual secretion that has been transformed in its encounter with the head forces. There is nothing incomprehensible about this process; it is quite possible to understand what is taking place.<sup>6</sup>

For processes of this kind, we need to look for a type of fodder that does not work as strongly in the direction of the head as roots do, which have absorbed the ego-force. However, since it also has to remain related to the sexual force, it should not have too much astrality, not too much of the blossoming and fruiting tendency. This means that for milk production, we need to turn to what lies between the flower and the root, to what is green and leafy, to everything that develops as foliage [Drawing 24]. Let's assume that I am giving leafy fodder to a dairy cow because that's what is available. I now want to increase her milk production; I believe this is possible. So what do I do? I use plants that take the fruiting process — the process that occurs in flowers and in fruits — and bring it into the leafing process. This is

what the pulses do, for example, or especially the different varieties of clover. With respect to its substance, what is fruit-like in clover develops just like a leaf.<sup>7</sup> With this treatment you won't notice too much difference in the cow herself, but when she calves, this calf will then become a good dairy cow. Reforms in feeding practices usually take a generation to work themselves out.



DRAWING 24 (COLOR PLATE 8)<sup>8</sup>

Now in this area of feeding, there is one thing that must be particularly kept in mind. When the old traditions of instinctive wisdom vanished, people held onto a few things in this area, just as doctors have held onto a few remedies without knowing why anymore, simply because they had always worked. People still know a few things from the old traditions, but they no longer know why the things were used. And so for the rest, they experiment; they try this for the milking animals, and that in order to fatten the animals, and so on. The result is similar to what happens when things are tried out on humans, especially when this experimentation is simply left to chance. Just think what happens when you are with many friends and happen to have a sore throat. Each of your friends gives you something or other for it, and in half an hour you've collected enough to stock a whole pharmacy. If you took all of those things, they would cancel each other out, and you would probably end up with an upset stomach, and still have a sore throat. In these circumstances, something quite simple becomes something quite complicated.

It is similar when you start experimenting with all kinds of fodder. You try something out, and it works in one respect but not in another.

So you add a second kind of fodder, and then a third, until you have any number of fodders, each of particular value for young animals, or animals to be fattened, or whatever. Very soon it all gets so complicated that you no longer have an overview of the situation; you can no longer see how the forces interact. Or the effects of the different things start to cancel each other out. That is actually what often happens, especially with people who take up farming in a semi-academic way. They look it up in their books, or they recollect what they were taught. They look it all up, but this doesn't help much, because what they read in their books may well conflict with what they are already doing. This situation can only be dealt with rationally by thinking along the lines I have indicated. In that way the question of animal nutrition is considerably simplified, so that it is possible to have an overview of it.

You can understand the way carrots and flaxseed work. It is comprehensible and you don't get everything mixed up; you comprehend the effect of what it is you are feeding. Just think what it would be like to do everything in farming as consciously and deliberately as that! That is how you will learn to simplify rather than complicate the feeding of your animals. A lot of what has been discovered through trial and error is perfectly correct, but unsystematic and imprecise. The kind of precision applied nowadays is actually imprecise, because everything gets muddled up together and nothing is understood. On the other hand, the interactions I have presented are simple enough that you can clearly trace them right into the animal organism.

Let's take another example; let's turn to the flower and the fruiting process within the flower. But we can't stop there, we must also look at the fruiting process in the other parts of the plant. It is characteristic of plants — and that is why Goethe was so fond of them — that the potential to develop any of their parts is present throughout their body. With most kinds of plants, in order to get new plants you must take germ of the fruit that appears in the flower and put this into the ground. With potatoes, however, it is different — there you use the eyes of the tubers. In many of our plants the fruiting process is

complete, but not everything in nature is pushed to the final stage. You can always enhance an incomplete fruiting process, however, by means of processes that are outwardly similar to outer combustion. Thus, if you feed any chopped and dried tubers, or similar plant parts, these will become more effective if you first spread them out in the sun to steam a bit. There the latent tendency is taken a little further toward fruiting.

A wonderful instinct is involved here. If you look at the world intelligently, you might well wonder how it ever occurred to people to cook their food. We usually don't stop to wonder about things that are around us all the time, but this is a legitimate question. How did people ever get the idea to cook their food? Well, it happened because they gradually discovered that the processes inherent in cooking — in burning, warming, drying, steaming, and so on — play a role in every fruiting process. These processes make the flowers and seeds in particular — but indirectly also all the upper parts of the plant — especially suitable for stimulating the kind of forces that are needed by the animal's metabolic-limb system. Even when the flower and seed parts of the plant are given as fodder without being cooked, they work on an animal's digestive system, primarily by means of the forces they contain rather than through their substantiality. The metabolic-limb system requires earthly forces, and we must meet this need.

Think of the animals that graze in the Alps. They are not like the animals on the plains, they have to walk around under difficult circumstances, since the ground isn't level. It makes a difference whether animals have to walk on level or sloping ground. Animals in the mountains need something to help them develop the forces in their limbs that their will must exert. Otherwise they would not be good for work or for milk or meat. You must therefore make sure that enough of their fodder comes from the aromatic alpine herbs, in which nature itself has enhanced the flowering and fruiting parts through the sun's cooking process. And further cooking or simmering of the fodder will also bring force into the limbs. It is best to use what comes from the fruiting and flowering parts of plants, especially of plants that have a strong natural tendency to flower and fruit, plants that do not develop

much in the way of leaves but quickly bloom and bear fruit. These plants, which place little value on leaf development, and which allow flowers and fruit to proliferate, should be cooked.

And it would also be good if people would sometimes take note of these things for themselves. We would then have fewer instances of people who slide into indolence by telling themselves that if they are active the whole day they will not be able to become real mystics. Such people are convinced that they can become real mystics only if they stay quiet and still, and are not stimulated by themselves or their surroundings. In effect, they say to themselves and their surroundings: I can't spare any strength for working, I want to become a real mystic, and so I will also arrange my diet so that I become more mystical. They thus become raw food enthusiasts; they stop cooking altogether and eat only raw foods. These things are deceiving, however, and do not always work out the way people expect. People who already have weak constitutions, who are already on the way to becoming mystics of this sort, will of course make great progress. They become more and more lethargic, that is to say, more and more "mystical." (And since what happens to people also applies to animals, we know what will make our animals alert and lively!) With people, however, it can also turn out differently. It can happen that they have strong physical constitutions and only later develop the eccentricity of wanting to become mystics. In that case, the inner forces that are developed by working on the raw food will simply augment the forces these people already have. This will not harm them. In fact, if in this way they summon up and transform forces that would otherwise remain below and cause rheumatism and gout, they will become all the stronger.

These things all have two sides, like the two pans of a balance. We have to learn to apply them differently in individual instances — there are no hard and fast rules. The real advantage of a vegetarian lifestyle is that it makes people fundamentally stronger by calling up forces that would otherwise lie fallow in the body. These are really the same forces as those that cause gout, rheumatism, diabetes, and so forth. When only plant foods are eaten, these forces are active in ripening the plants for the human being. But when animals are eaten, these forces are not used



and begin to accumulate in the body. They then begin to act on their own: they deposit the products of metabolism in all kinds of places, or they expel from the organs and claim for themselves certain things that the human being needs, as in diabetes and so on. Without insight into the principles, these things cannot be understood.<sup>9</sup>

And now, on the subject of how to fatten animals, we must imagine that we are filling a sack with as much cosmic substance as possible. Oh, those fat pigs — what heavenly creatures they are! For with the exception of their nerve-sense systems, their fat bodies consist entirely of cosmic substance, not earthly substance. They take in large amounts of cosmic substance from all sides. What they eat is only needed in order to distribute this cosmic substance to the different parts of their bodies. Pigs must eat in order to have the forces for distributing the substance that is drawn from the cosmos. And the same is true of other fattening animals. You will find that such animals put on weight when you give them fodder with an inherent fruiting tendency — preferably treated further by boiling or steaming — and also when you give them fodder where the inherent fruiting tendency has been enhanced by cultivation, as with fodder beets or turnips, for instance, which grow larger under cultivation than they did in the wild.

So, what should we feed the animals that we want to fatten? Well, they need something that helps as much as possible to distribute the cosmic substance; that is to say, something with a strong fruiting tendency, which has also had some further treatment. This condition is largely met by certain kinds of oil-seed cakes and the like. But we can't completely ignore these animals' heads; some earthly substances still have to get through to their heads. We need to supplement their fattening feed with something else, though only in small amounts since in this case the needs of the head are minimal. Thus we should add something root-like to the fodder of these animals, even if only in very small amounts.<sup>10</sup>

In general, we can say that what is root-like has a function in relation to the head, what is flower-like has a function in relation to the metabolic-limb system, and what is leaf-like has a function in relation to the substantiality of the human rhythmic system. But there

are also substances of another sort, pure substances that have no specialized function in the body. what we also need to provide — because they work on all parts of the animal organism — are the salt-like substances. Since salt makes up only a very small proportion of what both humans and animals consume, you can see from this that it is not always the quantity that counts but rather the quality. Small amounts will suffice if the quality is right.

Now, there is still one especially important subject I want to mention. I would like to ask you to carry out very precise experiments in this area, experiments which can also be extended to include human beings, if they happen to like this food. You know that tomatoes were introduced as a food only relatively recently. Many people are very fond of them, but they are also an extraordinarily important thing to study. You can learn an extraordinary amount by studying tomato production and consumption. People who have given the matter a bit of thought — and there certainly are such people nowadays — believe that tomato consumption is highly significant for human beings. This is true, and it could also be said for animals, for it would be quite possible for animals to get used to eating tomatoes.

Tomatoes have a significant effect on everything that tends to separate itself from the organism and develop an independent organization within the body. Two things follow from this. On the one hand, it confirms the statement of an American researcher, namely, that under certain circumstances, adding tomatoes to the diet can have a beneficial effect on an unhealthy human liver. Because the liver is the organ that works most independently in the human body, when the liver is diseased, especially in animals, it could also be treated in general with tomatoes. Here we gain insight into the relationship between plants and animals. On the other hand, therefore — let me say this in parenthesis — people diagnosed as having cancer should immediately be forbidden to eat tomatoes, because cancer from its very inception makes a certain part of the human or animal body independent of the rest of the organism.

But now we need to ask ourselves, why do tomatoes in particular have such a strong effect on everything that tends to be independent,

on everything that specializes and separates itself off from the rest of the organism? This tendency is directly related to what tomatoes prefer and require for their own growth. Tomatoes feel most at home when they are given manure or compost that is as close as possible to the form in which it comes from the animal or other source. They prefer raw compost that hasn't had much chance to be transformed through natural processes. If you just throw all kinds of scraps together onto an untidy heap, and give the heap no further treatment or preparation, you'll find that the most beautiful tomatoes will grow there. And if you were to use compost made from tomato plants, that is, if you were to let the tomatoes grow in their own compost, they would grow even better. Tomatoes have no desire to step outside of themselves, no desire to step outside of the realm of strong vitality. That's where they want to stay. They are the least social beings in the entire plant kingdom. They do not want anything from strangers, and above all, they do not want any fertilizer that has gone through a composting process; they reject all that. This is the reason that they can influence what works independently within the human or animal organism.

And in this respect, potatoes are somewhat similar to tomatoes. They too act extremely independently, that is to say, they tend to pass very easily through the whole digestive process and then enter the brain and make it independent; they make it independent even of the influences of the other organs in the human body. From the time potatoes were first grown in Europe, excessive potato consumption has contributed toward making human beings and animals materialistic.<sup>11</sup> We should eat only enough potatoes so that our brain and our head in general are stimulated. Potato consumption in particular should not be overdone. Knowing these things brings agriculture into intimate relationship with society in an objective way. And this is what is so important, that agriculture be related to the whole of social life.

In these lectures, I have only been able to supply certain guidelines, of course, but I am sure that they will provide a foundation for many different experiments extending over a long period of time, and that they will lead to brilliant results if worked into your

agronomical practices on an experimental basis. That should be a guideline for dealing with the material presented in this course. I am in complete agreement with the decision of the farmers participating in this course that what you have learned here should not leave this group but should serve as a basis for experimentation — and that the farmers' association, the Agricultural Experimental Circle — will determine when the experiments have proceeded far enough for this material to be made public.<sup>12</sup>

Because of the admirable tolerance prevailing here, it has been possible for a number of interested people who are not actually farmers to take part in this course. These people will have to recall the well-known opera and put a lock on their mouths, and not fall into the common anthroposophical failing of immediately proclaiming these things far and wide. We have often come to grief because people who were not actually qualified to talk about something simply went around repeating what they had heard. It makes a great difference whether the person talking about these things is a farmer, or someone only remotely connected to farming. You can readily understand this. What would happen if non-farmers started spreading all this around as a new and interesting chapter in the study of anthroposophy? What would happen — and this has already happened with other lecture cycles — is simply that other people, including farmers, would hear about it from the wrong source. Farmers that hear about it from other farmers will merely say, "Pity that they've lost their minds." That is what they will say the first time, and maybe the second. But when farmers actually see something working, they then have a hard time rejecting it out of hand. On the other hand, if they hear about it from people who are not professionals but simply interested amateurs, then you can just as well forget about it; it will have been discredited and will not be able to develop further. For those friends who were only allowed to participate out of general interest, and who are not part of the Agricultural Circle, it is imperative that they exercise restraint, that they keep these things to themselves and refrain from broadcasting them as people so often like to do with anthroposophy. Our dear

friend Count Keyserlingk announced this decision of the Agricultural Circle, and I must say I support it wholeheartedly.

Now that we have come to the end of these lectures, except for the discussion to follow, allow me first to express my own satisfaction that all of you wanted to come and take part in everything that has been said here, and in everything that should come of this. On the other hand, I am sure I speak for all of us when I say that I hope that what has taken place here will prove to be useful and to have the deepest inner value. But now let us bring to mind two other things. Think of all the effort put in by Count and Countess Keyserlingk and all the members of their household so that this course could happen in the way that it has. That required energy, a sense of purpose, anthroposophical good sense, total involvement in the cause of anthroposophy, self-sacrifice, and much more besides. And, because of the way everything was arranged here, our work together towards great and fruitful goals for humanity, could also acquire a truly festive character. In five minutes we will have yet another opportunity to experience this festive hospitality. Everything surrounding this occasion — last but not least the great warmth and kindness of all the people who work in this house — has provided a wonderful festive setting for our work, so that in addition to having an agricultural conference, we could also celebrate a real agricultural festival. We offer Countess and Count Keyserlingk our most heartfelt thanks for everything they have done for us during these ten days, for everything they have done in the service of our cause, and for their kindness in welcoming all of us here and making our stay so pleasant.

#### FOURTH DISCUSSION

Koberwitz

Monday, June 16, 1924

QUESTION: *Does liquid manure have the same ego-organizing power as solid manure?*

DR. STEINER: What is important is to use them in combination, so that they work together to enhance the organizing forces of the soil. The relationship to the ego applies primarily to the solid manure and not, generally speaking, to the liquid manure. But any ego, even the ego-potential present in manure, needs to work in conjunction with something astral, and the solid manure would not have any astrality without the liquid manure. That is what the liquid manure supports; it has stronger astral forces, while the solid manure has stronger ego-forces. Solid manure is more like the brain itself, while liquid manure is more like the brain's secretion, the brain's fluid aspect, the cerebral fluid.

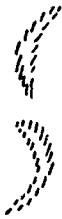
*Could you tell us the right times for making the preparations that require burning?*

DR. VREEDE: We can't give exact indications now — the required calculations can't be done so quickly. In general, the right time for burning insects would be between the beginning of February and some time in August. For getting rid of field mice, the right time this year [1924] would fall in the period from the second half of November to the first half of December; but the periods shift from year to year.<sup>1</sup>

DR. STEINER: The anthroposophical calendar we once started would have to be executed more precisely — then you could follow such a calendar quite exactly.<sup>2</sup>

*When you talk about full moon and new moon, do you mean just the day of the full or new moon, or do you mean the time shortly before and after as well?*

Consider it new moon approximately from the time the Moon looks like this [Drawing 25]. You see the Moon looking like this, and then it disappears. Consider it full moon from the time when the Moon is present as a narrow crescent, like this, and then disappears. Always about 12-14 days.<sup>3</sup>



DRAWING 25  
(COLOR PLATE 8)

*If the insects are not available during the right time for burning, can they be saved and burned later?*

The right time for making these preparations still needs to be determined more precisely. Yes, you can store the insects.

*Do the weed seeds have to be burned in summer, or can that be done at any time?*

Not too long after you have collected them.

*How should we spread a pepper made from insects that never actually come into contact with the ground?*

That too should go on the ground. It is not a matter of physical contact; what matters is the quality that this homeopathic dosage contains. Insects have a totally different kind of sensitivity, and they flee from what develops when such a pepper is strewn on the ground. It makes no difference if the insects do not actually touch the ground.

*What about frost damage in farming, especially frost damage to tomatoes? What is the cosmic context of frost?*

Tomatoes need to be kept warm if you want them to get nice and large. They suffer terribly from frost. As to frost in general, you need only look at its effects. These arise because of a significant strengthening of the cosmic influences that are at work in the Earth. At certain temperatures, these cosmic influences are normal and are

exactly right for the plants. But if we get a frost that lasts too long and penetrates too deeply, then the celestial influence on the Earth is too strong, and the plants tend to spread out in all directions and become stemmy and spindly. Thus, because they are so thin, they may quickly succumb to the surrounding frost. When it goes too far, frost is extremely damaging to plant growth because too much of the heavens gets into the soil.

*Should we sprinkle the ashes of horseflies on the bodies of the animals or only on the pastures?*

Spread them where the animals feed. Since these ashes are all intended as supplements to the manure, they are always spread on the fields.

*What is the best way to get rid of couch grass? Couch grass seeds are very hard to get.<sup>4</sup>*

When couch grass propagates the way you have in mind, without ever making seeds, it will eventually disappear by itself. If you can't get any seeds, then you don't really have a couch grass problem. On the other hand, if it keeps spreading underground, then it can also be combatted. You will be able find the few seeds that are required; after all, people also find four-leaf clovers!

*Is it permissible to preserve bulk fodder by means of electric currents?*

What do you hope to accomplish by that? Here, of course, the whole role of electricity in nature needs to be considered. It's of some comfort to know that at least in America, where people are developing a better gift of observation than here in Europe, voices can be heard saying that human beings will no longer be able to grow and develop as they used to, now that the whole atmosphere has electric currents and radiations running through it. This has an effect on the entire development of the human being. It even makes a difference whether the trains in a given area have steam engines or are electrified. The effects of steam can be recognized, but electricity has a terribly unconscious way of working — people simply cannot tell where certain

things are coming from. Nowadays both radiant and conducted electricity are being used above ground to carry news as quickly as possible from one place to another. The effect of the radiant electricity on the people living in the midst of it will be that they will no longer be able to comprehend the news that is transmitted so quickly. Electricity gradually wipes out comprehension. This effect is already noticeable today; you can already see that people have a harder time comprehending things that come toward them than they did a few decades ago. It is a hopeful sign that at least in America some insight into these things is evident.

Now, as often happens, when something new appears on the scene, it is soon used for healing. But then it also is taken advantage of by the "prophets." When something first appears, it is strange how things that are a matter for clairvoyance are reduced to a mundane level. People come along and make all kinds of wild prophecies about the healing power of electricity, even though earlier it wouldn't have occurred to them at all. Things come into fashion this way. As long as it had not been discovered, it was impossible to think of healing by means of electricity. Now all of a sudden it's a method of healing, not just because it is available, but because it has become fashionable. Radiant electricity is sometimes not much more of a remedy than if you were to take tiny, thin needles and poke the patient with them. Any healing that occurs is not due to the electricity but to the shock effect.

You mustn't forget that electricity always works most strongly on the head-organization of humans and animals (and correspondingly on the root-organization of plants). If you preserve fodder by passing electricity through it, the animals that eat it will eventually become sclerotic. This is a slow process, you won't notice it right away. You might notice at first that the animals tend to die sooner than they ought to, but you'll blame it on all kinds of other things; you won't trace it to the electricity. Electricity is really not something that can work on living things and do them any good. You see, electricity lies one level below the living, and the higher a given form of life is, the more it tries to ward off the electricity. If you constantly make an

organism defend itself unnecessarily, it gradually gets nervous and fidgety and sclerotic.<sup>5</sup>

*What does spiritual science say about preserving fodder by letting it sour — about ensiling in general?*

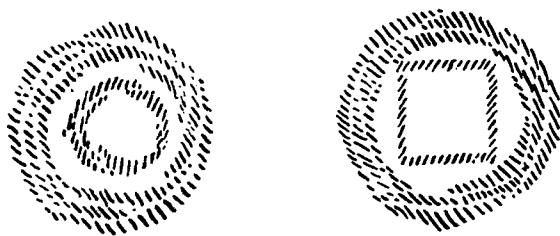
If any salt is used in these kinds of processes, it does not make too much difference whether you add the salt in preparing the fodder, or right at feeding time. If you have fodder that does not contain enough salt, so that the fodder is not brought to the places in the body where it's needed, then ensiling is a good thing. Suppose you have fodder beets. We have seen that roots are particularly well suited for working on the head-organization, so for certain animals, especially young ones, they are an excellent fodder. However, if in your locality you notice that such fodder makes the animals shed their hair too soon and too strongly, then you should salt the fodder, because you know that not enough of it is being deposited where it ought to be. The fodder is not getting far enough. The general effect of salt is to ensure that the food gets to wherever in the body it is needed.

*What about making silage out of beet foliage and other green fodder?*

In this case, you need to make sure to get the optimum result and not go beyond that. In general, ensiling won't have any harmful effects unless it is carried to extremes, since the salt-like components are actually the ones that undergo the least change inside the body.

As a general rule, animal constitutions — and human ones to an even greater extent — completely transform what they take in. For example, it is mere prejudice to believe that any of the protein that enters your stomach is of further use to you in that form. The protein has to be totally transformed into dead substance, and then turned back into protein by your own etheric body. The etheric body changes it into specifically human or animal protein, as the case may be. Everything that enters a living organism has to be transformed. This even applies to ordinary warmth. I can sketch it schematically like this [see Drawing 26]: Here is a living organism, and here is the warmth surrounding it. Here is a piece of dead wood — also once part of a

living entity, but now dead — and here is the warmth around it. In the case of a living organism, the warmth does not simply penetrate in a little bit, nor does it go straight through the organism; rather, as soon as the warmth reaches the organism, the organism starts to work on it and to transform it into warmth of its own. That's the way it has to be. In the case of the piece of wood, the warmth simply penetrates it and stays the same inside the wood as it is outside in the mineral world. But if warmth were to enter into us without being changed, which is what happens in the case of the wood, at that moment we would catch cold. Nothing that comes into a living organism from outside can stay the way it is; it must be immediately transformed.



DRAWING 26 (COLOR PLATE 8)

But this process occurs least of all with salt. That's why you cannot do too much damage with salts, when you use them for ensiling fodder as you suggested. If you overdo it, your animals will refuse to eat the fodder because of the taste. If ensiling is needed for purposes of preservation, then this is a sign that the process is justified to a certain degree.

*Is it advisable to make silage without salt?*

That is a process that has gone too far. You might say it is a super-organic process, and it can be very harmful under certain circumstances, if it has gone too far.

*Are the animals harmed by the whiting that is used to counteract the souring effects?*<sup>6</sup>

Some animals cannot tolerate whiting at all; it makes them sick. Other animals can tolerate it, but at the moment I can't tell you which ones they are. As a general rule, though, it is more likely to harm them than help them.

*Doesn't it weaken their digestive juices?*

Yes, it makes them ineffective.

*I would like to ask if it isn't very important what a person's frame of mind is in these matters. I mean there is a big difference between sowing grain and spreading something destructive. The attitude must be considered. When someone uses the methods you introduced against insects, isn't the effect on karma much greater than if the person gets rid of the animals each time, for instance by mechanical means?*

Well, with regard to the attitude, surely it is basically a matter of whether the intentions are good or bad. But what do you mean by "spreading something destructive"? You must take into account the whole way in which these things have to be thought about. Consider the way in which today's lecture was given. I showed you, for instance, how you can know something about a subject and even recognize it outwardly, how you can recognize what kind of process flaxseed and carrots undergo in an animal's body just by looking at them. In order for something like this to become a reality for you, you have to go through a kind of objectifying process — and this is scarcely possible if you have not permeated yourself with a certain amount of piety. Then you will be doing these things in the service of humanity and the universe. Your attitude could lead to harm only if you were to actively bring in bad intentions. As long as morality in general is being encouraged, I cannot imagine how there could be any negative effects. Do you think it would somehow be less bad to simply chase after the animals and kill them?

*I just wondered whether the means of destruction — mechanical means or cosmic influences — whether that makes any difference.*

Well, at that point things get very complicated, and they can only be understood if you look at them from a broader perspective. Suppose you catch a fish in the ocean and kill it. There you've killed something — you've done something that takes place on one particular level. But now suppose that for some reason or other you scoop up a whole bucket of seawater, in which there is a lot of fish spawn; there you end up killing a whole multitude of life. What you have done there, however, is something quite different from killing that one fish; it is a process that takes place on a quite different level. At the stage of the mature fish, a certain process in nature has been brought to completion. Undoing that, causes disruption. But interrupting an unfinished process — one that has not yet come to an end in a mature organism — is not the same thing.

So your question can be reduced to this: What wrong am I doing by making this pepper? For what you destroy by *applying* the pepper is no longer relevant here — that involves a different level. The only thing that could come into consideration is what you need for *making* the pepper, and in most cases you will destroy far fewer animals by making pepper than you would if you tried to catch them all and kill them by some other means. If you think about this question practically — not in the abstract — I am sure it will not seem so terrible to you.

*Can human feces be used, and if so, how should they be treated before using them?*

They should be used as little as possible, of course, because the benefit is very slight in comparison with animal manure, and they can be much more harmful than any other kind of manure. If you insist on using them, the amount naturally available on a typical farm is plenty. In fact, there you have a measure for how much can be used without harm: If you mix what comes from the people living on the farm with all the manure that comes from the animals and so on, that gives you an upper limit of what should be used. It is utter foolishness when

human manure is used extensively in the vicinity of large cities, for in these cities there is really enough for an enormous farm. How can anybody accept the crazy idea of using all the human manure from the whole city of Berlin, for example, on a small area right outside the city? Just eat the plants that grow there — they will show you what happens. Try it with asparagus or something else that is honest and upright, and you will soon see. You also have to take into account that this manure can be especially harmful if applied to things that are eaten by animals. When what comes from such plants passes through the bodies of animals, a lot of it remains at the same level as the asparagus does when it goes through a human body. Out of sheer ignorance, an awful lot of harm has been done along these lines.<sup>7</sup>

*How can you get rid of swine erysipelas?*

Well, that is a veterinary question, and I have not considered it yet because nobody ever asked me before. However, I think you could treat it with an external application of stibnite — antimony ore — in the right dosage. That is a question of healing; that is a real disease.<sup>8</sup>

*Will those powders also get rid of hybrids, such as wild radish?<sup>9</sup>*

The powders I talked about only have an effect on the plant species from which they are derived. Thus, if a plant really is a cross between two species, it cannot be affected. Symbioses will not be affected.

*What do you think of green manuring?*

It has its good points, especially if it is used more for fruit crops. Such things cannot be applied across the board, but green manuring does have its uses in certain cases. It should be used when you want to strongly reinforce the growth of the green leaves and shoots. If this were your intention, you could supplement your manuring with a little green manure.

## ADDRESS TO MEMBERS OF THE AGRICULTURAL EXPERIMENTAL CIRCLE

Koberwitz

Wednesday, June 11, 1924

First of all, let me express my profound satisfaction that the Experimental Circle proposed by Count Keyserlingk has now been formed and has also been expanded to include all those concerned with agriculture who were present at the first meeting.<sup>1</sup> This all began when Herr Stegemann, in response to various requests, expressed his willingness to share something of what he and I had discussed over the past few years regarding all kinds of guidelines for agriculture, as well as something of his own admirable efforts to try out some of these things on his farm. This led to the discussion between our good friend Count Keyserlingk and Herr Stegemann, which in turn led to a conversation in which they formulated the resolution that was read aloud just now. That is how we have been brought together again today.

It is deeply gratifying that a group of people have now come together as a carrier for the experiments involved with the guidelines to be given here in these lectures, so that these guidelines — and they cannot be more than that — can be confirmed and demonstrated in practice. One thing we must be aware of, however, on the occasion of such an auspicious beginning, is the need to make use of the experience we have gained from our efforts in other practical fields within the anthroposophical movement; namely, to avoid the mistakes that became so apparent during the years when the transition was made from anthroposophical activity that was more central, so to speak, to activity that was more peripheral, that is to say, to the introduction of

what anthroposophy can and should be in the various fields of practical endeavor. In particular, of course, our experience in introducing anthroposophy into the general scientific world will be of relevance to the work that this agricultural community will have to accomplish.

You see, when it came to that transition, the people who had in their way been faithfully and devotedly administering our central anthroposophical activity, and those who were standing on the periphery and wanting to apply it to a particular area of practical activity, generally did not see eye to eye. We experienced this particularly when working together with our scientific research institutes. On the one hand there are the anthroposophists as such, those who live within this core of anthroposophy and who live it as their philosophy of life, perhaps even carrying it with inner intensity every minute of the day. These are the anthroposophists who love and live anthroposophy and make it the content of their lives. Usually, though not always, they think something significant has been accomplished when one or more persons have been won over to anthroposophy. In terms of outward activity, all they aspire to achieve is to win people over, and they seem to think that people must let themselves be won over absolutely — university professors of natural science, for instance, who are in the midst of their scientific work. Anthroposophists of this kind, with all their love and good intentions, will naturally imagine that from one day to the next they can also completely win over farmers, along with their land and everything on it and everything the farm produces for market. That is the opinion of the "central" anthroposophists. They are mistaken, of course. And though many of them claim to be faithful followers of mine, it is often the case that they are faithful followers at heart but are deaf to what I have to say at decisive moments. For instance, they don't hear it when I say it is naïve to think that a professor or other scientist nowadays can be won over to anthroposophy from one day to the next. That doesn't work. Such a person has to make a complete break with twenty or thirty years of his or her past, and this means leaving behind a chasm. Things in life must be accepted as they are. Anthroposophists



often think that thinking is all there is to life. But that is not true. These things must be said, so that they may also fall on fertile ground.

On the other hand, those with good and faithful hearts who want anthroposophy to unite with some field of practical endeavor — perhaps even a scientific one — did not make things quite clear to themselves when they began working within anthroposophy. They always proceeded from the mistaken opinion that they should do things in exactly the same manner as science has done them up to now. For example, there are a number of perfectly nice anthroposophists working with us who are active in the field of medicine, and who believed that physicians should apply what comes from anthroposophical medicine in the same way that they had practiced medicine before. (In this regard, Dr. Wegman<sup>2</sup> is a notable exception; she saw very clearly what was necessary within our Society.) So, what did we experience as a result? Here I am speaking not so much of spreading the central core of anthroposophy, but of spreading anything anthroposophical out into the world. We experienced that the people said: "Well, we've been doing this all along, we are the experts here, we can master this with our methods, and we can certainly pass judgment on this. What you bring is in contradiction to what we have found with our methods." Thus they say it is wrong. We experienced that when we try simply to imitate their methods, the scientists say that they can do it better. And in these cases there is no doubt that they can, if only because in recent years science has been consumed by methodology. Methods are all that remain of the sciences. They don't address their subject any more; they have been consumed by their methods. Nowadays we have research, but without any content. Thus we experienced that these scientists with their highly refined methods were furious when anthroposophists came along and did not do anything other than use these same methods. What does this go to show? It shows that in spite of all the nice things we could do, and all the excellent investigations carried out by the Biological Institute,<sup>3</sup> the only thing that came of it was that people were furious when our scientists gave lectures based on these same methods. They were furious because they heard things that they were used to hearing in different

contexts. But we also experienced something else, which is important: Some of our scientists at last brought themselves to depart from the methods they had been copying from others; that is, they used them only half the time, so that in the first part of their lectures they were thoroughly scientific in applying the methods of science. Their audiences became furious: "What are they doing meddling in our business? These impertinent amateurs are meddling in *our* science!" But in the second part, when the speakers got down to real life, presenting it not as something derived in the old way, but as anthroposophical content derived from superearthly worlds, the same people who had been furious suddenly became terribly attentive, were eager for more, and even began to get enthusiastic! They liked the anthroposophy well enough, but they couldn't stand the sloppy patchwork of anthroposophy and science. That will not bring us forward at all.

I am therefore very pleased that as a result of Count Keyserlingk's initiative, the professional farming community has chosen to join forces with the Natural Science Section that has now been founded in Dornach. Like everything else that is being presented here, the Natural Science Section is a result of the Christmas Conference.<sup>4</sup> That means that what should be coming from Dornach, will be coming: we will find the most exact scientific methods and guidelines out of anthroposophy itself.

But I cannot agree, of course, with what Count Keyserlingk said about this professional community being merely an organ of implementation. You will soon realize that the kind of guidelines and indications offered by Dornach will require those who wish to participate, to be full-fledged co-workers at their various posts. In fact, the basis for the work we will have to do in Dornach, will first have to come from you. This will become apparent by the end of the lectures when the first guidelines will have been given. These guidelines will be given in such a way that only on the basis of the answers we get from you, will we in Dornach be able to do something. So from the very beginning, we will need co-workers who are as active as possible, not just people who implement what is proposed.

As a case in point, take what Count Keyserlingk and I have now discussed several times: the fact that a farm is always an individuality, in the sense that one farm is never the same as another. The climate and soil conditions are the very foundation of a farm's individuality. A farm in Silesia is not the same as one in Thuringia or southern Germany. They really are individualities. From the perspective of anthroposophy, generalities and abstractions are of no value, least of all when we want to tackle something practical. It does no good to talk in generalities about practical things like farms. In general, if you keep to things that are concrete, you will be able to figure out what measures need to be taken. Naturally, you must take what is presented in these lectures and use it as you do the letters of the alphabet, because only in bringing things together will you find what you are expecting.

If we want to speak about practical matters based on this group of sixty co-workers, then it really is a matter of coming up with practical advice and guidance for these particular sixty farmers. So the first thing to do will be to pull together what we already know. Only then can the very first series of experiments come about; then we will have to get down to real practical work. For that we will need members who are as active as possible. In fact, that's what we need in the Anthroposophical Society as a whole — real practical people who will not be deterred by the fact that real life involves things that cannot be accomplished overnight. When the "central" anthroposophists, as I called them, think that a professor or a farmer or a doctor can embrace anthroposophical convictions from one day to the next, after having been immersed for decades in a specialized milieu, they are certainly mistaken. This will become clear enough in the case of farming. It is possible that anthroposophical farmers, if they were idealistic enough, could switch over to an entirely anthroposophical way of farming quite quickly, say from their twenty-ninth to their thirtieth year; but what about the fields, and the whole organization of the farm, what about all the people who mediate between the farm and the consumers, and so on. They cannot be made into anthroposophists from one year to the next.

Once you begin to realize this, you can easily lose heart. But that is just the point, that you not lose heart, that you realize that momentary successes are less important than persevering work. Just do as much as is possible in the moment. One person will be able to do more, another less. In the end you will actually be able to accomplish more — paradoxical as this may sound — if the acreage you start out working according to our methods is more limited. After all, there's less to ruin if you are dealing with a smaller area! On the other hand, any improvements that result from the anthroposophical guidelines will take effect very quickly, since you don't have to change as much. Thus also the positive effects will be more apparent than they would on a larger area.

But in a sphere of life that is as practical as farming is, there must really be agreement on things if this group is to have success. And here we have a peculiar fact. The disagreement between Count Keyserlingk and Herr Stegemann at the first meeting has been the occasion for much good-natured discussion. I myself almost began to wonder on that evening whether we shouldn't fetch someone or other — perhaps the anthroposophical Executive Council — in order to keep the peace! Gradually, however, I became convinced of something entirely different, namely, that what occurred there — despite the rough exterior — was actually the foundation for an intimate tolerance among farmers, for an intimate attitude of "live and let live" amongst colleagues. It is actually true that farmers, more so than many other people, need to protect their skin, since all too often it happens that outsiders interfere in things that only farmers can understand. But beneath this exterior, farmers are fundamentally quite tolerant. These are the kinds of things that must be properly appreciated in this group, and I comment on it here only because I really feel it is necessary that we start off on the right foot.

So let me once again express my profound satisfaction with what has been accomplished here today. I believe that we have taken the experiences of the Anthroposophical Society into account, that what has been inaugurated will prove to be a great blessing, and that we can count on Dornach's energetic cooperation with everyone who wants

to be an active participant in this work. We have every reason to be pleased with the beginning we have made here in Koberwitz. And although Count Keyserlingk keeps referring to the burden I have taken on in coming here, I would like to ask — without meaning to start another heated discussion! — just what kind of effort have I had to make? All I had to do was get here and enjoy the best and most pleasant conditions, with everyone else doing the difficult parts. All I have to do is lecture each day — though I do have a healthy respect for this, since it is breaking new ground. My trouble is not so great. When I see all the trouble that Count Keyserlingk and his whole household have gone to with so many of us descending on them, all the countless details that had to be arranged in order for us to be here together, then I must say this seems to me to completely dwarf my coming here and setting myself down in the midst of everything once it was ready. I cannot agree with the Count on this point. Therefore, please direct to him whatever appreciation or gratitude you may feel for the fact that this course is now taking place, and please also keep in mind that if he had not thought and sent his representative to Dornach, if he had not had such an iron sense of purpose, it is likely — considering all that has to be undertaken from Dornach — that this course of lectures in this easternmost corner of the country would never have taken place. I cannot agree at all that the feelings of gratitude should be directed to me — they really belong in the fullest sense to Count Keyserlingk and his entire household.

That is what I wanted to interpose into the discussion.

For the time being, there is not too much more to be said, except that from each one of you who wants to work in this Circle, we in Dornach will need a description of your farm in terms of what is above ground and what is below ground, and how these two things are working together. After all, if our advice is to be of any use, we need to know your circumstances quite exactly. What is meant here is what you know from your daily practice much better than we can know in Dornach: the soil structure of your individual farm, the amount and type of woodland, the crops that have been grown on the farm in the

last few years, how the yields were, and so on. In short, everything that farmers themselves need to know in order to run their farms with intelligence — with peasant wisdom. What is on the farm, and what your individual experience with it has been — that is the kind of information we will need initially. This does not take long to describe. The way in which these things should be put together will emerge in the course of this conference as we touch on further perspectives that will help you comprehend the relationship between what the soil ultimately produces, and the true nature of the soil and its environment. With that I believe I have adequately described what Count Keyserlingk hopes for from the members of this Circle.

In his kind words to us, our esteemed friend the Count has made a delicate distinction between the farmers and the scientists, whereby all the farmers are found in this Circle and all the scientists sit in Dornach. This distinction cannot remain this way. We must grow together. As much peasant wisdom as possible must prevail in Dornach, in spite of the science there; and the science that goes forth from Dornach must be of a sort that makes sense even to the most hard-headed conservative farmer. I hope it was also only a special kind of polite modesty that made Count Keyserlingk say he did not understand me, for I think that Dornach and this Circle will be able to grow together like twins. Indeed, in the end he referred to me as the "grand" farmer. This is a sign that he too feels that we will be able to grow together. But I surely don't deserve that title on the strength of the little bit of manure-stirring that I had to undertake before coming here. The manure, in fact, needed to be stirred for a long time — for longer than I could do it. I could only make a beginning, then someone else had to take over!

Well, that is a trivial point, but at least my background speaks in my favor. I grew up among peasants — I indicated this in my autobiography<sup>5</sup> — and in my heart I'm still at home there. I have also planted potatoes in my time, though on a smaller scale than on the big estate here; and although I did not raise horses, I at least worked closely with our neighbors' pigs and cows. All these things were part of my life for a long time; the fact that I grew up surrounded by agriculture

means that I grew up loving it, which is more important for the present than the little bit of manure-stirring. And in this sense I must also say that I am not in complete agreement on something else, for as I look back over my life, it is not the "grand" farmer who is most valuable, but rather the small farmer, who worked in farming as a peasant boy. If this initiative of ours should now start to happen on a larger scale, and become more scientific, it will have truly "grown out of a peasant's skull," as they say in Lower Austria. This background serves me better than anything I have undertaken since. So I would ask you to think of me as the small farmer who learned to love agriculture, who recalls his peasant heritage and for this reason can understand what lives among farmers today. You may be assured that this is understood in Dornach.

I have always been of the opinion — and it was not meant ironically, though that's how it seems to have been taken — that the alleged stupidity or foolishness of farmers and peasants actually becomes wisdom in the eyes of God, in the eyes of the spiritual world. I have always found what farmers and peasants thought about things much more intelligent than what scientists thought. I always did, and I still do. I would much rather listen to the experiences of people who work directly on the fields, than to all the ahrimanic statistics we get from science. I was always glad when I would get a chance to listen to the peasants, because I always found them extraordinarily wise. And it is just in this area of practicality, of practical implementation, that I have always found science to be extremely stupid. Thus, in order to make this science more intelligent, we in Dornach are trying to bring some "peasant stupidity" into it. Then this stupidity will become wisdom in the eyes of God.

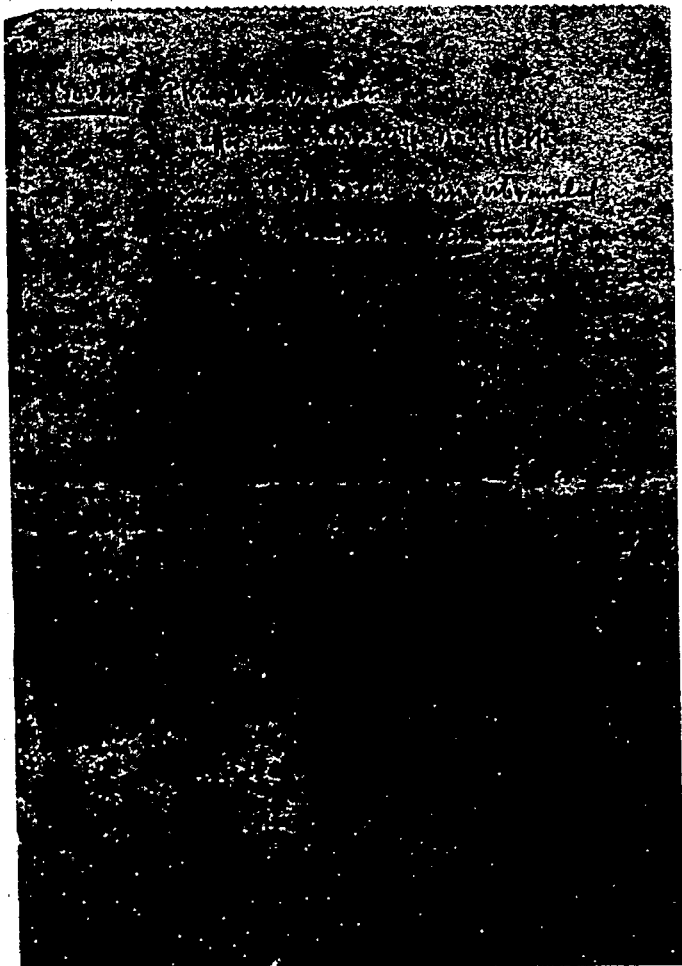
Deciding to work together like this will be a solidly conservative and yet also extremely radical and progressive beginning. It will always remain with me as a lovely memory if this conference can become a starting point for genuine peasant wisdom to enter into the methods of science, which have become perhaps not stupid — that might be too insulting — but which have indeed become dead. Dr. Wachsmuth<sup>6</sup> has also rejected this dead science and has called for a living science

fructified by peasant wisdom. In this sense, may Dornach and the Circle grow together like Siamese twins! It is said that twins feel and think alike, and if we are also able to feel and think alike, then we will make the best possible progress in our common endeavor.

APPENDIX A

RUDOLF STEINER'S HANDWRITTEN NOTES  
TO THE AGRICULTURE COURSE

The following notes were made by Rudolf Steiner in preparation for his freely-spoken lectures; the notes evidently include information from standard reference sources as well as his own thoughts and perceptions.



Soil: plants take up  
water and mineral nutrients.  
inorg. components: nonflammable  
org. components: flammable

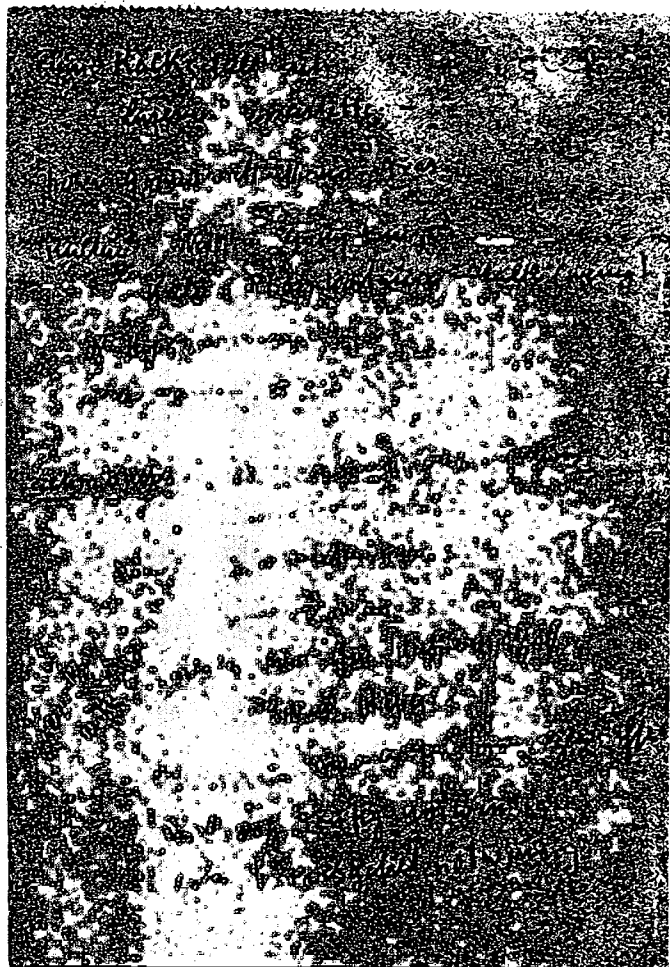
~

Soil holds dissolved substances. Absorption:  
phosphoric acid }  
potash } as fertilizer any time.  
ammonia }

Nitrates: (Chile saltpeter, calcium nitrate) for  
growing plants only, as top-dressing  
in small doses.

**Stony soil:**

**Sandy soil:** 20% clay — warm —  
low moisture holding capacity and capillarity.  
nutrient-poor.  
potatoes, rye, lupines.



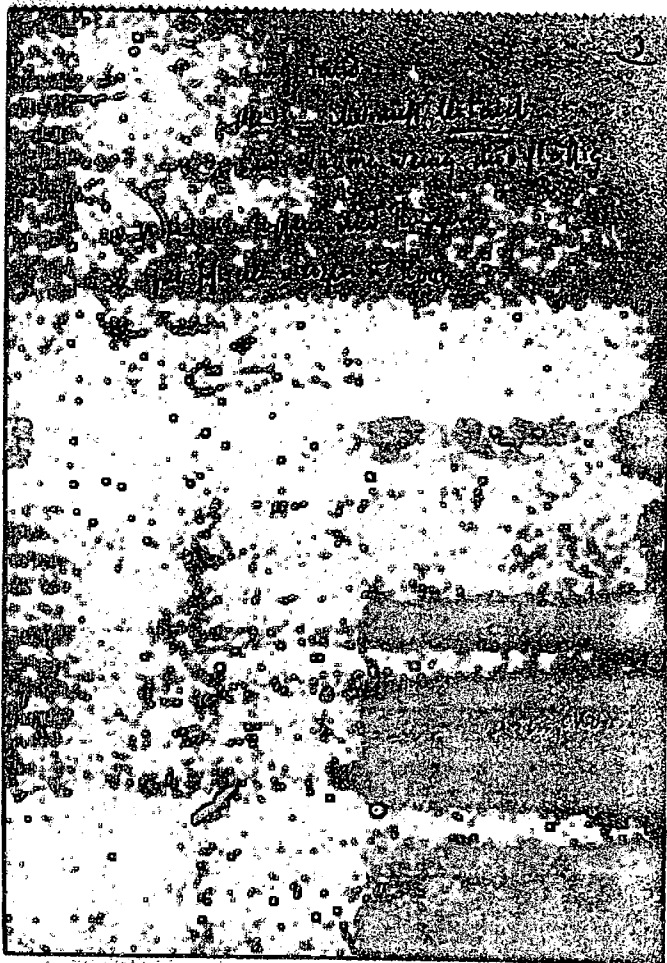
If lime content is high:  
alfalfa, sainfoin —

High water table: grass

Soil treatment: manure & green manure;  
potash, phosphoric acid, lime (little)  
N top-dressing —  
Clover/grass mixtures.

Loam: clay and sand, clump together to some extent when moist.  
best type of arable land  
enough warmth  
ideal soil for rotation-systems,  
orchard, vineyard  
plow in late autumn for summer crops  
liming often necessary  
high humus content necessary.

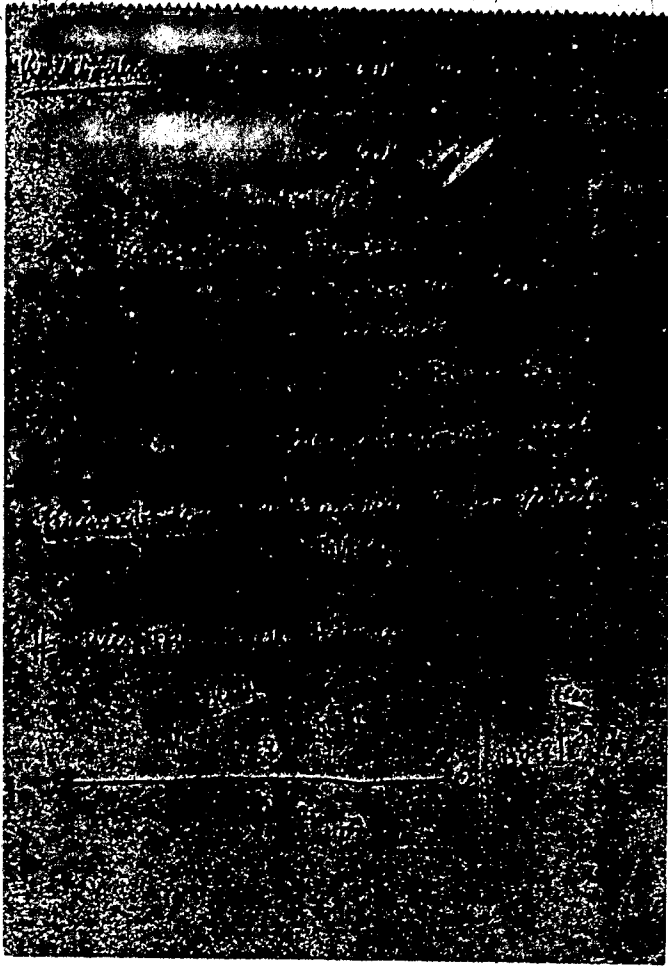
never work  
when wet



Clay soil: clay, little sand  
holds water but drains poorly  
hard for air and warmth to penetrate  
not for potatoes and rye  
but for heavy wheat crops and other small grains  
mangolds  
best meadows and pastures.

Marl soil: clay with 5-20% lime  
The higher the lime and humus content the better;  
very sticky to the touch  
falls apart when dry  
Very good arable land:  
plump-kerneled, thin-husked, wheat, rye  
barley, oats, will grow cloves

potatoes and mangolds good.  
good for rotation-systems: orchard, vineyard.

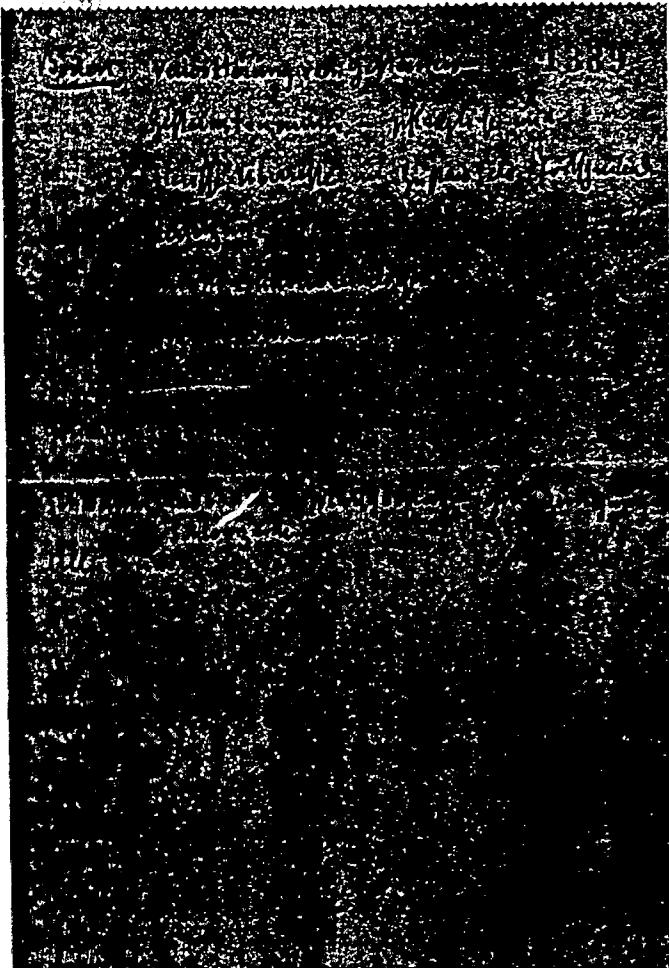
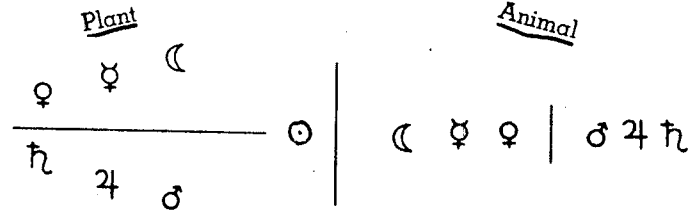


Lime soil: calcium carbonate over 50%  
 light color —  
 heats up too much if too much lime  
 (manure consuming)

If enough clay is present:  
 grains, root crops, clover  
 alfalfa, sainfoin  
 Fertilization — N P acid potash  
 contour plowing.

Humus soil: 50% by volume, 15% by weight  
 org. substance —

gravel, clay, lime, humus:



Soil: weathering of rocks  
 rock debris — plant and  
 animal residues in state of ongoing  
 decomposition.  
 inorg.: non-combustible  
 org.: combustible

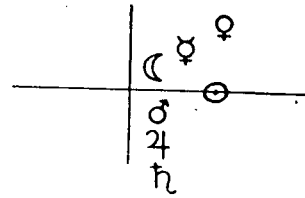
rocky soil

alluvial soil: marshland - without fertilization:  
 black earth.

alluvium



Interaction of atm. air and soil air



dependent on it whether the astral is drawn upward out of roots. the nutrients downwards

Marshland/it contains nutrients.

manuring provides substance suited for receiving the forces of the Moon —

Air in the soil: CO<sup>2</sup> NH<sup>3</sup>

Im. decay decomposition  
exchange of gases with atmospheric air

↓ NH<sup>3</sup>

barn manure. not when ground is frozen  
Potatoes, beets, clovers  
grasses less. ~

# Die Wurzeln... 1358  
denn hängt ab...  
die Luft...  
die Erde...  
Bodenluft...  
Kartoffeln...  
Gräser...

Die Wurzeln...  
die Erde...  
die Luft...  
die Erde...  
die Luft...  
die Erde...  
die Luft...  
die Erde...  
die Luft...  
die Erde...

Root pole: enhanced by what is mineralized, non-combustible.

Blossom pole: furthered by lime and what is combustible.

In animals, the head pole corresponds to what grows in the Earth, the fruit pole to what is on the Earth.

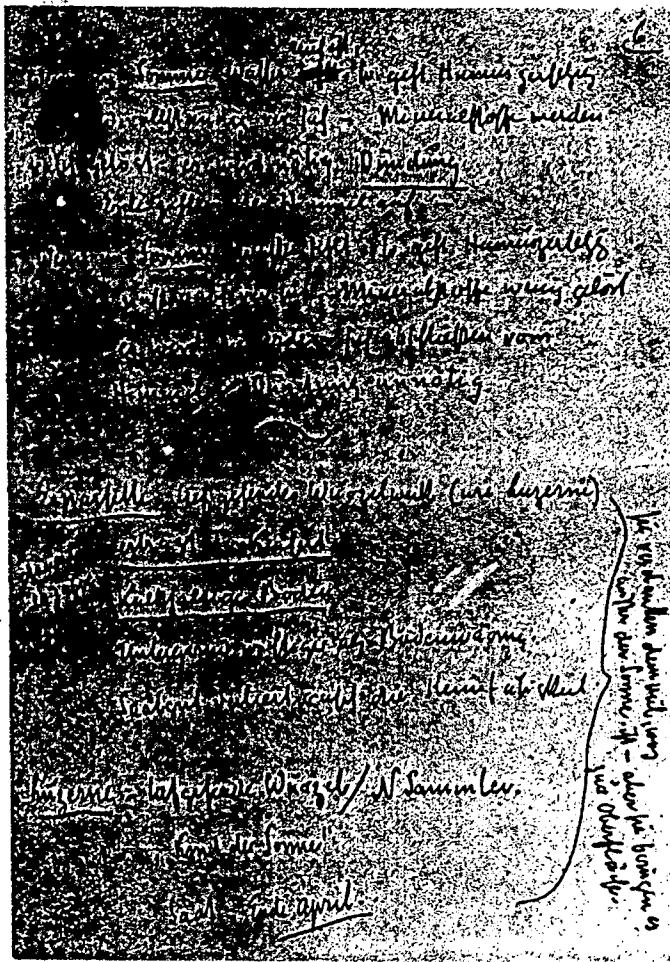
Manuring necessary when water is available to break down humus. — light-colored soil

Light is being taken up there/when light is not being taken up, manuring is not necessary.

Winter: precipitation: water is alive, the Earth becomes alive.

Summer: Earth dies off. The heaven makes its influence felt: ripening i.e. promoting leaf and flower formation.

red light colors blue  
♂ 4 ♀



When water is plentiful in summer, humus breakdown proceeds quickly and completely. Mineral substances are dissolved quickly: manuring becomes necessary. Earth merges with the heavens.

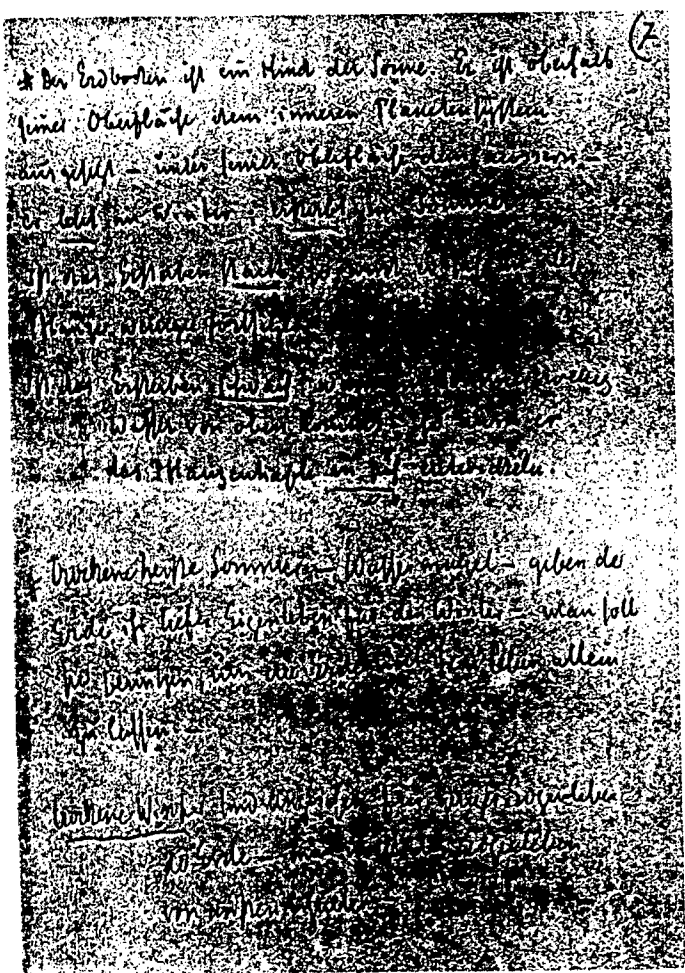
When water is scarce in summer, humus breakdown does not proceed quickly, few minerals are dissolved. Earth will shut itself off from heaven/manuring unnecessary.

Sainfoin: deep penetrating roots (like alfalfa) tolerates dryness  
lime-rich soil  
 subsoil more important than soil warmth.  
 seed loses viability quickly.

lasts 10 years

They owe a lot to what is beyond the Sun but they bring it to the surface.

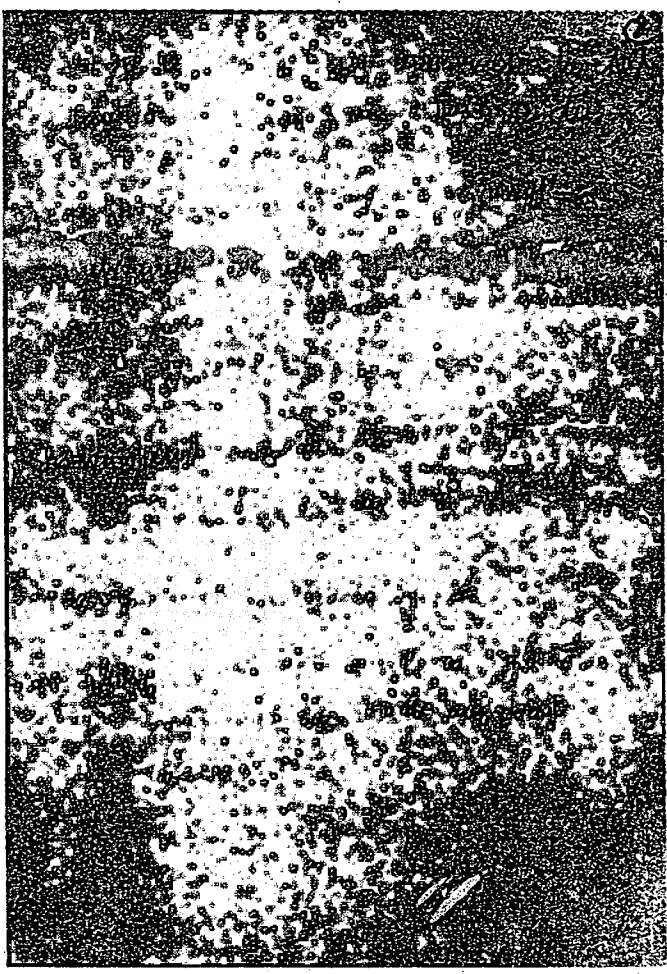
Alfalfa: deep roots. / N collector  
 "Sun child"  
 sowing: end of April.



The soil is a child of the Sun. Above its surface, it is exposed to the near planets — below its surface to the distant ones. It is alive in winter; dies off in summer. If it dies off strongly, it extends less into the plants. If the dying off is minor, when little water comes, from above in summer, then it develops what is plant-like in itself.

Hot, dry summers — water shortage — intensify the Earth's life in itself for the winter: they should be used to leave the Earth alone with its life.

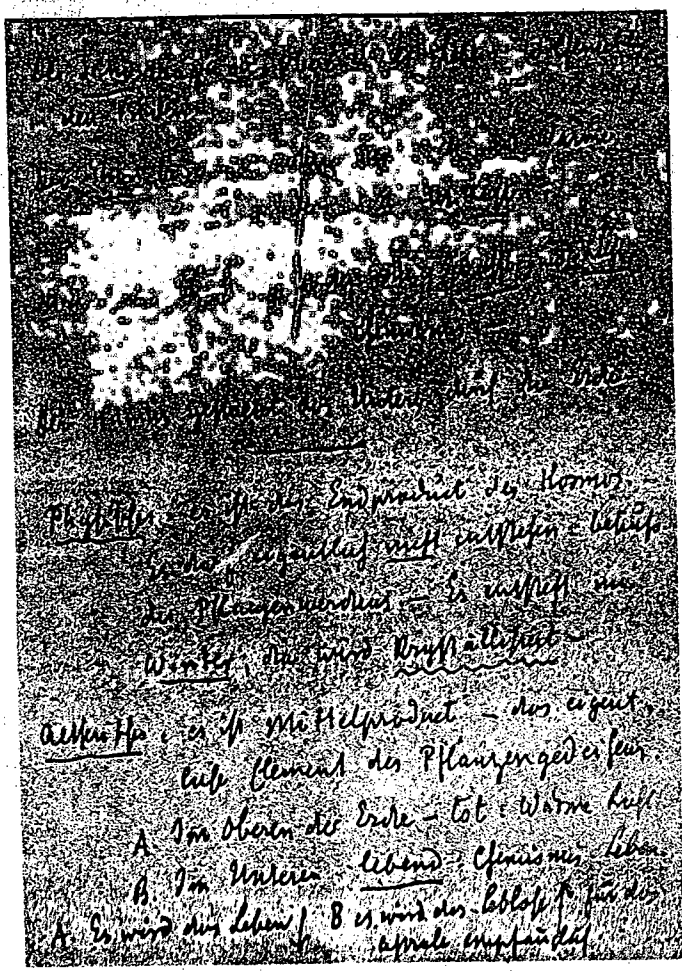
Dry winters are a sign that the Earth has little life of its own — this life needs support from outside.



The animals' bodily existence is in the Earth's external world: Earth replaces this by what percolating external water brings about

As much manure as corresponds to the amount of livestock more gives more nutrients in the plants less yields more plants with a lower nutrient content.

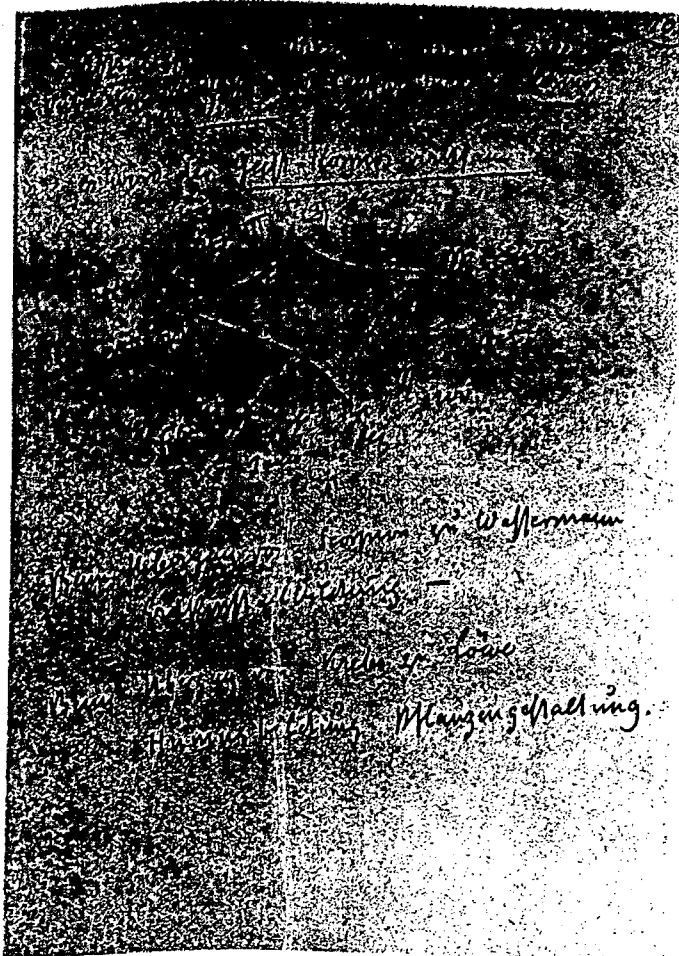
The root pole is held back by manuring, / The blossom pole is promoted by manuring. / Imports only for healing. Nitrogen in the Earth acts as a poison — must be absorbed by the soil



Sand carries the upper into the soil as life and chemical activity — Clay carries the upper into the soil from the air as light and warmth. Lime forms the lower by means of water and air chemical activity — Humus fashions the lower by means of the earth.

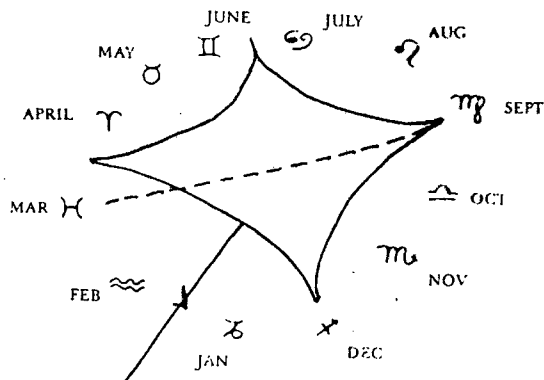
The Physical: it is the end product of the cosmos. — For plant development, it actually should not come about. — It evolves in winter, when crystallization is going on —

The Etheric: it is an in-between stage, the actual element by which plants thrive.  
A. Above the Earth — dead: warmth light  
B. Below alive: chemical activity, life  
A. life becomes ↓ B What is lifeless ↑ becomes receptive to the astral



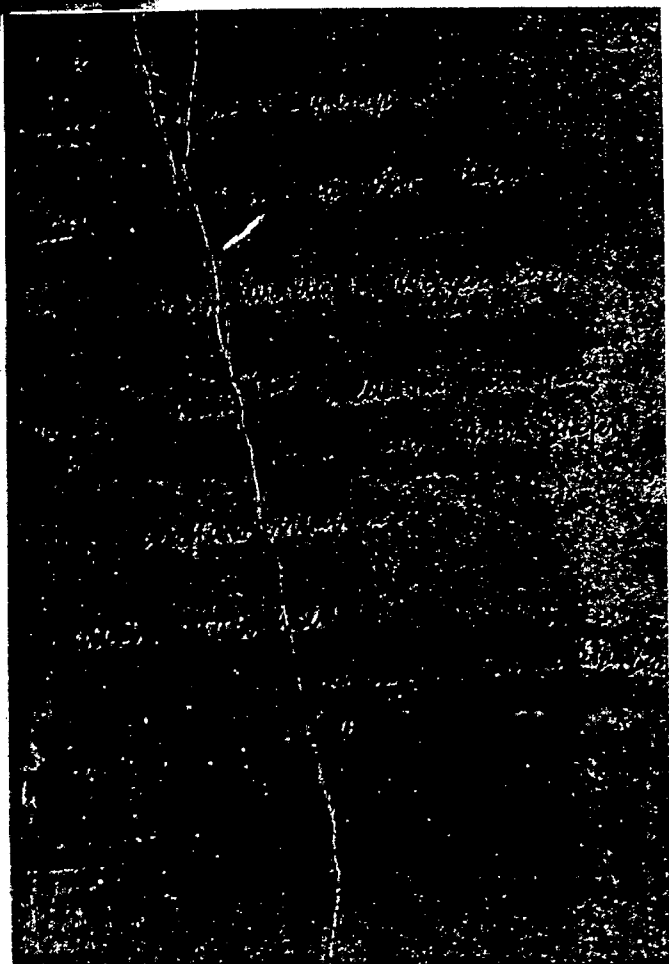
The Astral working from above downwards —  
 in connection with warmth. Initial product of the cosmos.  
 In winter.

The Spirit - Cosmos takes effect:



Transition from Scorpion to Waterman  
 crystal formation in the Earth. —

Transition from Crab to Lion  
 humus formation: shaping of plants.



Soil:  
Sand: for roots.

Loam: sand, clay: for fruit, grapevines

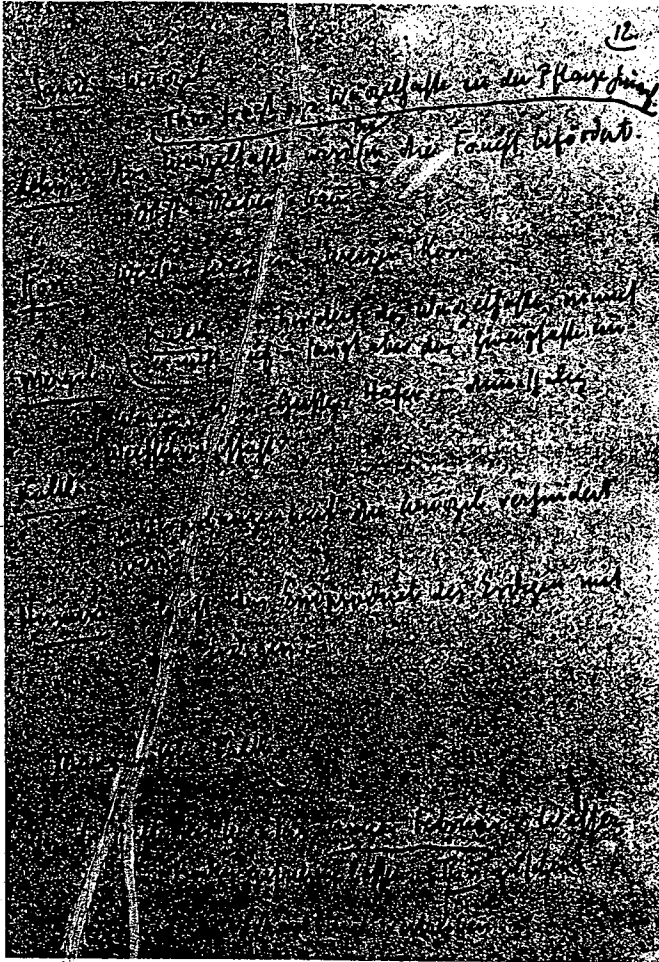
Clay: meadows, pastures — wheat rye

Marl: clay 5-20%, lime: plump-kerneled, thin-hulled  
 wheat, rye, barley, oats  
 rotation-systems

Lime Soils: 50% lime

tendency } grains, root crops, alfalfa, sainfoin  
 to burn } (manure consuming)

Humus soils:



Sand: root

Clay carries the root element up into the plant

Loam: root element is carried all the way up to the fruit.  
Orchards, vineyards.

Clay: meadows, pastures, wheat, rye

Lime: hinders the root element, doesn't take it up, but  
sucks in what is branch-like.

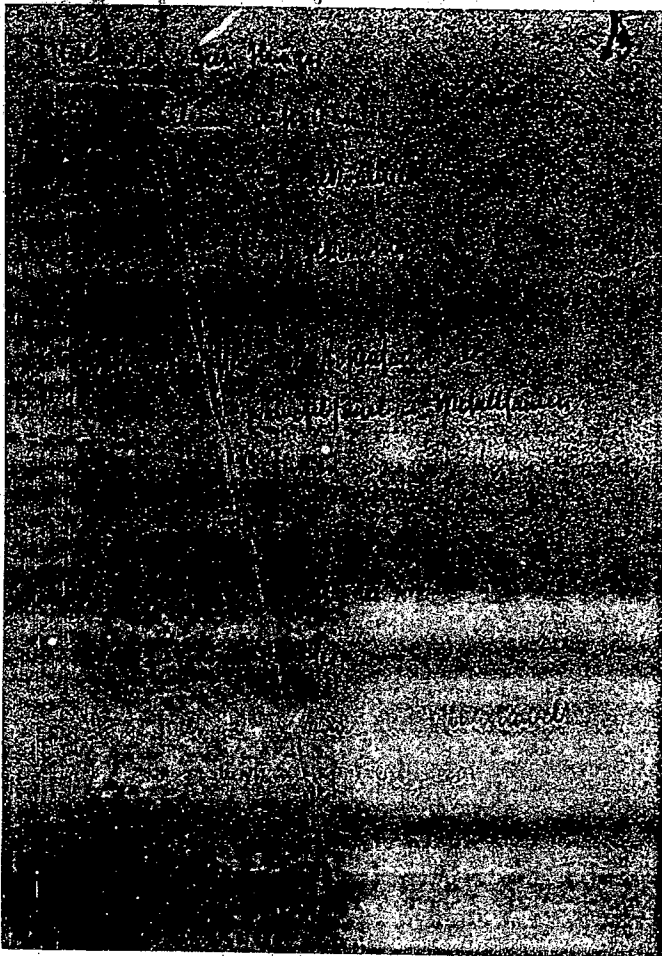
Marl: Wheat, rye, barley, oats, — thin-hulled  
rotation-systems

Lime: fodder plants, since the root is depressed.

Humus: is the final product of the earthy  
with the earthy

One would have to use talc

In midwinter, January/February: let water  
freeze in the soil: add clay  
It will drive away pests.



Lime: greed, hunger  
calcium attracts 0

Silica: has come to rest

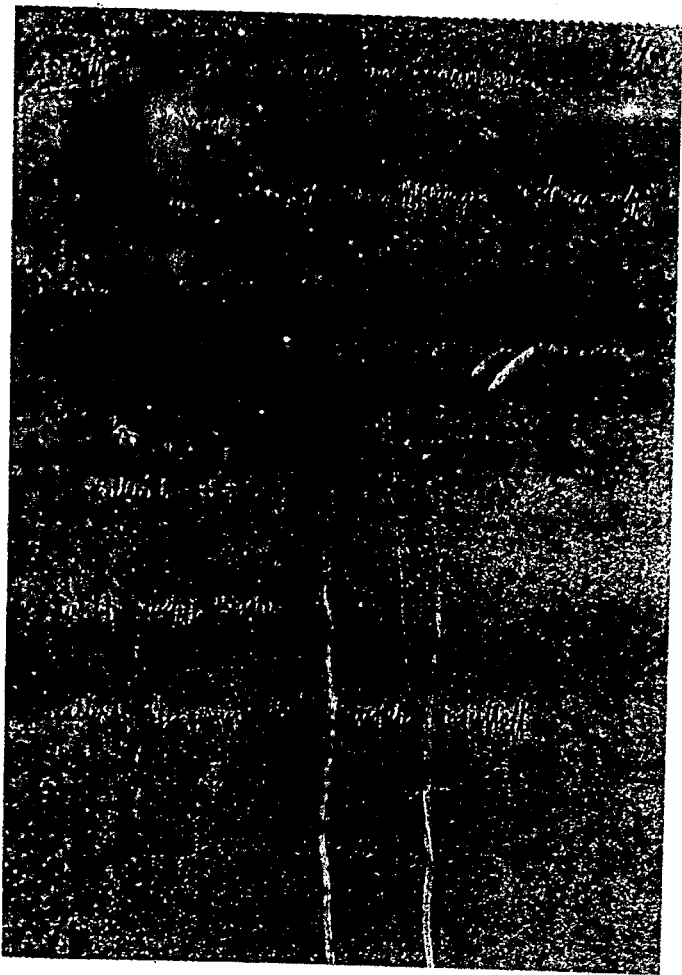
Clay: has come to rest

gobbles up water and carbon dioxide or  
sulfuric acid — metallic acids  
bitumen.

<on contact>

Lime is the consuming element in the earthy epoch  
of the animal kingdom.

It clothes the plant-world in the  
supersensible animal nature.



Nitrogen — becomes significant in flower and fruit formation

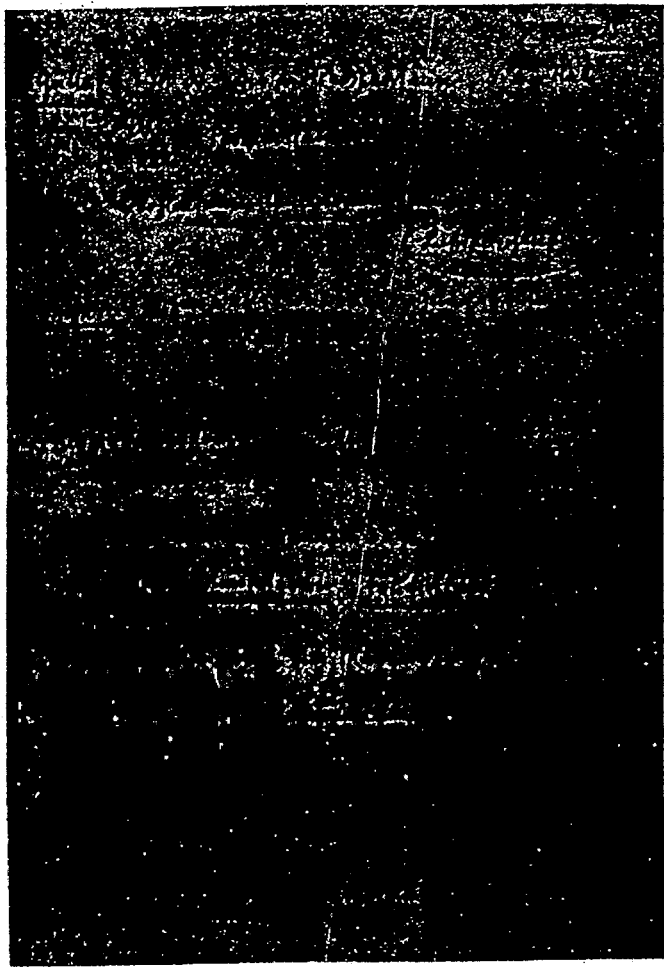
mushrooms, nitrogen-rich plants (brassicac)

however, in the animal body  
NH<sup>3</sup> caustic, alkaline — like pure lime.

O:N = 1:3  
Lime: H = 1:3

animal/human body: N O

Colloid intensification of N-content fibrous material



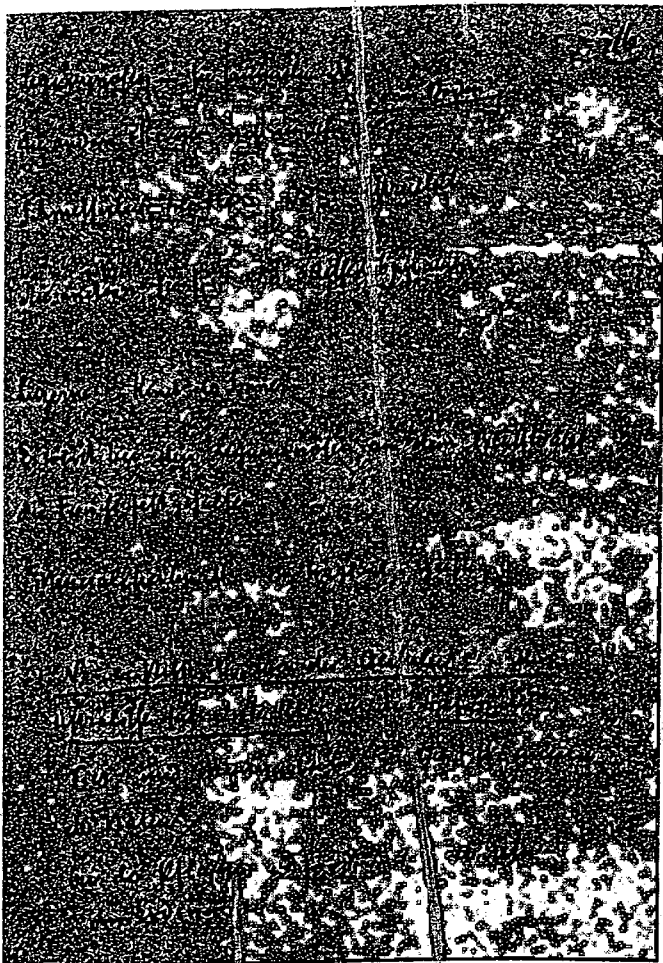
Liquid manure: 0.2% N 0.03% phosphoric acid, 0.4% potash  
( N phosphoric acid  
potash  
ammonium carbonate — shutting out air)

Compost: for meadows, vineyards, vegetable gardens, fruit trees

Nitrogen: plant nutrient | It goes from  
protein 16% | the Sun into  
promotes plant growth | the leaves

lush dark green: fruit formation delayed

By means of nitrogen, the being of the plant is lifted out of the natural course of its development; it is drawn toward the animal life of the soil.  
Legumes (root-nodules bacteria): N from the air  
grasses, cereal plants, potatoes.



Legumes — they collect N

the other plants take it out of the soil —

Papilionaceae: ↓ N : astral body

the others: they are ether-body plants.

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Alfalfa "Sun child"

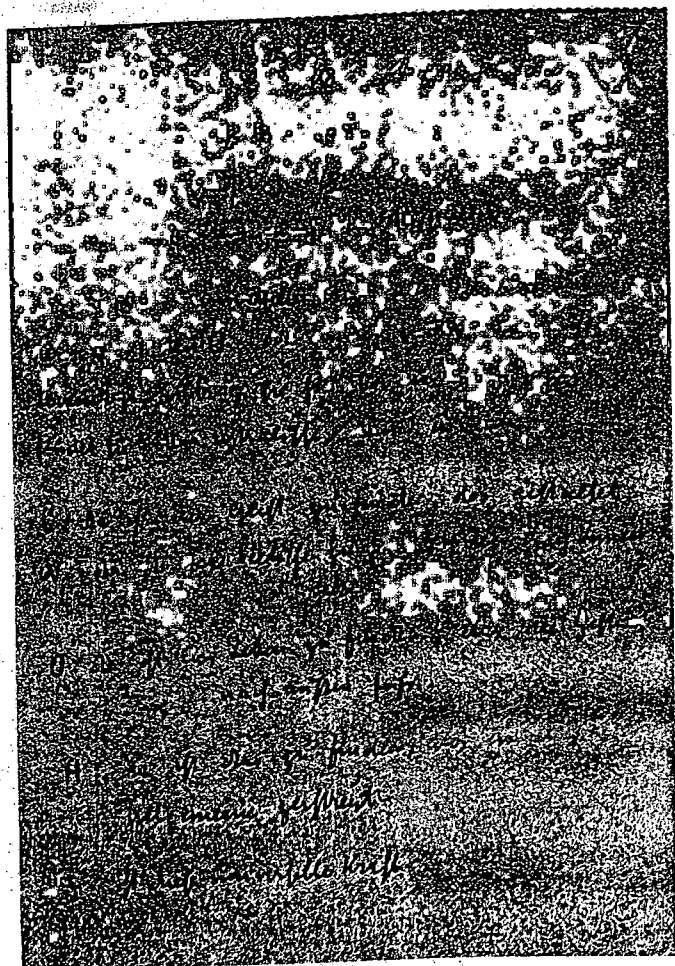
In legumes, the fruit is held back  
in the leafy part

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Mineralized N: it carries spirituality into the  
Earth

N: It is found where the etheric body sinks into  
the astral body: in the formed  
animal and human body / in nature in  
general /

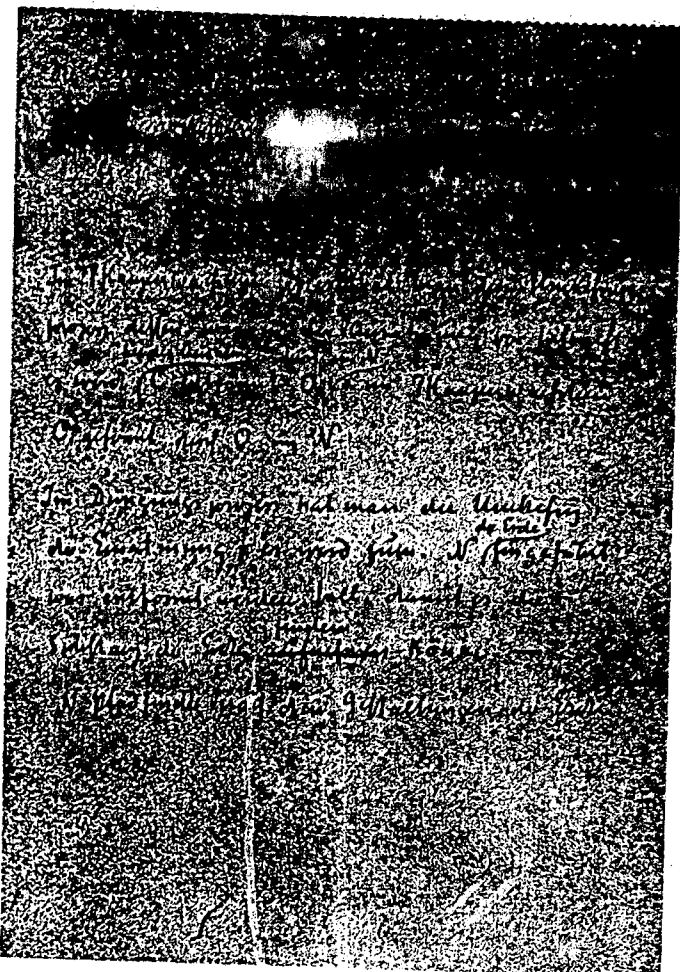
In plants, it promotes dependence on the  
Earth's interior.



Nitrogen is the receiver of formative activity life goes  
where it finds the N-dependent formative activity;  
there C is led over  
into form by the spiritual being.

The universal force carries the being — out  
of H into O; there it finds the living  
etheric / carries it across into N, where  
it finds the astral / then into C

C: here the form-giving spirit is to be found  
N: here the soul element working inward is to  
be found  
O: here life is to be found, carrying  
the form outward  
H: here is to be found what dissipates  
into general existence  
S: is that universal force.

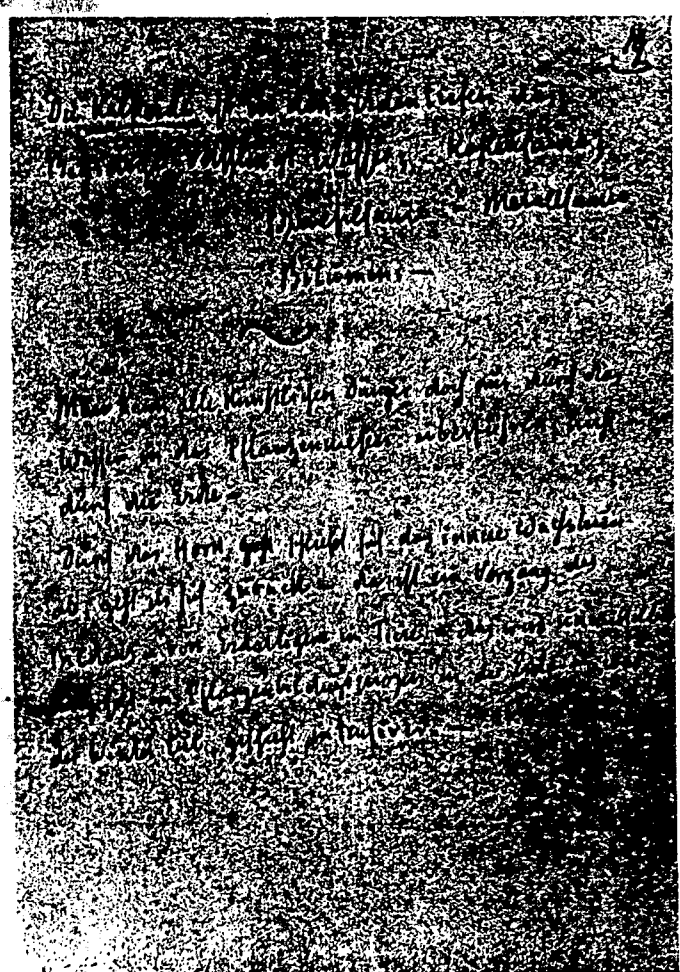


Legumes are the lungs of the spiritual:  
The other plants are consumers of the  
spiritual —



In plant growth the reverse takes place of what  
happens in exhalation:  
in exhaling, C is deprived of form by O in N;  
in plant growth C is formed by O in N

In manuring the reverse of  
inhalation takes place: what should  
be deprived of form so that it can join up  
with the substance of the Earth is brought to  
the N of the Earth. —  
N finds the path toward the formations of the Earth.



In the depths of the Earth, lime  
is greedy, swallowing up water, carbon dioxide;  
sulfuric acid — also metallic acids  
bitumen. —



But all artificial fertilizers can only be brought  
into the plants by way of water, not  
by way of the earth —  
Through the horn, inner growth seals itself  
off, turns into itself — this is a formative  
process — of what is earth-like in animals; this becomes directly  
transformed into the process of plant formation in the earth  
— what the winter does, happens more intensely.

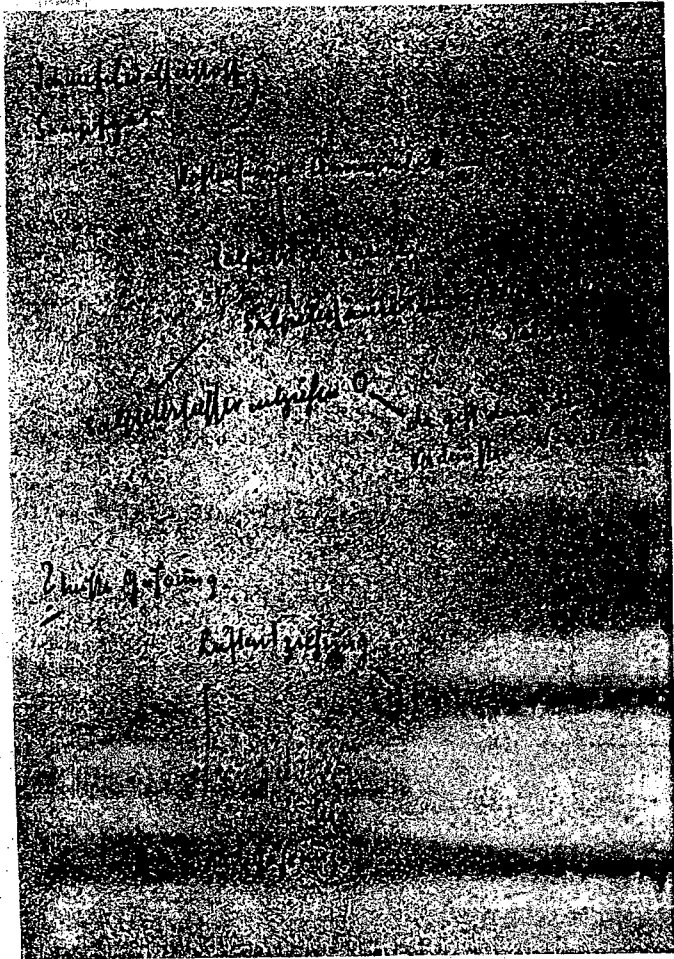
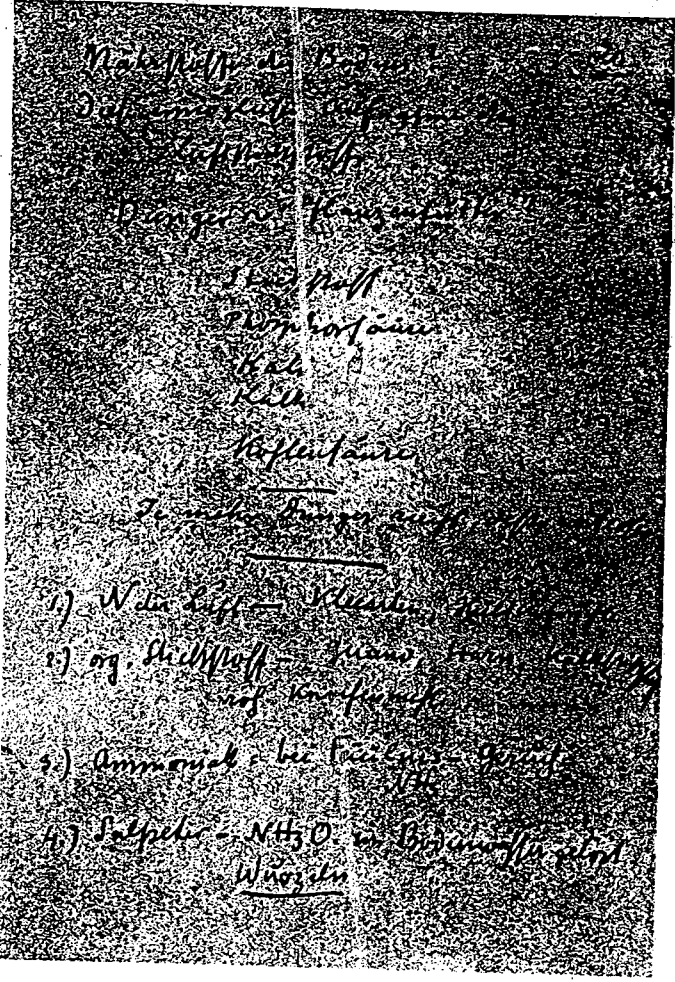


Soil nutrients?  
They make it possible for nitrogen to be taken up from  
the air  
Fertilizers plant foods?

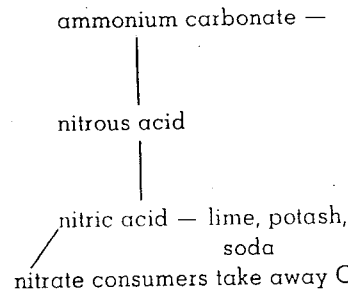
- nitrogen
- phosphoric acid
- potash
- lime
- carbon dioxide

The more fertilizer smells, the less value it has.

- 1) N from air — clovers, pulses
- 2) org. nitrogen — guano, urine, calcium cyanamide, raw bonemeal
- 3) ammonia : when it smells rotten:  
 $NH^3$
- 4) saltpeter —  $NH_3O$  dissolved in groundwater  
roots



hydrogen sulfide  
swamp gas

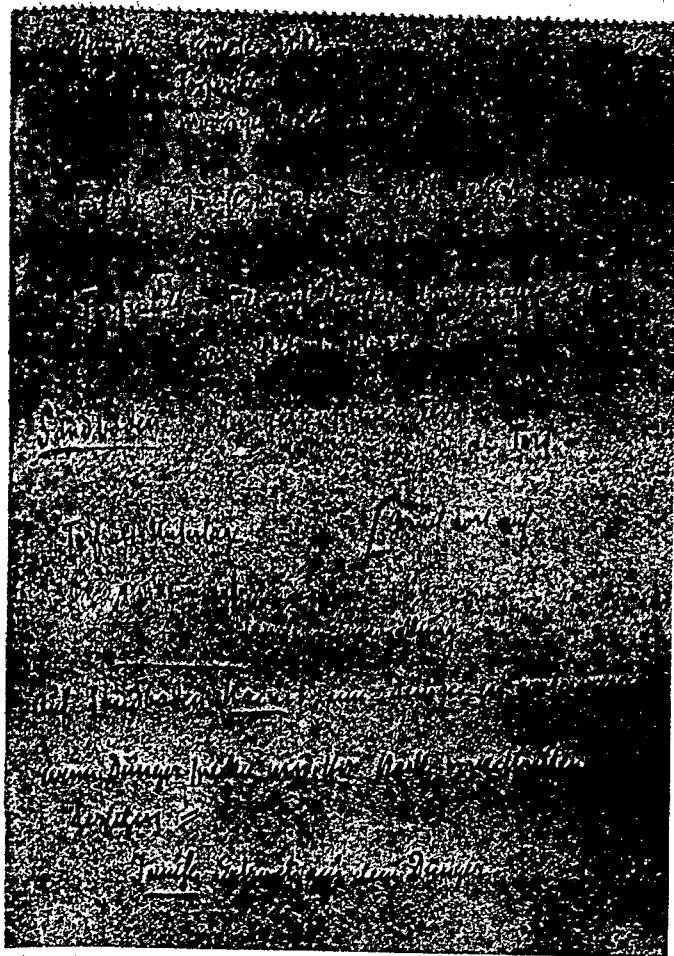


then N is lost  
through volatilization

? hot fermentation  
anaerobic

tread it down

liquid manure suffers the most losses  
through fermentation.



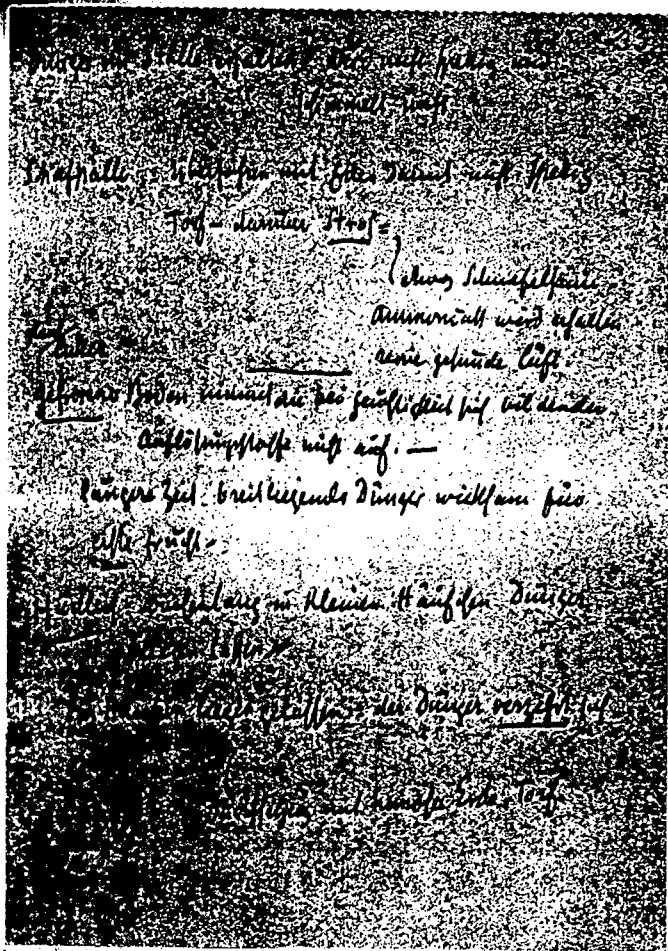
Layers of humus-rich soil —  
peat soil  
moorland soil

peat soil + liquid manure, manure — decomposes,  
becomes greasy, binds sand, water

loose peat: holds the volatile ammonia.  
compresses the surface.

Sandy soil: wastes fertilizer —  
hence peat. —  
peat as a base [stops smell]  
|  
effect of liquid manure. //

Kainite on sandy soils, to preserve manure  
when manure becomes greasy, very advanced state  
of decomposition //  
Liquid manure extract from manure.



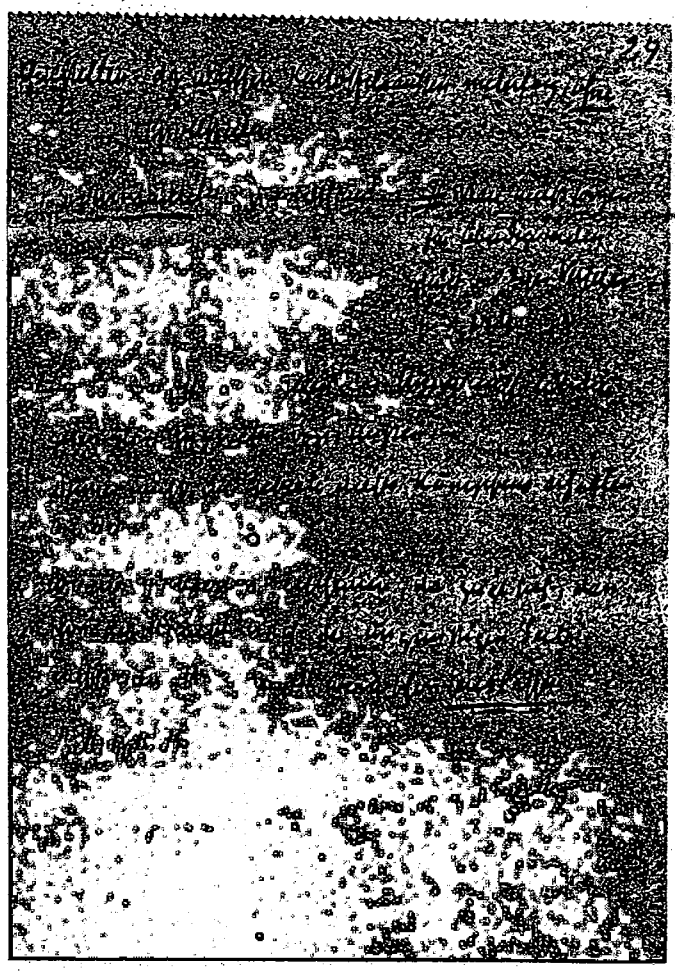
Manure stored in the barn — doesn't become greasy and  
doesn't mold

Sheep stalls: cover with earth so it doesn't get greasy  
Peat — straw on top: //  
} some sulfuric acid —  
ammonia is retained  
clean healthy air

the same in the field

frozen ground doesn't absorb the substances released  
in the presence of moisture —  
manure left spread out for a long time effective for  
first crop.

Harmful to leave manure in little piles  
for weeks. //  
left in piles, manure consumes itself  
(  
mix with humus-rich earth, peat



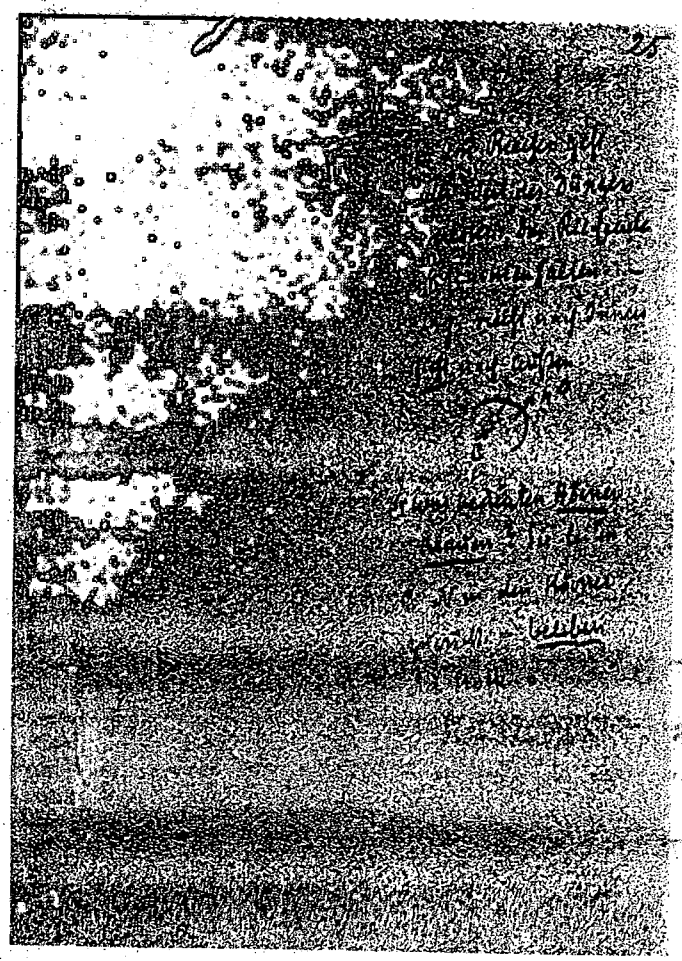
rank patches: potato shoots grow very long without tuber formation.

soil cover - very effective. - must make sure that it becomes alive by mixing with earth before too long

In C, S battles against what is becoming inorganic, against attack from outside. Manure must be kept in the realm of this struggle.

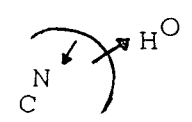
When bacteria appear, it shows that the battle has already been decided in the wrong direction: N is already escaping. Sealed off from air.

Ortmann's technique: liquid manure separate from manure.



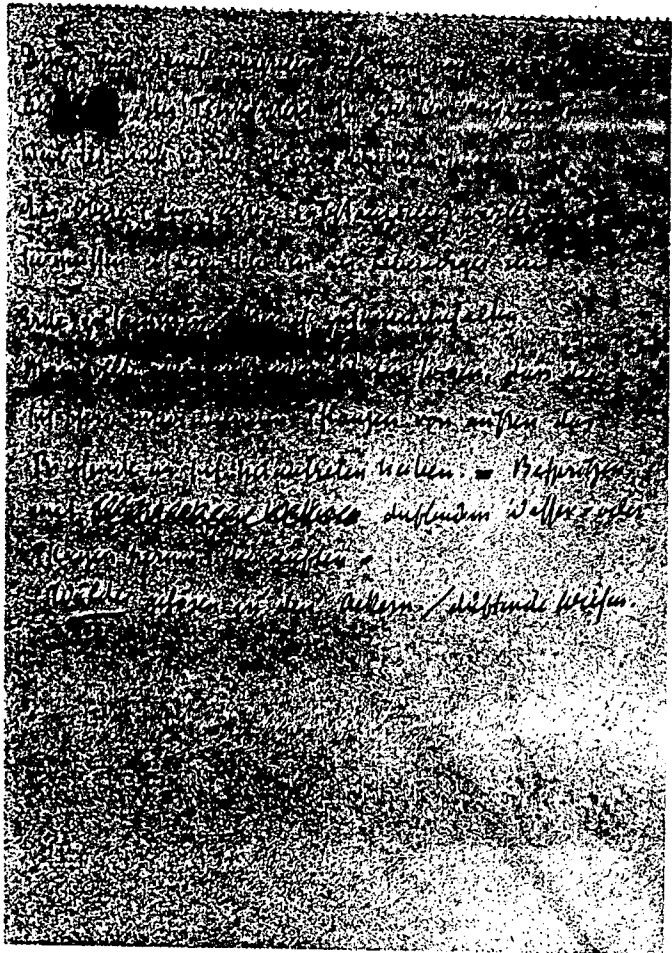
Barn as a storage place  
manure piles which do not smell

The value of the manure escapes along with the odor. Contain the smell. Org. smells inside looks outward

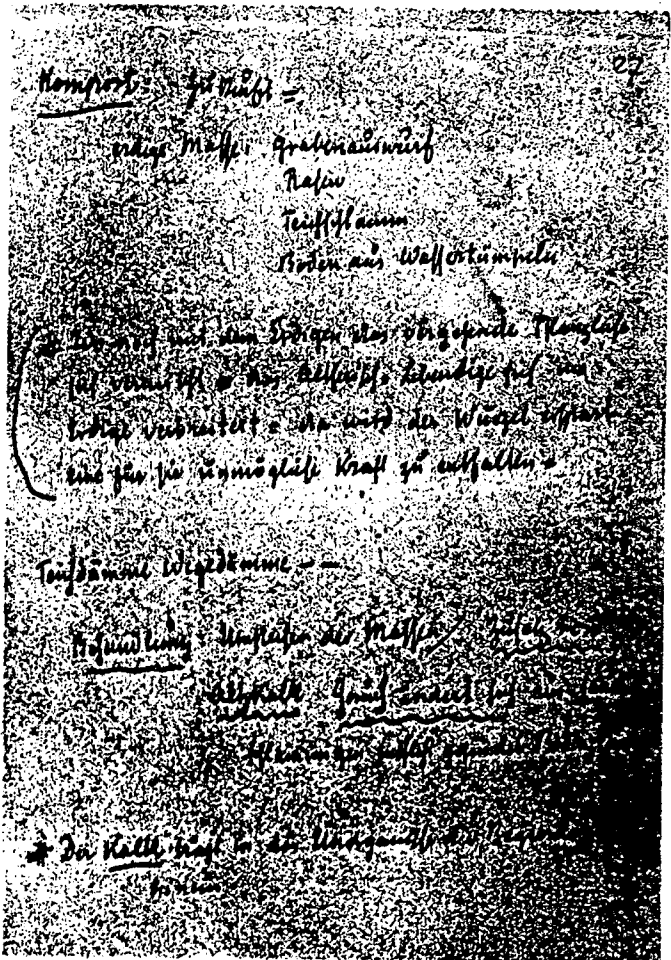


compact, moist/

What is the significance of horns, hoofs? They lead C N back into the body - enliven substances.



Manure and liquid manure come about as excretions of the animal body which have not yet been killed off. They are cast off to keep them out of the region where the upper (the spiritual substantiality) is active — they must be preserved as something that is alive together with earth / Contain the smell. In addition, however, we should see to it that already developing plants are exposed to smell from outside. — Spray with scented water — or have plants around which have a scent. Woods belong together with cultivated fields / aromatic meadows.



Compost: future:  
 earthen mass: ditch cleaning  
 lawn grass  
 pond dredgings  
 soil from ponds.

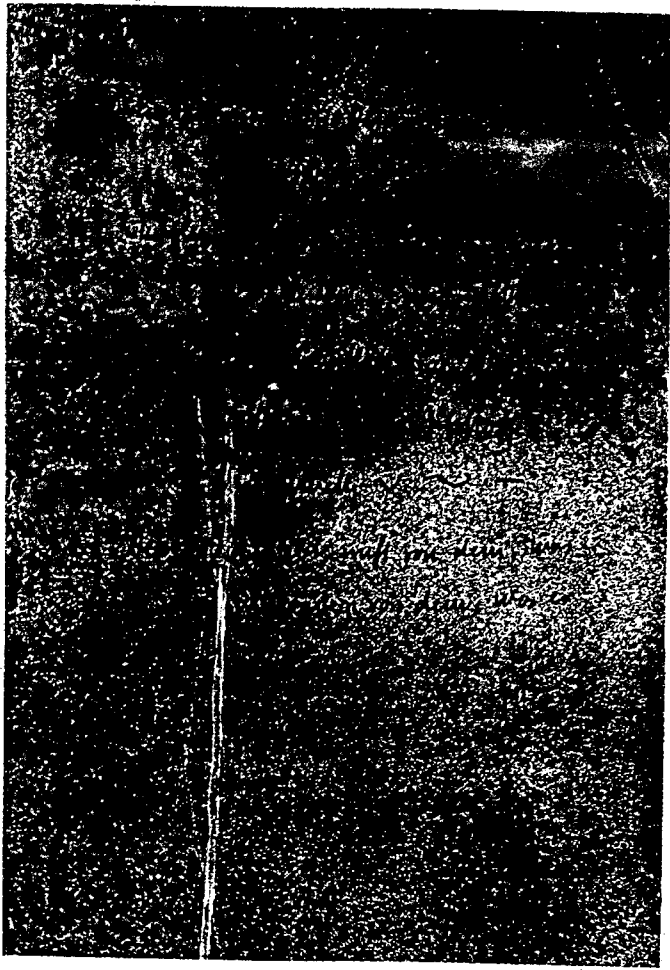
Wherever decaying plant matter mixes with earth: the etheric-living element is spread out deep into what is earthy — there the roots are spared having to develop more force than they would be able to —

dams, embankments — —

treatment: turning the piles / addition of quicklime smell changes, sour slimy smell turns into healthy earthy smell

Lime carries craving into the inorganic.





Optimum protein: 70 kg. body weight: 120 gr.  
but 50 gr. at the most

superfluous protein: fuel  
fat, sugar, starch —  $H^2O$   
 $CO^2$

Protein: urea, uric acid  
intermediate products: poisons.  
blood pressure: ~ ~ ~

"People don't live on what  
they eat, but on what they  
digest" —

*Achillea millefolium* 30 } in Blasen  
in eigenen  
Gummis und  
Harz.  
Wurde, Gummi, Spuren von Schwefel.  
Viel Kalifolge

*Chamomilla matricaria* } aufhängen  
Harz Gummi durch Schwefel  
Kalium in Calciumfolge

*Urtica dioica* } Natrium, Calcium  
Schwefel, Eisen  
kann überall das an  
des Urteils Menschliche  
wirkende Substanzen

*Quercus robur* } Natrium, Calcium 77%  
Pflanzliche  
Krankheitsgefahren  
den Regenerations  
in der man  
die Masse  
von ihnen gehen

*Taraxacum* } in der Gestrüpf  
in der Luft  
hängen

Yarrow *Achillea millefolium*. } in bladders  
solid resin, gum, traces of sulfur } in its own  
lots of potassium salts } gum and resin. /  
hang up } Bladder  
stag

Chamomilla matricaria resin, gum, some sulfur as  
Chamomile potassium and calcium salts } sausages  
intestines — hang up

Urtica dioica calcium }  
stinging nettle potassium } restrains everywhere luxuriant  
sulfur, iron } development in the direction  
of the animal/human  
it regulates everything: gather carefully

Quercus robur no smell calcium 77% } pulls etheric body  
oak } rickets } together;  
in bony sheaths,  
put into rain water  
with added moss  
or peat

Dandelion *Taraxacum* silica }  
potassium } in mesentery  
liver ailments } hang in the air.  
intestinal ailments }  
skin diseases }

Iron, sulfur, chlorine, magnesium,  
lime, potash, phosphoric acid, nitrogen compounds.

Iron: chlorophyll      sugar synthesis ] traces / present

Chlorine [table salt]: too much, stops starch, sugar / present

Sulfur [sulfates]: protein synthesis      present

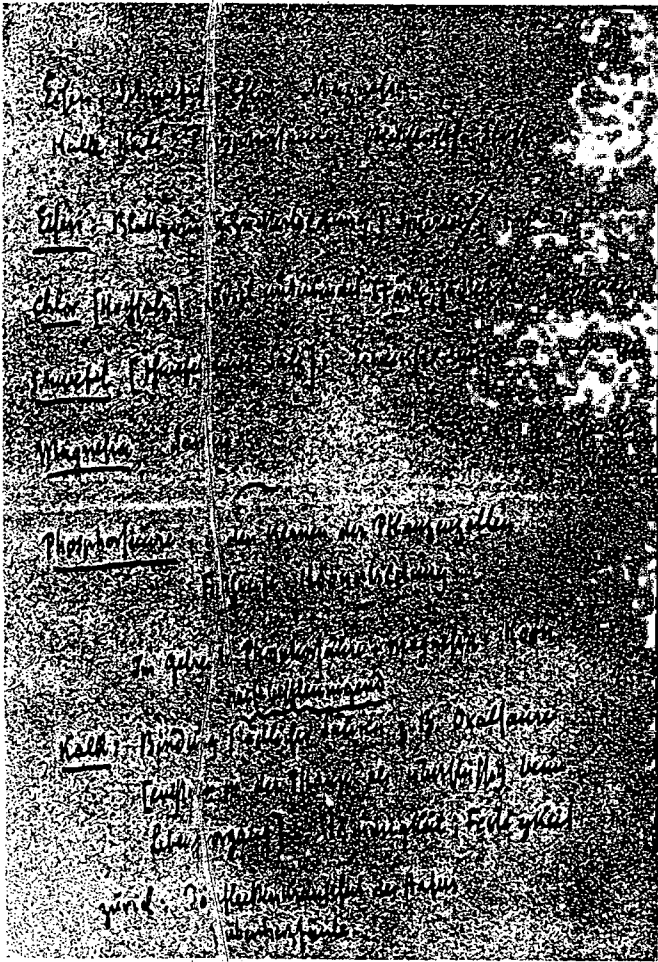
Magnesium: seeds      present

Phosphoric acid: in the nuclei of plant cells  
early maturity, seed formation.

In grains phosphoric acid + magnesium: seed  
speeds up ripening

Lime: binds up harmful acids e.g. oxalic acid  
[arise in the plant as excesses of the  
life-process]: sturdiness and solidity.

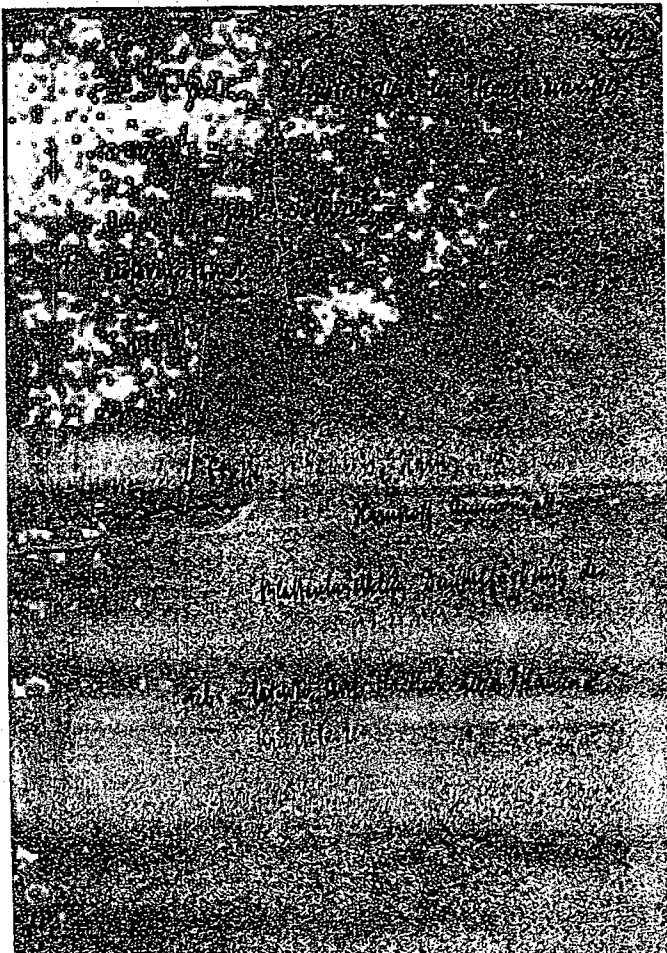
too much: gray spot disease in oats  
core rot in beets.



Potash: cell division, life-activity of plant protein  
starch, sugar  
root crops, barley, fruit trees  
delays ripening  
straw  
loamy soils

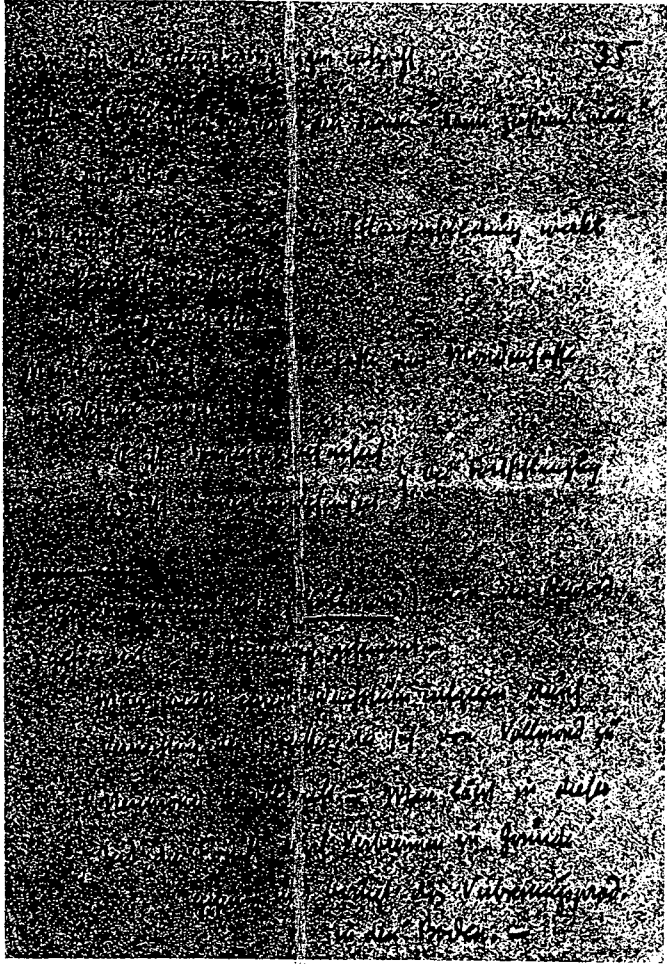
Nitrogen compounds: protein, urine  
urea, ammonia  
leaf development, dark color of  
leaves

too much: susceptibility to plant diseases.









one takes away the conditions it needs to live.

Earth + seed / one burns the seed, then sprinkles the ash

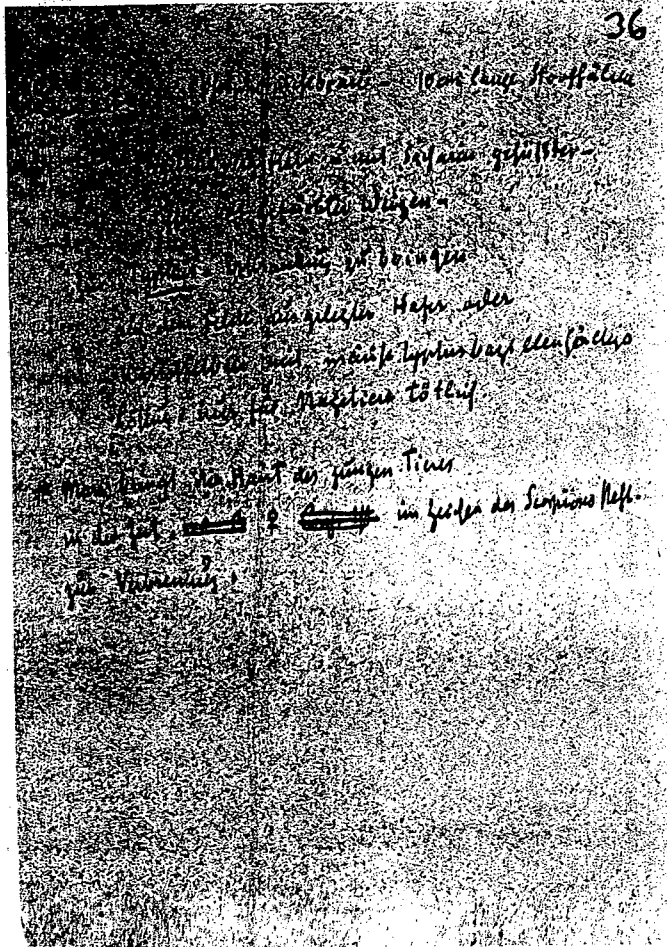
You need to know that cosmic aspects of Moon and Sun are at work in plant growth

The lunar can be rendered ineffective by the solar:

☾ is the absence of Sun } in reproduction  
☉ is the presence of Sun }

In the presence of the Sun (full moon) reproduction is promoted: at new moon it is hindered —

You work against growth by destroying the process taking place between full moon and new moon ☾ — during this time you destroy the fruit by burning it — and add the prod. of combustion to the soil. —



Field mice: phosphorus flour brew — straw stems 10 cm long. wheat poisoned with strychnine — sweetened with saccharine dyed fuchsin-red.

to spread typhus infection, put oatmeal or mashed potatoes with solution of mouse-typhus germs: only fatal for rodents.

When ♀ is in the sign of the Scorpion, burn the skin of young animals.

Beet nematodes: Aufschwellungen an den Faserwurzeln

Nach der Kopfform Aufschwellungen der Faserwurzeln

Blätter sind morgens schlaff

# Es wird das Mittlere - die Blätter - nicht fähig vom Kosm. Kräfte aufzunehmen

dagegen entwickeln sich die Wurzeln so, dass sie diese Kräfte aufnehmen

Es wird also der Aufnahmeprozess vom Kosm. zur Erde hinunter geleitet



Wenn die Sonne im N. steht, das heißt im Sommer, und die Erde verdunstet, abstrahlt

Beet nematodes: swellings the size of a pinhead on the fibrous roots leaves also limp in the morning.

The middle section — the leaves — is not capable of taking up cosm. forces.

Instead, the roots develop in such a way that they absorb these forces.

Thus the absorption process slides down the plant into the Earth.



Burn the insect when ☉ is in ♀ and spray the diluted ash. —

Pflanzkrankheiten:

Krautfäule Erkrankung des Samenkorns:

Feuchtwarme Witterung fördert die Ausbreitung der Brandes: (z. B. z. Verfahren)

Es wird die Pflanz ganz Permaten ein Erdboden - es ist zu viel Sonne in ihr & es hat der Vollmond bei Feuchtigkeit zu stark gewirkt - die Erde muss aufgelockert werden: es muss ~~das Wasser~~ <sup>das Wasser</sup> ~~aus der Erde~~ <sup>aus der Erde</sup> ~~entzogen~~ <sup>entzogen</sup> werden: düngt man mit Equisetum arvense. Es wirkt in der Erde so, dass er dem Wasser die Feuchtigkeit entzieht.

Plant diseases:

Pathological degeneration of seed: Warm moist weather encourages the spread of smut: (? disinfecting seeds)

The plant becomes soil as it were — too much Sun in it: effect of full moon was too strong in humid conditions — the Earth must be relieved by bringing the opposite into play: fertilize with Equisetum arvense. Its effect in the Earth is to deprive the water of fertility.

From the reverse side of page 38:

Liquid manure in husbandry like manure.

Constellation — Nov., Dec.



Milchfütterung: Weizen, Hafer, Gerste, ...  
Milchfütterung: ...  
Jungviehfütterung: Heu, Einlamen, Möhren, Roggenkleie.  
Jungviehfütterung: Heu, Haferstroh, Schrot, ...  
 # Es wirkt, das Futter bei, dass es die organischen Kräfte hervorbringt; die Stoffbaueen müssen dann auf dem Wege laufen: erstens hinauf Kopfwärts, zweitens hinunter Bauchwärts. Beides zubereiten.

Fodder for dairy animals: meadows, clover hay; any green fodder, fresh clover, green maize raw potatoes — chips oat straw.

Fodder for fattening stock: oil cakes of all kinds, pulses, fodder beets and potatoes: boiled or steamed. Dried chips (sun-dried) —

Fodder for young animals: hay, flaxseed, carrots, rye bran.

Fodder for draft animals: oats, pulses, chips, fodder beets.

Fodder works by bringing about the organizational forces; then the substances follow in their tracks: earthy upwards toward the head, airy downwards toward the belly. Prepared

Milchfütterung: alles, was auf dem ...  
Milchfütterung: ...  
Jungviehfütterung: alles, was in den Fruchtprozess ...  
Jungviehfütterung: ...  
Jungviehfütterung: Was so wirkt, dass die Kräfte ...  
Düngstoff: ...

Fodder for dairy animals: everything which has not yet reached the fruiting stage or is prepared from a pre-fruit state: but nothing rooty.

fresh clover / green fodder  
oatstraw / raw potatoes

Fattening fodder: anything which carries the fruiting process in itself, either by nature or by treatment

cooked potatoes  
oil cake. —

Fodder for young animals: anything that has entered the process of fruiting, but moderated.

oats / hay  
carrots

Fodder for draft animals: anything which has the effect of developing strength.

manure: fruit trees: add something of its own: falling leaves.

*Additional Notes:*

Atm. warmth does not normally unite itself with Phys.  
Atm. air does not normally unite itself with Eth.  
Atm. water does not normally unite itself with Astral.  
Atm. earth does not normally unite itself with Ego.

Soil warmth unites itself with Phys.  
Soil air unites itself with Eth.  
Soil water unites itself with Astral.  
Soil earth unites itself with Ego.

The plants acquire ego-force through CO<sup>2</sup>  
The plants acquire astral-force through NH<sup>3</sup>

coronary band / hoof trimming  
osteomalacia / calcium carbonate  
/ calcium phosphate  
/ calcium chloride

## APPENDIX B

### FURTHER AGRICULTURAL INDICATIONS

BY RUDOLF STEINER

The following reports are included here as a stimulus to further research and reflection. Readers should bear in mind that most of these indications are quoted from memory and may contain errors or misunderstandings. Furthermore, because the indications were given to specific individuals in specific situations, they may not be of general applicability.

- Part 1. On Various Fertilizers
- Part 2. On Soil Conditions
- Part 3. On Pests, Weeds, and Plant Diseases
- Part 4. On Companion Plants
- Part 5. On the Biodynamic Preparations
- Part 6. On Spiritual Beings

## FURTHER AGRICULTURAL INDICATIONS BY RUDOLF STEINER

### Part 1. On Various Fertilizers

*The following three sections (A to C) cover a series of conversations between Rudolf Steiner and the chemist Johann Simon Streicher. At the time of their first conversation in 1920, Dr. Streicher was working at the fertilizer research laboratory of the BASF (Badische Anilin und Sodafabrik) in Ludwigshafen, Germany, where the process for producing artificial fertilizers from atmospheric nitrogen had recently been developed. In 1921 he gave up a potential career at the BASF to join the small anthroposophical Research Institute in Stuttgart,<sup>1</sup> where he worked on producing plant colors for artists.*

*A. Report by J.S. Streicher of a conversation with Rudolf Steiner in Dornach on a short walk between Steiner's house and his studio, October 9th, 1920.<sup>2</sup> (Note that the following indication applies specifically to "impoverished and degraded soils," and that the dialogue is not necessarily reproduced verbatim.)*

Dr. Streicher: Artificial fertilizers (mixtures of potassium salts, chemically treated phosphates, e.g., superphosphate, nitrogen salts of all kinds, calcium nitrate, etc.) are commonly used today in Central Europe. The nitrogen salts, especially ammonium sulfate, are regarded as "yield regulators." The cereal plants and the soil are accustomed to the artificial fertilizers. They are more accustomed to them than the farmers would like. From the standpoint of spiritual science, should the farmers be dissuaded from using any kind of artificial fertilizer?

Dr. Steiner: Artificial fertilizers can be used — today this is even a necessity — but the salts that are added to the soil must be better chosen than is usually the case . . . above all, no nitrogen salts should be used. . . . For today's so broadly impoverished and degraded soils, a

mixture of fertilizer salts that contains potassium, sulfur, and magnesium — especially, sulfur and magnesium — would be very appropriate. . . . And in order that the plants can also assimilate these salts, certain *poisons* must be added to the salts. (Dr. Steiner recommended the questioner get in touch with Herr Stegemann.)

Dr. Steiner then directed the questioner's attention to the life processes of the birch, to the upward and downward weaving of the plant's etheric body.<sup>3</sup> He then continued: The etheric body of most of today's cultivated plants has become weak . . . mineral fertilizers have to be brought to the plant . . . but the *right* mineral fertilizers . . . no nitrogen fertilizers, no kinds of nitrogen salts . . . However, even when the minerals are the correct ones, the cereal plant's etheric body can grasp them only with difficulty. (Instead of "grasp," Dr. Steiner used the expression "to string them upward" [*auffädeln*].) . . . Therefore "*poisons*" have to be added to the mineral fertilizers . . . these will then allow the etheric body of the cereal plant to grasp the mineral substances and "string them upward," so that they are carried into the body of the plant like pearls on a pearl necklace.

With this our first conversation ended, for we then stood at the door of his studio . . . it was ended with a cordial handshake and hearty "Auf Wiedersehen."

*In his original report, Streicher comments that he was still new to anthroposophy at the time and did not know what to make of the "poison additive." Hence his next conversation with Rudolf Steiner (section B, below) is described by Streicher as a kind of "probing session," in which Streicher brought up several possible "poisonous" fertilizers, none of which, however, met with Steiner's approval. Thus, the nature and identity of the poison additive did not emerge until a subsequent series of conversations (section C, page 248).*

*B. Report by a stenographer of part of a group discussion with Rudolf Steiner at the Research Institute in Stuttgart, Dec. 17, 1921:<sup>4</sup>*

STREICHER: Another matter that we are concerned with here [besides plant colors] is one that I was brought into contact with during my youth. I grew up in the country and have concerned myself a great

deal with the problem of fertilizers for plants. [Streicher's father was a farmer, baker, and grain dealer.] In this regard I am very disturbed by the present situation and the prevailing opinions; people have not gotten much beyond what was inaugurated by Liebig, who enriched the soil with mineral substances — nitrogen, phosphoric acid, potash. At its present state of development, the fertilizer industry produces nitrogen that is bound to very strong acids, to hydrochloric acid and sulfuric acid, and agriculture is now faced with the danger — which has already become a reality to some extent — that fertilizers will be added to the soil regardless of how the plants relate to them. These fertilizers create an acid reaction in the soil, and in a dry summer the results are disastrous.

STEINER: In point of fact, the only really healthy fertilizer is cattle manure, and all further considerations must be based on this. However, we also need to find a means — and I don't think we are far enough along yet to fully describe this — a means of bringing about the healthy nitrogen content of the soil in a way that allows the soil to become worked through by the earthworms and other such animals.

And then it is also a matter of finding the necessary weeds, that is, the necessary companion plants. As I said yesterday to Herr Stegemann, who has now dedicated himself to the farming activity here, it is important, for example, to plant sainfoin [*Onobrychis viciaefolia*] at least along the edges of wheat and grain fields. Such influences definitely do exist. You should investigate systematically how important it is to plant horseradish along the edges of your potato fields, and to have a sprinkling of cornflowers [*Centaurea cyanus*] in your grain fields, but to eradicate the field poppy [*Papaver rhoeas*].<sup>5</sup>

These things must be considered in connection with the fertilizer question. Otherwise you are left with the abstract principles of acid formation in the soil, and the simplistic question of how to counteract them. Over time this completely destroys the soil for plant growth; the soil simply becomes deaf.

STREICHER: The farmers too have the feeling that the soil is impoverished by the use of artificial fertilizers.

STEINER: It's not at all a bad expression: they make the soil deaf. On the other hand, one must not fall into the extreme of using plants as fertilizers; these too must not be regarded as being favorable for plant growth. Really, the only ideal fertilizer is cattle manure, not plant manure. This must be the basic principle, and then one must also be clear that very much depends on the companion plants, namely the legumes, particularly sainfoin. Herbaceous plants such as these should, if possible, be planted in a dry soil, whereas cereal plants need a more moist soil. But here one's whole personal relationship to the seeds is certainly also of importance — no matter how strange this sounds to contemporary chemists and biologists. If you really test this carefully, you will find that it makes a difference in how well something flourishes, whether the sower simply takes the seeds from the sack and throws them down, or whether he has the habit of shaking them in his hand a little bit and gently throwing or strewing them. There you will find differences that are of importance in relation to the question of fertilizers.

It would be good for you to discuss these matters with farmers, who cannot help but be interested in them. They have experienced some of these things, only their experiences have been forgotten. Modern agriculture no longer has room for such experiences. I would advise you — I think it will serve you well — to look in old peasant almanacs for clues about the fertilizer question. They contain indications that are sometimes curious, but which you will certainly be able to formulate in chemical terms.

STREICHER: Modern farmers, especially just now, have had a difficult time because their cattle herds in the last year have been decimated by epidemics and by lack of fodder.

STEINER: Here scientists only need to develop the courage to point to the main culprit. The extravagant praise for stall feeding in recent years is certainly connected with the incidence of tuberculosis among cattle,<sup>6</sup> and also with the fact that although for a time the animals may perhaps produce more milk or whatever, their state of health over generations inevitably declines. Even the manure collected from the pasture by the peasant woman with a basket on her back and a shovel

are first subjected to a vigorous drying and roasting process, which has the advantage of making them easier to grind down, but which also involves a loss in weight of up to about 15%, mostly of water.) Dr. Steiner answered to the effect that unroasted horn meal was better on account of the higher hydrogen content. For the proper effect on the manure, this hydrogen content was in fact more important than the nitrogen content. Modern science had only not yet appreciated the significance of the hydrogen content for the growth of plants.

*F. Reported by Frau A. Ganz [no further details known]:<sup>12</sup>*

To a question about the use of mineral fertilizers, Dr. Steiner answered: If obliged to use mineral fertilizers, one should always mix them first with dung or liquid manure.

Dr. Steiner strongly rejected the use of outhouse wastes, saying they should also not be emptied out on fresh compost "even if the compost will only be needed in four years, because it will still contain things that are not good."

*G. Reported by the gardening teacher Gertrud Michels:<sup>12</sup>*

Some years before the war [1914], Dr. Steiner said in answer to a question about using night soil, that it should not be used because the cycle from the human being to the plant and back to the human being is too short (in horticulture). The proper cycle is from the human being to the plant, from the plant to the animal, from the animal again to the plant, and only then from the plant back to the human being.

Dr. Steiner repeatedly and expressly rejected the use of peat for the improvement of the soil, not only as a fertilizer but also for improving the soil physically. Instead, humus and humus again should be given to the soil in every conceivable form (compost, leaf-mold, etc.).

## Part 2. On Soil Conditions

*A. Reported by the agronomist Ernst Stegemann:<sup>12,15</sup>*

In planting oats, one should take care that the soil is dried off. The same applies to potatoes and root crops. Wheat and rye on the other hand should be sown in a moist soil.

*B. Reported by the agronomist and physician Count Adalbert von Keyserlingk; the following exchange occurred during a walk with his parents (Carl and Johanna von Keyserlingk) and Rudolf Steiner at Whitsun 1924:<sup>16</sup>*

My mother complained about her poorly blooming roses, but Rudolf Steiner believed not much could be done about this; it was due to the excessive iron in the soil. My mother was not satisfied, however, and insisted that there must be some way to have the roses bloom more nicely. Rudolf Steiner reflected a moment and then said, "Try adding highly diluted lead."

## Part 3. On Pests, Weeds, and Plant Diseases

*A. Reported by the biochemist Ehrenfried E. Pfeiffer:<sup>12</sup>*

In Dornach and Arlesheim we suffer from an awful plague of snails, which eat up all the leaves. To counteract them, Dr. Steiner advised spraying a 0.3% dilution of pine seeds. This is to be understood as referring to the soluble content of these seeds — presumably extracted by pressure — which should be dissolved in water to a dilution of 3-in-1000 and then sprayed over the affected beds. Dr. Steiner said we should try this and that it would be very interesting if parallel experiments were made on other beds.<sup>17</sup>

To eradicate weeds more effectively, the rootstock as well as seed of the weed may be burned.<sup>18</sup>

To a question about plant diseases, Dr. Steiner replied that properly speaking there can be no such thing as sick plants, since the etheric is always healthy. If disturbances occur in spite of this, this is a sign that something is wrong in the environment of the plant, especially in the soil. Then it is not the plant that must be healed, but the soil. Thus, to strengthen trees that are growing old, one could try putting fresh soil around their roots — soil taken from the neighborhood of the roots of *Prunus spinosa* [blackthorn] or birch.<sup>19</sup>

*B. Reported by the agronomist Ernst Stegemann:<sup>12</sup>*

Against wireworm [*Limonius sp.*], Dr. Steiner suggested the following: Expose rainwater to the waning moon for 14 days, and then pour the water over the places where the worm occurs. Enough water should be used so that the soil is moistened through to the depth where the worm lives.

To counteract the degeneration of the potato, Dr. Steiner suggested cutting the seed-potato into little pieces each containing only a single eye. This process should be repeated the following year.

*C. Reported by the horticulturist Franz Lippert:<sup>12</sup>*

Under trees suffering from woolly apple aphid [*Eriosoma lanigerum*], a ring of nasturtiums [*Tropaeolum majus*] should be planted.<sup>20</sup>

*D. Reported by the agronomist and physician Count Adalbert von Keyserlingk:<sup>12</sup>*

In answer to a question by Count Carl von Keyserlingk concerning smut in cereal crops, Dr. Steiner suggested planting stinging nettles around the fields.<sup>21</sup>

Part 4. On Companion Plants<sup>22</sup>

*A. Reported by the agronomist Ernst Stegemann:<sup>12</sup>*

As border plants for cereals, Dr. Steiner indicated dead-nettle [*Lamium sp.*<sup>23</sup>] and sainfoin, which should be planted four to five meters apart. For root crops and potatoes, horseradish would be appropriate. It need only be planted at the four corners of the plot, but must be removed every year.

*B. Reported by the biochemist Ehrenfried E. Pfeiffer:<sup>12</sup>*

As border plants for vegetable gardens, Dr. Steiner mentioned sainfoin, dandelion, and horseradish.

Part 5. On the Biodynamic Preparations

*A. Reported by the biochemist Ehrenfried E. Pfeiffer:<sup>12</sup>*

On a walk through the Dornach and Arlesheim plantings, Dr. Steiner recommended the following method for strengthening preparation 500 [horn manure] before applying it on meadows and land where fruit trees grow. Take a few fruits and a handful of leaves of the trees in question and make a decoction of these in a liter of water; then add this "fruit-tea" to the bucket in which the content of the cow horn is being stirred.

To strengthen sick and feeble fruit trees, dig a circular trench to about a hand's depth — corresponding to the edge of the tree's crown — and into this pour large quantities of the stirred preparation 500.

For the horn silica preparation [501], Dr. Steiner said it would also suffice to fill the horn with a bean-sized piece of [powdered] quartz that had been mixed and kneaded together with soil from the field to be sprayed. If a little bit of this were dissolved and stirred, this would still contain enough silica radiation.



Count Carl von Keyserlingk brought problems from still another quarter. Then Dr. Wachsmuth and the present writer went to Dr. Steiner with questions dealing particularly with the etheric nature of plants, and with formative forces in general. In reply to a question about plant diseases, Dr. Steiner told the writer that plants themselves could never be diseased in a primary sense, "since they are the products of a healthy etheric world." They suffer rather from diseased conditions in their environment, especially in the soil; the causes of so-called plant diseases should be sought there. Ernst Stegemann was given special indications as to the point of view from which a farmer could approach his task, and was shown some first steps in the breeding of new plant types as a first impetus towards the subsequent establishment of the biodynamic movement.

In 1922<sup>2</sup> Rudolf Steiner described for the first time how to make the biodynamic preparations, simply giving the recipe without any sort of explanation — just "do this and then that." Dr. Wachsmuth and I then proceeded to make the first batch of preparation 500. This was then buried in the garden of the "Sonnenhof" in Arlesheim, Switzerland. The momentous day came in the early summer of 1923 when this first lot of 500 was dug up again in the presence of Dr. Steiner, Dr. Wegman, Dr. Wachsmuth, a few other co-workers and myself. It was a sunny afternoon. We began digging at the spot where memory, aided by a few landmarks, prompted us to search. We dug on and on. The reader will understand that a good deal more sweating was done over the waste of Dr. Steiner's time than over the strenuousness of the labor. Finally he became impatient and turned to leave for a five o'clock appointment at his studio. The spade grated on the first cow horn in the very nick of time.

Dr. Steiner turned back, called for a pail of water, and proceeded to show us how to apportion the horn's contents to the water, and the correct way of stirring it. As the author's walking-stick was the only stirring implement at hand, it was pressed into service. Rudolf Steiner was particularly concerned with demonstrating the energetic stirring, the forming of a funnel or crater, and the rapid changing of direction to make a whirlpool. Nothing was said about the possibility of stirring

with the hand or with a birch-whisk. Brief directions followed as to how the preparation was to be sprayed when the stirring was finished. Dr. Steiner then indicated with a motion of his hand over the garden how large an area the available spray would cover. Such was the momentous occasion marking the birth-hour of a world-wide agricultural movement.

What impressed me at the time, and still gives one much to think about, was how these step-by-step developments illustrate Dr. Steiner's practical way of working. He never proceeded from preconceived abstract dogma, but always dealt with the concrete given facts of the situation. There was such germinal potency in his indications that a few sentences or a short paragraph often sufficed to create the foundation for a farmer's or scientist's whole life-work; the agriculture course is full of such instances. A study of his indications can therefore scarcely be thorough enough. One does not have to try to puzzle them out, but can simply follow them to the letter.

Dr. Steiner once said, with an understanding smile, in another, very grave situation, that there were two types of people engaged in anthroposophical work: the older ones, who understood everything, but did nothing with it, and the younger ones, who understood only partially or not at all, but immediately put suggestions into practice. We obviously trod the younger path in the agricultural movement, which did all its learning in the hard school of experience. Only now does the total picture of the new impulse given by Rudolf Steiner to agriculture stand clearly before us, even though we still have far to go to exhaust all its possibilities. Accomplishments to date are merely the first step. Every day brings new experience and opens new perspectives.

\* \* \*

Shortly before 1924, Count Keyserlingk set to work in dead earnest to persuade Dr. Steiner to give an agricultural course. As Dr. Steiner was already overwhelmed with work, tours and lectures, he put off his decision from week to week. The undaunted Count then

dispatched his nephew to Dornach, with orders to camp on Dr. Steiner's doorstep and refuse to leave without a definite commitment for the course. This was finally given.

The agriculture course was held from June 7 to 16, 1924, in the hospitable home of Count and Countess Keyserlingk at Koberwitz, near Breslau. It was followed by further consultations and lectures in Breslau, among them the famous "Address to Youth."<sup>3</sup> I myself had to forego attendance at the course, as Dr. Steiner had asked me to stay at home to help take care of someone who was seriously ill. "I'll write and tell you what goes on at the course," Dr. Steiner said by way of solace. He never did get round to writing, no doubt because the heavy demands on him; this was understood and regretfully accepted. On his return to Dornach, however, there was an opportunity for discussing the general situation. When I asked him whether the new methods should be started on an experimental basis, he replied: "The most important thing is to make the benefits of our agricultural preparations available to the largest possible areas over the entire Earth, so that the Earth may be healed and the nutritive quality of its produce improved in every respect. That should be our first objective. The experiments can come later." He obviously thought that the proposed methods should be applied at once.

This can be understood against the background of a conversation I had with Dr. Steiner en route from Stuttgart to Dornach shortly before the agriculture course was given. He had been speaking of the need for a deepening of esoteric life, and in this connection mentioned certain faults typically found in spiritual movements. I then asked, "How can it happen that the spiritual impulse, and especially the inner schooling, for which you are constantly providing stimulus and guidance bear so little fruit? Why do the people concerned give so little evidence of spiritual experience, in spite of all their efforts? Why, worst of all, is the will for action, for the carrying out of these spiritual impulses, so weak?" I was particularly anxious to get an answer to the question as to how one could build a bridge to active participation and the carrying out of spiritual intentions without being pulled off the right path by personal ambition, illusions and petty jealousies; for these

were the negative qualities Rudolf Steiner had named as the main inner hindrances. Then came the surprising and thought-provoking answer: "This is a problem of nutrition. Nutrition as it is today does not supply the strength necessary for manifesting the spirit in physical life. A bridge can no longer be built from thinking to will and action. Food plants no longer contain the forces people need for this."<sup>4</sup>

A nutritional problem which, if solved, would enable the spirit to become manifest and realize itself in human beings! With this as a background one can understand why Dr. Steiner said that "the benefits of the biodynamic preparations should be made available as quickly as possible to the largest possible areas of the entire Earth, for the Earth's healing."

This puts the Koberwitz course into proper perspective as an introduction to understanding spiritual, cosmic forces and making them effective again in the plant world.

In discussing ways and means of propagating the methods, Dr. Steiner said also that the good effects of the preparations and of the whole method itself were "for everybody, for all farmers" — in other words, were not intended to be the special privilege of a small, select group. This needs to be more emphasized in view of the fact that admission to the course was limited to farmers, gardeners, and scientists who had both practical experience and a spiritual-scientific background. The latter is essential to understanding and evaluating what Rudolf Steiner set forth, but the biodynamic method can be applied by any farmer. It is important to point this out, for later on many people came to believe that only anthroposophists can practice the biodynamic method. On the other hand, it is certainly true that a grasp of biodynamic practices gradually opens up a wholly new perspective on the world, and that the practitioner acquires and applies a kind of judgment in dealing with biological — i.e. living — processes and facts which is different from that of a more materialistic chemical farmer; he follows nature's dynamic play of forces with a greater degree of interest and awareness. But it is also true that there is a considerable difference between mere application of the method and creative participation in the work. From the first, actual practice has been closely bound up with

the work of the Natural Science Section of the Goetheanum at Dornach. This was to be the source, the creative, fructifying element; while the practical workers brought back their results and questions.

The name, "Biodynamic Agricultural Method," did not originate with Dr. Steiner, but with the Experimental Circle concerned with the practical application of the new direction of thought.

In the agriculture course, which was attended by some sixty persons,<sup>5</sup> Rudolf Steiner set forth the basic new way of thinking about the relationship of earth and soil to the formative forces of the etheric, astral, and ego activity of nature. He pointed out particularly how the health of soil, plants, and animals depends upon bringing nature into connection again with the cosmic creative, shaping forces. The practical method he gave for treating soil, manure, and compost, and especially for making the biodynamic preparations, was intended above all to serve the purpose of reanimating the natural forces which in nature and in modern agriculture were on the wane. "This must be achieved in actual practice," Rudolf Steiner told me. He showed how much it meant to him to have the School of Spiritual Science going hand in hand with real-life practicality when he spoke on another occasion of wanting to have teachers at the School alternate a few years of teaching (three years was the period mentioned) with a subsequent period of three years spent in work outside, so that by this alternation they would never get out of touch with the conditions and challenges of real life.

## I. EDITORIAL NOTES

The official stenographer for this Course was Kurt Walther; the first German edition (1925) was based on the transcription of his shorthand notes, which are no longer in existence. In the second German edition (1929), a number of improvements in the text were made from the shorthand notes of Lili Kolisko, which also no longer exist. It is not possible to ascertain to what extent the notes of other participants may have been used.

The present English translation of the Course is based on the seventh German edition (1984). However, in several instances (indicated below), minor departures have been made based on a comparison with the first German edition (1925).

Rudolf Steiner's blackboard drawings at the end of this volume could be preserved because they were drawn on black paper hung over the blackboard. These originals were nevertheless misplaced for many years and were first published in the seventh German edition (1984). Earlier German editions contained only the hatched drawings in the text, which have been retained in this edition as an aid to the reader. The hatched drawings were made by A. Turgenieff and M. Ziegler from sketches made by E. Reise during the Course. In this English edition the first hatched drawing in Lecture One has been slightly amended to conform more closely to the original blackboard drawing.

Specific aspects of the historical and conceptual context of the Course are conveyed in the following annotation. Access is provided here also to subsequent literature relevant to the Course. (The full references are listed beginning on page 283.) Although much of this literature is in German, English translations are available in most cases; where none is cited, readers should inquire whether new translations have appeared since publication of this volume. In the case of some of Rudolf Steiner's works, brief excerpts are included in the notes below. For practical guidelines and advice on biodynamic farming and gardening, readers are encouraged to contact the Bio-Dynamic Association in their country or region (see the List of Useful Addresses, page 296).

## INTRODUCTORY: RUDOLF STEINER'S REPORT

1. "The General Anthroposophical Society is meant to be a union of people who desire to further the life of the soul — both in the individual and in human society — on the basis of a true knowledge of the Spiritual World" (First Statute of the General Anthroposophical Society; see Steiner 1924c: 4). The Society's international headquarters are at the Goetheanum in Dornach (near Basel), Switzerland. For further information, see Carlgren (1979).
2. The city of Breslau is located on the Oder River in the region of Central Europe known as Silesia; the village of Koberwitz lies about 25 kilometers southwest of Breslau. In 1924 Breslau and Koberwitz were part of German territory; since 1945 they have been part of Poland and have been renamed Wroclaw and Kobierzyce respectively.
3. The estate consisted of 18 farms belonging to a large sugar factory. Although the farms' primary crop was sugar beets for the factory, they were still quite diversified and supported many cattle for their manure. Count Carl von Keyserlingk (1868-1928) was director of the agricultural operations, which involved over 1000 workers (Keyserlingk 1985).
4. Steiner refers here to large periods in the spiritual development of humanity. The Kali Yuga (Dark Age) was a 5000-year period that ended in 1899; the present Light Age will last for the next 2500 years. For further details, see Steiner (1910, Feb. 2).
5. The Natural Science Section is part of the School of Spiritual Science (*Freie Hochschule für Geisteswissenschaft*) at the Goetheanum in Dornach, Switzerland; an agriculture department is included in this Section. On the "Circle," see Steiner's Address to Members of the Agricultural Experimental Circle (p. 180).
6. Elisabeth Vreede (1879-1943): first leader of the Section for Mathematics and Astronomy at the School of Spiritual Science.
7. Ernst Stegemann (1882-1943): one of the first agronomists to approach Rudolf Steiner with agricultural questions (cf. Appendix C).
8. Until 1963 the text of this Course was reserved as internal working material for members of the Agricultural Experimental Circle.
9. Eurythmy is an art of movement in which the invisible sounds of speech and music come to visible expression.
10. See Steiner (1924b). Karma is the principle of spiritual cause and effect.
11. See Steiner (1924a).
12. The refounding of the Anthroposophical Society took place at Christmas 1923.
13. Marie Steiner (1867-1948): first leader of the Section for the Spoken Arts and Music at the School of Spiritual Science; wife of Rudolf Steiner. (It is German custom to address the wife of a man with a doctorate as "Frau Dr.")

14. The Class Lessons were given in Breslau for members of the School of Spiritual Science (June 12 & 13, 1924; no transcripts are available). The two youth-group meetings were held in Breslau (Steiner 1924, June 9 & 14); an "unofficial" youth-group meeting also took place in Koberwitz (Steiner 1924, June 17).
15. For an account of this visit and the beginnings of the anthroposophical curative-educational movement, see Strohschein (1958).
16. Steiner was director of a school founded by one of the owners of the Waldorf-Astoria cigarette factory for the children of the factory workers. On the later growth of this school into a worldwide independent school movement, see Barnes (1980).
17. Penmaenmawr, England (Steiner 1923, Aug. 23).
18. Compare also Steiner's description in Penmaenmawr (1923, Aug. 23):

As unlikely as it may sound to you, in your metabolic-limb system you carry something that in respect to its substance does not originate from the Earth but . . . from the substance that is present in the spiritual world. You will say: But I see my legs, they are physically perceptible; if they consisted of *spiritual* substance they would not be visible. This objection is completely justified, but you must take the following into account.

Your true legs actually consist of spiritual substance, and your true arms are also thoroughly spiritual; [earthly] matter is only sent into them from the head. . . . Thus, the substance that originates from the spiritual world is permeated and saturated with physical matter from the head. . . . in terms of substance, the head of the human being extends throughout the body.

. . . The human limbs and also the digestive system are formed wholly out of heavenly substance. They would not be visible were they not saturated with earthly substance from the head.

These relationships are also discussed in Lecture Four and Lecture Eight of this volume.

## LECTURE ONE

1. Rudolf Steiner had specifically requested that the eurythmists (cf. Introductory, note 9, above) attend the agricultural lectures in Koberwitz (Groot 1989: 36).
2. "Der Kommende Tag, A.G." (The Coming Day, Inc.): a socially innovative joint stock company formed in Stuttgart in 1920. Most of its profits were dedicated to anthroposophical educational and research initiatives. It functioned as a holding company and eventually encompassed about twenty businesses, including a number of farms and mills. It was weakened by Germany's hyperinflation — which culminated in the collapse of the currency in November 1923 — and was

dissolved in 1925. For further information, see *Der Kommende Tag* (1921) and Kühn (1978).

3. Gustav Theodor Fechner (1801-1887): German scientist and philosopher. On his work concerning the Moon, see Fechner (1856); see also Steiner (1909, Dec. 9).
4. Matthias Jakob Schleiden (1804-1881): German botanist; founder of the cell theory of plants.
5. For studies on correlations between sunspots and major events in human history, see Dewey (1960), Payne (1984), and Wachsmuth (1950: chap. 5).
6. For further details on this geocentric sequence of planets, see Davidson (1985: chap. 8) and Vreede (1980: 64-71). These seven planetary names refer not only to the visible planets but also to the "spheres of influence" delineated by their orbits:

In reality, the Moon is what is circumscribed by its orbit; we — along with the Earth — are within the sphere of the Moon. Similarly, in a certain respect we are also within the sphere of the Sun and the spheres of the planets. (Steiner 1921, Jan. 18)

7. Silica is generally present in plants as silica gel (polymerized silicic acid) (Lewin & Reimann 1969). The figure of 90% silicic acid in equisetum is evidently based on an ash analysis.
8. Present estimates of the abundance of silica (SiO<sub>2</sub>) in the Earth's crust are as high as 60% (by weight) (Mason & Moore 1982).
9. Within Saturn's thirty-year orbital period, fifteen years is the sum of time Saturn is above the horizon of a given location.
10. The "ascending period" of a planet is evidently the period during which the height of its daily arc above the horizon is increasing. With the Sun this is the six-month period between winter solstice and summer solstice; with Saturn this is a fifteen-year period. For further discussion, see Vreede (1936).

## LECTURE TWO

1. In spiritual science, four kinds of ether or etheric force are distinguished: *life-ether*, *chemical-ether*, *light-ether*, and *warmth-ether*. These forces are opposite in character to the physical forces; whereas the physical forces radiate out from a center (e.g. the Earth) and bring about contraction and densification, the etheric forces work inward from the cosmic periphery and bring about expansion and dematerialization. For a mathematical-geometrical description of this polarity, see Adams (1965) and Adams & Whicher (1980).

The interaction of the etheric and physical forces is regulated by higher-order forces (esp. those of the planets and stars; see Steiner 1920, Apr. 24, and Steiner & Wegman 1925). In living substances, the ethers — particularly the

*life-ether* — are inwardly united with the physical substances; in non-living substances, the ethers have withdrawn and work only from outside. For further discussion on the individual ethers — and on their relation to the classical elements *earth*, *water*, *air*, and *fire* — see Bockemühl (1985), Lehms (1985), Marti (1984; 1989), Steiner (1919, Dec. 23 & 24; 1920, Mar. 1-14; 1921, Apr. 12; 1921, June 17), and Wachsmuth (1932; 1980). On the difference between the ethers and the hypothetical ether of 19th century physics, see Steiner (1920, Apr. 16); on the relation to theories of "vitalism," see Steiner (1904: chap. 1).

2. For a study on the strength of the crystallization forces at different seasons and at different depths in the Earth, see Kolisko & Kolisko (1978: 33-50).
3. This indication is not explicit in the remainder of this Course. Compare, however, Steiner's reference to feldspar (a parent material of clay) in Lecture Four.
4. Compare Steiner's handwritten notes (Appendix A, p. 201). Compare also Steiner's description of the life of whole Earth as sleeping in the summer (exhaling its soul), and waking in the winter (inhaling its soul) (1910, Dec. 8; 1923, Mar. 31).
5. For further discussion on chaos and seed formation, see Grohmann (1981), Steiner (1921, July 1; 1923, Dec. 30), Steiner & Wegman (1925: chap. 5), and Vreede (1980: 295-308). Compare also Steiner (1921, June 19).
6. Sainfoin (*Onobrychis viciifolia*) is a leguminous crop grown for hay and pasturage.
7. On soils for different crops, compare Steiner's handwritten notes (Appendix A, pp. 205-206).
8. On the Kali Yuga, see Introductory, note 4, above.
9. On the "light effects" of silica versus humus, see the plant experiments of Kolisko & Kolisko (1978: 71-79) and Künzel (1950).
10. Compare Steiner (1923, Oct. 24):

Every young animal has a mother, and she too has a mother, and so on. The mother animals have absorbed the Sun's warmth and light; it is within them and is then inherited. And just as we release the Sun's warmth from coal, so does the little animal in the mother's womb take in the sunlight that is stored there.

11. For further discussion, see Steiner (1923, Dec. 2; 1924, Apr. 24, evening). See also Poppelbaum (1927) and Stauffer (1983: chap. 11).
12. For studies on the "agricultural individuality," see Hurter (1988), M.W. Pfeiffer (1990), and Reitsma (1960), and de Vries (1992).

## LECTURE THREE

1. The life of an individual being is maintained by its "etheric body." For further discussion, see Poppelbaum (1985) and Steiner (1904; 1913).

## 2. Compare Steiner &amp; Wegman (1925: chap. 4):

One need not be put off by the expression "astral." The forces that radiate outward [from the Earth] are the earthly forces, while the forces that radiate inward are the forces of the cosmic circumference around the Earth. In the "astral," something is present that is of a higher order than these two kinds of forces. It is this that first makes the Earth itself into a cosmic body, into a "star" (astrum). By means of the physical [earthly] forces the Earth separates itself from the universe; by means of the etheric [cosmic] forces it lets itself be influenced by the universe; by means of the "astral" forces it becomes an independent individuality within the universe.

In the animal [and human] organism, the "astral" is an independent, self-contained element, just like the etheric and physical bodies. One can therefore speak of this element as an "astral body."

On the near equivalence of the terms "astral body" and "soul," see Steiner (1904: chap. 1).

3. On the soul as mediator, see Steiner (1904; 1910, Nov. 17).
4. Further aspects of nitrogen's complex role as mediator between carbon and oxygen — especially the transitory formation of poisonous cyanogen (CN) compounds — are described in Steiner (1923, Oct. 10; 1923, Oct. 16, afternoon & evening). See also Reuter (1954; 1958) and Schaefer (1986).
5. For a review of experiments on nitrogen metabolism and nitrogen excretion via the lungs, see Schaefer (1986). Compare also Benesch & Wilde (1983: 109).
6. Compare Steiner (1908, Feb. 8):

This astrality that works upon the plant causes the plant to culminate in flower and fruit. If the etheric body alone were to work, the plant would unfold leaf after leaf . . . . The etheric body is damped down, so to speak, by the astrality.

Compare also Appendix B, note 9, below.

7. Compare Steiner's description of these five elements in his handwritten notes (Appendix A, p. 211). For further discussion, see König (1982: 57-158).
8. The leaves of legumes are particularly rich in protein-nitrogen, which is usually characteristic of fruits and seeds; conversely, legume fruits (pods) are often thin and leaf-like (cf. Rohlf's 1985).
9. Steiner apparently has in mind here the seeds of sainfoin in particular (cf. Appendix A, p. 200), which has rather short-lived seeds compared with those of many other legumes (USDA 1948: 751).
10. On the legumes' relation to winter, compare Lecture Two, note 4, above. Compare also Steiner's notes (Appendix A, p. 212).

## LECTURE FOUR

1. On the relation between the forces in food and those in the body, compare Steiner (1919, Jan. 25):

You can picture it to yourself as follows: When you take in food, the food causes small explosions in you. You need these explosions because you must then destroy them, paralyze them, annul them, and in this annulling you develop your actual inner strength. The human being requires stimulation, and that, essentially, is what food is for us: a stimulation.

On the origin of the body's substance, compare Steiner (1923, July 18):

When we eat a potato, for example, it is not a matter of absorbing something from the potato; rather, the potato merely stimulates us . . . . There then arises in us the force to again drive out the potato, and while we are driving it out, there comes to us from the ether . . . that which builds up our body in the course of seven years. We do not actually build up our body from the substances of the Earth. What we eat is merely there so that we can be stimulated. In reality we build up our body from what is above. . . . You have compressed your heart [for example] from the sunlight, and the food you have eaten has only stimulated you to compress the sunlight to this extent.

For further discussion, see Hauschka (1929), König (1982: 193-265), and Schmidt (1980: 75-80, 179-181).

2. The regions of black earth — also called chernozem or mollisol — are found primarily in the Great Plains of North America and in the Steppes of Russia.
3. Compare Rudolf Steiner's notes (Appendix A, p. 200). Compare also Appendix B, part 4.
4. The sequence and position in the text of Drawing 9 and Drawing 10 (p. 70) have been altered relative to the prior German editions of this Course in order to conform more closely to the descriptions in the text.
5. On the effects of mineral fertilizers on plant growth and quality, see Bockemühl (1975), Engqvist (1962; 1965), Goldstein (1981), Grone-Gültzow (1973), Koepf et al. (1976: 371-379), and E.E. Pfeiffer (1983: chap. 13).
6. Note that Steiner has specified a compost derived primarily from plant materials, i.e., a compost that tends to be acid and can afford the alkalinity of lime. Quicklime (calcium oxide) is highly caustic and should be used with caution.
7. On astralization as a process of dampening or poisoning etheric life, see Steiner (1921, Apr. 15); compare also Appendix A (p. 202). On the dampening of etheric life in compost, compare Appendix A (p. 222).

8. For a discussion of astralization processes in the human being, see Steiner (1922, Oct. 26-28; see also 1922, Oct. 20-23).
9. For a study on horns and the development of bodily form, see Voegelé (1960a).
10. For anthroposophical studies on antlers and horns, see König (1982: 273-278), Poppelbaum (1992), Ritter (1976), and Schad (1977: chaps. 6 & 7).
11. The original anthroposophical foot-and-mouth remedy is described in Kolisko & Kolisko (1978: 263-282); see also Werr (1953: 69-75).
12. See Steiner (1907, Oct. 19) for an explicit mention of chaos in connection with animal manure.
13. The area indicated by Steiner was later measured to be about 1250 square meters, or 0.3 acres (A. von Wistinghausen 1982: 24).
14. Feldspar refers to a group of aluminum silicates, principally of soda, potash, and lime; orthoclase is potassium aluminum silicate ( $KAlSi_3O_8$ ).  
Since feldspar weathers to become clay, a fact which Steiner was aware of (cf. 1923, Feb. 17), the mention of feldspar here may be pertinent to his promised indication regarding a dosage of clay for certain soils (see p. 33).
15. The horn manure and horn silica sprays mentioned in this lecture are also known respectively as Preparations 500 and 501. For further discussion on the nature of these preparations, see Koepf (1989), Lievegoed (1951), M.W. Pfeiffer (1990: pt. 4), and Voegelé (1960b; 1960d). For a review of empirical studies on the effects of these sprays on plant growth and quality, see Koepf (1993). On their production and use, see Brinton (1983; 1986), Heinze (1970), Koepf (1971), E.E. Pfeiffer (1984), Procter (1989), Sattler & von Wistinghausen (1990: 90-96), Thun (1973), C. von Wistinghausen & Scheibe (1981), and C. von Wistinghausen et al. (1991). Consult the Bio-Dynamic Association for further details.

#### FIRST DISCUSSION

1. Marie Ritter (died 1924): German pharmacist who developed "photo-dynamic" herbal remedies (not related to biodynamic agriculture).
2. A Swiss milk bucket holds about eight liters (2 gallons). For information on recommended weights and measures in specific countries or climates, contact the local Bio-Dynamic Association.
3. Western cattle may adapt more slowly because their bodies are especially "dense"; the bodies of human beings in America are described by Steiner as being "very, very dense" (1921, Jan. 6).
4. On the effect of the sowing season of one generation on the growth of the next generation, and the implications of this for plant breeding, see Voegelé (1929; 1960c).

5. This question was recorded by one of the stenographers (Kolisko), but not by the other (Walther) (cf. p. 263). Hence it was not included in the first German edition of this Course and in subsequent editions came to be inserted in the wrong position (i.e., it was coupled with the next question, while Steiner's reply was merged with his reply to the previous question).
6. The "Bockschen Saal" was an auditorium belonging to a music business in Breslau. The farmers held a meeting there on June 8, 1924, which Steiner attended; no transcript is available.
7. Steiner's talk was his Address to Members of the Experimental Circle (p. 180).
8. "Potash-magnesia" refers to a sulfate of potassium and magnesium (see Appendix B, part 1C). The question presumably stems from the discussion in the Bockschen Saal (cf. note 6, above).

#### LECTURE FIVE

1. On the role of silicic acid, lead, mercury, and arsenic in plant nutrition, compare Steiner's notes (Appendix A, p. 228).
2. Lili Kolisko (1889-1976) was the director of the Biological Institute in Stuttgart, a small laboratory supported by Der Kommende Tag (cf. Lecture One, note 2, above). On Kolisko's work, see Junge (1991) and L. Kolisko (1923); for a summary of subsequent research, see Husemann (1992).
3. The yarrow is *Achillea millefolium* (Appendix A, p. 225).
4. On the Agricultural Circle, see Steiner's Address to Members of the Agricultural Experimental Circle (p. 180).
5. On the use of the bladder, compare Steiner's instructions in connection with a medicinal substance derived from mistletoe (Leroi 1987: 239):  
  
Best stored in an animal bladder, because the product obtained is very delicate, and because the two forces should not be lost, which would happen if something inorganic was used.
6. *Chamomilla officinalis*, the German or true chamomile, is now classified as *Matricaria chamomilla*, or sometimes also as *Matricaria recutita*. (The "Chamomilla matricaria" in Steiner's notes — Appendix A, p. 225 — appears never to have been a standard taxonomic name.)
7. For an indication that the chamomile-filled intestines might also be treated like the yarrow-filled bladder (i.e., first suspended above ground during the summer), see Steiner's notes (Appendix A, p. 225). Consult the Bio-Dynamic Association for further information.
8. For further discussion on the radiations of iron, see König (1950; 1959), Pelikan (1962), and Steiner (1921, Apr. 18). On the relation between iron and stinging nettles, see Pelikan (1973: 79-82; 1978: 140-143).

9. The figure of 77% is evidently based on an ash analysis of *Quercus robur* (Appendix A, p. 225). *Quercus robur* (pedunculate oak) is indigenous to Eurasia and should not be confused with the American *Quercus rubra* (red oak). For a comparative atomic absorption analysis of bark from several eastern American oak species, see Lisle (1977).
10. On the association of oxygen and nitrogen in the air, compare Appendix A (p. 208) where a ratio of 1:3 is indicated (oxygen is 23% and nitrogen 75% of dry air by weight). On the role of hydrogen in the transmutation of lime into nitrogen, see Benesch & Wilde (1983: 107-115); compare also Appendix B, part 1E, and Remer (1983: chap. 2).
11. For a tentative discussion on the identity of this substance, see König (1982: 246-249).
12. The abdominal cavity of mammals is lined with a membrane called the *peritoneum*. The stomach and intestines are suspended from the dorsal side of the abdomen by a sinuous fold in the peritoneum known as the *dorsal mesentery* (the *ruffle* to butchers). The portion of the mesentery supporting the stomach (rumen) is itself folded and extended to form an apron over the front of the abdomen; this apron is known as the *greater omentum* (the *caul* or *net* to butchers). It is not clear whether Steiner had a particular portion of the mesentery in mind. (Compare also the Third Discussion, p. 135).
13. For an indication that the dandelion-filled mesentery might also be treated like the yarrow-filled bladder (i.e., first suspended above ground during the summer), see Steiner's notes (Appendix A, p. 225). Consult the Bio-Dynamic Association for further information.
14. For studies on the relationship between phosphorus and valerian, see Brinton (1976), Furlenmeier (1987), Krüger (1935), and Pelikan (1978: chap. 4).
15. The six compost preparations described here are also known as Preparations 502 through 507. For further discussion on the nature of these preparations, see Bockemühl (1969; 1970), Bockemühl & Clark (1977), Brinton (1983), Brockman (1967), Grohmann (1962), Grotzke (1964; 1965; 1966; 1988), Kolisko & Kolisko (1978: 193-212), König (1982: 279-313), Lievegoed (1951), Lippert (1981), Morrow (1987; 1991), M.W. Pfeiffer (1990: pt. 4), Plumb-Mentjes (1982; 1983), Simonis (1974), and de Vries (1992). For a review of empirical studies on the effects of these preparations on decomposition processes, soil characteristics, and produce quality, see Koepf (1993). On the production and use of these preparations, see Procter (1989), Sattler & von Wistinghausen (1990: 83-88), C. von Wistinghausen & Scheibe (1981), and C. von Wistinghausen et al. (1991). Consult the Bio-Dynamic Association for further details.

## SECOND DISCUSSION

1. The red deer (*Cervus elaphus*) is native to Europe, North Africa, and parts of Asia. In North America the most closely related species is the wapiti or elk (*Cervus canadensis*), which is sometimes also considered a subspecies of the red deer. For a study on the central position of the red deer among all species of deer, see Schad (1977: chap. 8). For an experimental study comparing the use of fresh versus dried bladders, see Kolisko & Kolisko (1978: 193-212).
2. This discussion did not take place during the remainder of the Course. For further indications, however, see the Fourth Discussion (last question and answer) and Appendix B, part 5A. Compare also Steiner's notes (Appendix A, pp. 205-206, 209 & 239).
3. Loess is a soft, porous rock that gives rise to rich, silty soils.
4. For studies on the radiant effects of the compost preparations, see Hagel (1984-1985) and E.E. Pfeiffer (1929). Compare also Lecture Five, note 8, above.
5. Quartz is harder than feldspar, which Steiner mentioned in the same context as quartz in Lecture Four (p. 74).

On the significance of fine grinding, compare Steiner (1924, Apr. 21):

Take a quartz crystal, for example. This is an earthly thing. . . . The quartz has its form through its inner force, and if you smash it with a hammer, the various pieces still retain the tendency to be six-sided prisms capped by six-sided pyramids. . . . If the quartz were pulverized so far that the pieces no longer had the tendency to follow their own forces, then something living and cosmic would emerge from the quartz. This is the case in seed formation. There matter is driven so far that the ether forces of the cosmos can enter in. We must regard the world as continually going into and out of chaos.

## LECTURE SIX

1. The situation described here — the indirect influence of the near planets, and the direct influence of the distant planets — was previously alluded to in Lecture One:
 

. . . in everything that makes one generation of plants follow another, Moon, Venus, and Mercury are working from the cosmos into the Earth by way of lime and similar substances. (pp. 22-23)

. . . the strength with which the Saturn forces approach the Earth's plant life always depends on the air's condition of warmth . . . (p. 25)
2. The grape phylloxera (*Phylloxera vitifoliae*) is an aphid-like insect.



3. On the cosmic evolution of the Earth and its separation from the Moon, see Steiner (1910; 1924, June 30 & July 3).
4. The passage "a reproduction that remains within the organism" does not occur in the seventh German edition of this Course; it is taken from the first edition (1925).
5. For studies on the relation between plant growth and lunar phase, see Brown & Chow (1973), L. Kolisko (1978), Kolisko & Kolisko (1978: 7-32), and Kollerstrom (1980); on the relation to other lunar rhythms, see Fyfe (1975), Spiess (1990a; 1990b), Thun (1978; 1990), and Thun & Heinze (1973; 1979).
6. On the timing of this burning, compare Steiner's notes (Appendix A, p. 230); see also the Fourth Discussion (fifth question). On the possibility of burning the rootstock as well as the seeds, see Appendix B, part 3A.
7. See Lecture Five, note 2, above.
8. The last two sentences here do not occur in the seventh German edition of this Course; they are taken from the first edition (1925).
9. Although Steiner refers here to the "sign" of the Scorpion (*Zeichen des Skorpions*), he is apparently not referring to the traditional astrological sign ("Scorpio" = 210°-240° ecliptic longitude); in the discussion following this lecture, Steiner refers explicitly to the visible constellation of the Scorpion (*Sternbild des Skorpions*), which is located between approximately 237° and 268°. (The discrepancy between the divisions of the astrologers' tropical zodiac and those of the astronomers' sidereal zodiac is due to the phenomenon of the precession of the equinoxes; for further details, see Schultz 1986.)
10. Compare Steiner (1922, Sept. 27):  

You must picture that the forces of reproduction that the Moon could give to the Earth while it was still within it, have now been acquired by the animals as an inheritance, which is passed on from one generation to the next.
11. Sugar beets were the primary crop at Koberwitz (cf. Introductory, note 3, above). The sugar-beet nematode or beet eelworm (*Heterodera schachtii*) devastated the sugar-beet industry in Europe in the 19th Century.
12. The cockchafer (*Melolontha melolontha*) is a member of the beetle family *Scarabaeidae*. Members of this family have large white grubs that live in the soil for one or more years before emerging as adults. On the dynamics of the cockchafer life-cycle, and its relation to the rhythms of Mars, see Steiner (1918, Jan. 13; 1924, Sept. 9 & 13).
13. The "pepper" technique of weed and pest control has given mixed results (Koeppf et al. 1976: 90, 202-203). For specific reports, see Bächli-Kunz (1985), Hack (1985), Jakoby (1929), Jost (1983), Kolisko & Kolisko (1978: 241-243),

- M.W. Pfeiffer (1976), Sattler & von Wistinghausen (1992: 103-104), Stockmeyer (1927), Thun (1986), and Twine (1985). For discussion on the spiritual aspects of the technique, see Bockemühl & Howald-Haller (1964: 33-37).
14. For a similar account, see Steiner (1921, Apr. 15).
  15. Equisetum is described by Steiner as a remedy that stimulates the silicic acid process in the kidneys when the astral body has incarnated in them too strongly (1923, Nov. 15; 1924, July 21). Compare also Appendix A (p. 233).  

The equisetum tea described here is sometimes also referred to as Preparation 508. For studies related to this preparation, see Krüger (1934), Mander (1990), and Mier (1975).

## THIRD DISCUSSION

1. On the Atlantean catastrophe and the evolution of the Earth, see Steiner (1908; 1910).
2. On the Circle, see Steiner's Address to Members of the Agricultural Experimental Circle (in this volume). On the ethical responsibilities attendant to this Course, compare Steiner (1924, June 26).
3. On the spiritual being known as Ahriman, see Steiner (1913, Aug. 25; 1913: part 2, chap. 5); on Ahriman's relation to the lunar forces, see Steiner (1923, Apr. 1). Compare also Ahriman's relation to limestone (Steiner 1923, Oct. 7).
4. Steiner refers here to German chamomile (cf. Lecture Five, note 6, above). This species is most reliably distinguished from several similar species by the hollow space in the center of its flower heads.
5. The identity of the plants referred to in this question and answer is difficult to ascertain. If the questioner was correct in identifying the plant in the field as a "Hundskamille" (a member of the genus *Anthemis*), the likely species is *Anthemis arvensis* (field or corn chamomile). However, no record has been found of this species being used for tea, as suggested by Steiner. Among similar field-growing species in Central Europe, *Chrysanthemum leucanthemum* (ox-eye daisy) is the only species for which mention has been found as a tea plant (Hegi 1929: 613). Another field-growing species is *Matricaria inodora* (scentless chamomile); its Latin name indicates that taxonomists consider it to be closely related to Steiner's first choice, *Matricaria chamomilla* (German chamomile).  

The "garden chamomile" that Steiner did not recommend using may have been *Chamaemelum nobile* (noble or roman chamomile) or *Chrysanthemum parthenium* (feverfew), both of which are commonly cultivated.
6. Water-weed is *Elodea canadensis*.
7. Cabbage clubroot is associated with an infection by the fungus *Plasmodiophora brassicae*.

8. It is likely that the preposition "behind" refers here to *time*, since neither Venus nor its fixed star background are visible when Venus is behind the Sun in terms of *space*. Thus, in terms of their daily westward motion, Venus is *behind* the Sun whenever it sets *after* the Sun. Venus is then an evening star, which corresponds with Steiner's reply to the previous question.

Although Venus passes in front of the constellation of the Scorpion approximately once a year, only in four out of every eight years is Venus also an evening star at that time. (After eight years, Venus repeats its positions almost exactly.) In the eight-year period beginning 1993, Venus will be an evening star in the middle of the constellation of the Scorpion only during November 1995, October 1997, November 1998, and October 2000. For further information on the rhythms and movements of Venus, see Schultz (1986).

9. On the relation of the mesentery (*Gekröse*) and the peritoneum (*Bauchfell*), see Lecture Five, note 12, above.
10. Compare also Appendix A (pp. 205-206 & 239) and Appendix B, part 5A.
11. Compare Steiner (1924, Aug. 2):

You see, when mineral fertilizers are used, this is just like putting salts in the soil — only the root is strengthened. We then get from the plant only what goes into our bones; we do not get a proper protein from it. That is why for some time now all the grains have suffered from a protein deficiency. And this will become ever greater if people do not return to proper manuring.

... You can't produce fertilizers simply by combining the elements that are in cow manure. You must realize that cow manure does not come from a chemical laboratory, but rather from the very much more scientific laboratory that is inside the cow. That is why cow manure not only strengthens the roots of plants, but also works strongly right up into the fruits, and thereby creates a proper protein that can make people strong.

If people were to continue fertilizing with mineral fertilizers alone, as has recently become popular — or even worse, with nitrogen derived from the air — well then, your children, and even more so your children's children, will have very pale complexions. . . . The healthy, lively color of human beings depends indeed upon whether the fields are properly manured.

12. For a biodynamic perspective on bees and beekeeping, see Allen (1975), Baker (1948), Burt (1991), and Hauk (1990). See also Steiner (1923).

#### LECTURE SEVEN

Compare Lecture Two on the difference between air and warmth above and below ground.

2. In the evenings, Steiner was holding a parallel lecture series on human karma (Steiner 1924b).
3. Compare Steiner (1923, Oct. 28):
- ... the astral atmosphere of the Earth, the Earth's astrality, lives in the circulation of the water as it goes up and comes down again.
4. A more detailed cycle of interaction between plants and animals is outlined in Steiner's notes (Appendix A, p. 236).
5. Johann Wolfgang von Goethe (1749-1832): German poet, playwright and scientist; subject of Rudolf Steiner's early scholarly work.

#### LECTURE EIGHT

1. On Steiner's concept of the threefold human organism — consisting of the nerve-sense system, rhythmic system, and metabolic-limb system — see Bühler (1979), E. Kolisko (1943), Schad (1977), and Steiner (1917: chap. 7).
2. On the relationship between substance and force (activity), compare Steiner (1923, Aug. 23):

In reality, substance and activity are one, but they work into the world in different ways. You can understand this by considering your own substantiality. When the substance of your arm is not in order, you feel some kind of pain. What is not in order in the substance manifests itself inwardly. On the other hand, when the activity of your arm is not in order, you may perhaps hit your neighbor. Then he feels the pain. There it is the activity that is out of order. Nevertheless, the substance and the activity of your arm are one; but they manifest in different ways.

3. On the consequences of excessive stall feeding, see Appendix B (p. 245).
4. On the relation of the intestines and the brain, compare Steiner (1920, Mar. 24):

The intestinal organs are truly the reverse side of the brain. For you to be relieved of physical activity so that you can think, you must burden the other end of your organism with the functions of a fully developed colon and bladder. Thus the highest soul-spiritual activity that a human being manifests in the physical world, insofar as it depends on a fully developed brain, is at the same time dependent on a corresponding development of the intestine. This is an extraordinarily important connection, and one that sheds a great deal of light on the way nature works.

For further discussion, see Hartmann (1959: 266-278, 548-584), König (1930; 1982: 193-230, 267-271), and Steiner (1923, Sept. 3; 1923, Dec. 31; 1924, Feb. 23).

5. Deposits of saltpeter (sodium nitrate) were being extensively mined and exported from Chile at that time.

6. Compare Steiner's description of human milk production (1924, July 7):  
 Mother's milk is permeated with forces that have only changed their field of action, as it were, within the mother's organization. Until the birth, these forces are active in the region that belongs primarily to the metabolic-limb system, while after the birth they are chiefly active in the region of the rhythmic system. Thus they migrate in the human organism, moving one stage higher.
7. Compare Lecture Three, note 8, above. Compare also Appendix A (pp. 238 & 240).
8. To the left of Drawing 24 on Color Plate 8 are two parallel lines and two partially illegible words; it is not clear how these relate to the text.
9. For further discussion on raw food, vegetarian, and meat diets, see Steiner (1923, Jan. 13; 1924, July 31; 1924, Aug. 2).
10. On fats and fattening, see Steiner (1923, Sept. 22). Compare also Appendix A (pp. 238-239), and Werr (1953: 54-63).
11. On the physiological connection between excessive potato consumption and materialistic intellectuality, see Steiner (1923, Sept. 22; 1924, Jan. 23).
12. See Introductory, note 8, above.

#### FOURTH DISCUSSION

1. The period indicated by Vreede for getting rid of field mice does not coincide with the period during which Venus passed through the constellation of the Scorpion in the sidereal zodiac; instead it is roughly coincident with the period during which Venus passed through the sign of Scorpio as defined in the tropical zodiac (cf. Lecture Six, note 9, above). Later, however, Vreede explicitly stated that she believed Steiner was referring to the constellations of the sidereal zodiac (Vreede 1927).
2. For efforts in this direction, see: *Stella Natura: The Kimberton Hills Agricultural Calendar* (P.O. Box 155, Kimberton, PA 19442, USA); *Sternkalender: Erscheinungen am Sternhimmel* (Verlag am Goetheanum, CH-4143 Dornach, Switzerland); and *Working with the Stars: A Bio-Dynamic Sowing and Planting Calendar* (Lanthorn Press, Peredur School, East Grinstead, Sussex, RH19 4NF, Great Britain).
3. The German text is ambiguous here. However, if "new moon" and "full moon" each involve a period 12-14 days, it is probable that the waning crescent represents the end of the new moon period, and the waxing crescent the beginning of the full moon period. For references by Steiner to the waning moon, see Appendix A (p. 230) and Appendix B, part 3B.
4. Couch grass (*Agropyron repens*) is also known as quack grass or quitch.

5. Compare Steiner (1923, July 11):

In times when there were no electrical currents, when the air was not swarming with electrical influences, it was easier to be human. . . . For this reason, in order to be human at all today, it is necessary to expend much stronger spiritual capacities than was necessary a century ago.

But it does not occur to me to be reactionary and say something like: Well then, we must banish all these modern achievements! That's not the objective. Modern human beings need the access to the spirit that spiritual science provides, so that through this strong experience of the spirit they can also become stronger in relation to the forces that accompany modern culture, the forces that harden our physical body and take it away from us.

6. Whiting is a purified limestone commonly used for whitewashing.
7. For further indications, see Appendix B, parts 1F & 1G.
8. Swine erysipelas is also known as swine fever. For further details on treating it with antimony, see Koepf (1989: 226) and Werr (1953: 97-101, 124).
9. Wild radish (*Hederich*) is *Raphanus raphanistrum*; it is not usually considered to be a hybrid.

#### ADDRESS TO MEMBERS OF THE AGRICULTURAL EXPERIMENTAL CIRCLE

1. The first meeting took place on Sunday, June 8, in the Bockschen Saal in Breslau (cf. the First Discussion, note 6, above); no transcript is available.
2. Ita Wegman (1876-1943): first leader of the Medical Section of the School of Spiritual Science at the Goetheanum in Dornach.
3. See Lecture Five, note 2, above.
4. See Introductory, notes 5 & 12, above.
5. Steiner (1925).
6. Guenther Wachsmuth (1893-1963): first leader of the Natural Science Section of the School of Spiritual Science.

#### APPENDIX B: FURTHER AGRICULTURAL INDICATIONS BY RUDOLF STEINER

1. The Research Institute operated under the auspices of "Der Kommende Tag" (see Lecture One, note 2, above).
2. This report is taken from J.S. Streicher's 13-page typescript entitled: "Die Angaben Dr. Rudolf Steiners betreffs Verwendung von mineralischem Dünger in der Landwirtschaft, insbesondere über die Notwendigkeit einer

- Magnesiadüngung" [The indications of Dr. Rudolf Steiner with respect to the use of mineral fertilizers in agriculture, in particular regarding the necessity for fertilizing with magnesium]. Parts of this typescript were previously published by Heinze (1972; 1980); it is published here with the permission of the Rudolf Steiner Nachlassverwaltung. The ellipses ( . . . ) in the report published here are from the original typescript, as are the emphasized words and comments in parentheses; material enclosed within square brackets derives from the editor.
3. Earlier that day, Steiner had given a lecture to doctors in which he described the processes of protein formation and potash salt deposition in the white birch (1920, Oct. 9, morning).
  4. The original report is entitled: "Aussprache der Mitglieder des Wissenschaftlichen Forschungsinstitutes mit Dr. Steiner am 17. Dezember 1921" [A Discussion between Members of the Scientific Research Institute and Dr. Steiner on Dec. 17, 1921]. The part of the report published here was first published in the *Mitteilungen des landwirtschaftlichen Versuchsringes der anthroposophischen Gesellschaft*, Apr. 15, 1928, and later in the appendix to the second German edition of the Agriculture Course (1929).
  5. For an experimental investigation of these indications, see Dreidax (1985).
  6. On tuberculosis in cattle and its treatment, see Koepf (1989: 222-223) and Werr (1953: 87-91).
  7. In his typescript report, Streicher states emphatically that this conversation took place after the conversation on Dec. 17, 1921 (section A), but gives the date as "Fall 1921." The soonest it could have occurred after Dec. 17, 1921, was when Steiner returned to Stuttgart in mid-January 1922.
  8. The salts referred to here are known as sulfates of potash-magnesia and are derived primarily from the minerals langbeinite ( $K_2SO_4 \cdot 2MgSO_4$ ) and kainite ( $MgSO_4 \cdot KCl \cdot 3H_2O$ ). A concentrated form of langbeinite is marketed in North America as "Sul-Po-Mag" or "K-Mag." On kainite, compare Steiner's notes (Appendix A, p. 216).
  9. On poisonous plants in general, compare Steiner (1923, Mar. 22):

As a rule the astrality does not combine with the etheric body or physical body of the plant. But with the poisonous plants it is different: there the astrality penetrates into the plant and combines with the plant substance. Plants such as deadly nightshade or henbane absorb the astrality to some degree and carry it within them, though naturally in a disorganized condition, for if it were in an organized condition they would become animals.

On foxglove (*Digitalis*), compare Steiner's characterization of this plant for a therapeutic eurythmist (Keyserlingk 1985: 125-126):

Or, what does the foxglove do? Under the influence of the rain, it lets its fine, loose roots sink deep into the ground. Then it develops a very long stem that lifts itself above the gravity of the Earth. And finally there are the bell-shaped flowers that again turn toward the Earth. Do you not see in your imagination how it presents a picture of balance — first uniting its root with the forces of gravity, then striving straight upward, lifting itself toward the light, despite the weight of many flowers? Can you not see that it must work in a harmonizing manner on the heart — alternately uniting itself with gravity and with the Sun, keeping itself harmoniously in balance?

For discussion of *Digitalis* from an anthroposophical medical perspective, see Husemann (1985) and Simonis (1981).

10. Little discussion on this set of indications has been published. In his typescript report, Streicher relates that in the spring of 1923 potash-magnesia and *Digitalis* extract were spread on the fields of several farms, and that this resulted in an enhancement of the "natural protein-formation process," especially among the cereals. Streicher describes this process as follows:

It begins shortly before the cereal plant starts to flower. Just prior to this the leaves are a normal green. During protein-formation the leaves suddenly become a beautiful dark green — the same dark green that sainfoin manifests almost continuously during the vegetative period.

When nitrogen salts are used as fertilizer, the protein-formation process is never or seldom initiated early enough, and so it takes an irregular course resulting in lodged stems and chaotic fruit development, etc.

As a border plant, sainfoin induces the protein-formation process to take a natural course — it is the permanent bearer of this process.

For further discussion, see Heinze (1971; 1972; 1980: chap. 5; 1983: chap. 3) and Rasmussen (1962). Compare also Menges (1952) for a report on the stimulating effects on plants of soil enriched with the poisonous secretions of toads (*Bufo*); these poisons are chemically similar to those of *Digitalis* (see Husemann 1985).

11. Compare also the First Discussion (p. 88).
12. First published in the appendix to the second German edition of the Agriculture Course (1929).
13. The Guldesmühle was a mill in Dischingen (near Ulm, Germany); for a time it was part of the holdings of "Der Kommende Tag" (cf. Lecture 1, note 2, above).
14. Compare the Fourth Discussion, last answer. Compare also Appendix B, part 5A.
15. Compare also Appendix B, part 1B.
16. Excerpted from Keyserlingk (1985: 135).

17. Compare E.E. Pfeiffer (1984: 60-61) and Kolisko & Kolisko (1978: 243).
18. See Lecture Six.
19. Compare E.E. Pfeiffer (1983: 112).
20. Compare E.E. Pfeiffer (1984: 52 & 60).
21. It is possible that "nettles" and "dead-nettles" have been confused here (see part 4A).
22. See also Appendix B, parts 1B & 1E. For further discussion, see Corrin (1961), Koepf et al. (1976: 234-238), Lippert (1953), Sattler & von Wistinghausen (1990: 105-106), and Speiden-Gregg (1943).
23. Stegemann (1926) states that all dead-nettles are suitable, but E.E. Pfeiffer (1984: 61) specifies *Lamium album*, i.e., white dead-nettle. Dead-nettles are members of the mint family.
24. First published in Heinze (1983: 152-154).
25. On the elemental beings, see Anderson (1993), Julius (1971), Krauss (1992), Spock (1980), and Steiner (1912, Apr. 3 & 4; 1923, Nov. 2, 3 & 4).
26. On the spiritual beings "Lucifer" and "Ahriman," see Steiner (1913, Aug. 25); on their relation to the elemental beings, see Steiner (1916, Dec. 25; 1922, May 28).
27. For further discussion, see Anderson (1993: 76) and Steiner (1922, Dec. 24).

#### APPENDIX C: NEW DIRECTIONS IN AGRICULTURE (Pfeiffer)

1. This is the first part of a commemorative essay originally published in *Wir erlebten Rudolf Steiner* (Stuttgart: Verlag Freies Geistesleben 1956); it appeared in English in the 1958 issue of *The Golden Blade* (no translator listed; presumably translated by Pfeiffer himself).
2. Pfeiffer's original essay has "1923" here, and later in this paragraph "early summer 1924"; these have been changed by one year to match the detailed chronology of Wachsmuth (1955) who also took part in these events.
3. See Steiner (1924, June: 17).
4. Compare also E.E. Pfeiffer (1981) and Steiner (1920, Dec. 17-19).
5. Approximately 60 farmers were members of the original Agricultural Experimental Circle (cf. p. 184); over 100 people attended the lectures (cf. p. 1).

## II. LITERATURE CITED

Note: Publisher names abbreviated in the references are listed in full on page 295. The "GA number" included with each Steiner reference designates the corresponding volume in the *Rudolf Steiner Gesamtausgabe* (the complete edition of Rudolf Steiner's work published in German by the Rudolf Steiner Verlag, Dornach, Switzerland). The English typescripts (rough translations) cited below for some of Steiner's works may be obtained from certain libraries (inquire at one of the Anthroposophical Society addresses listed on page 297).

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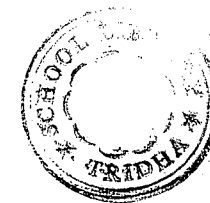
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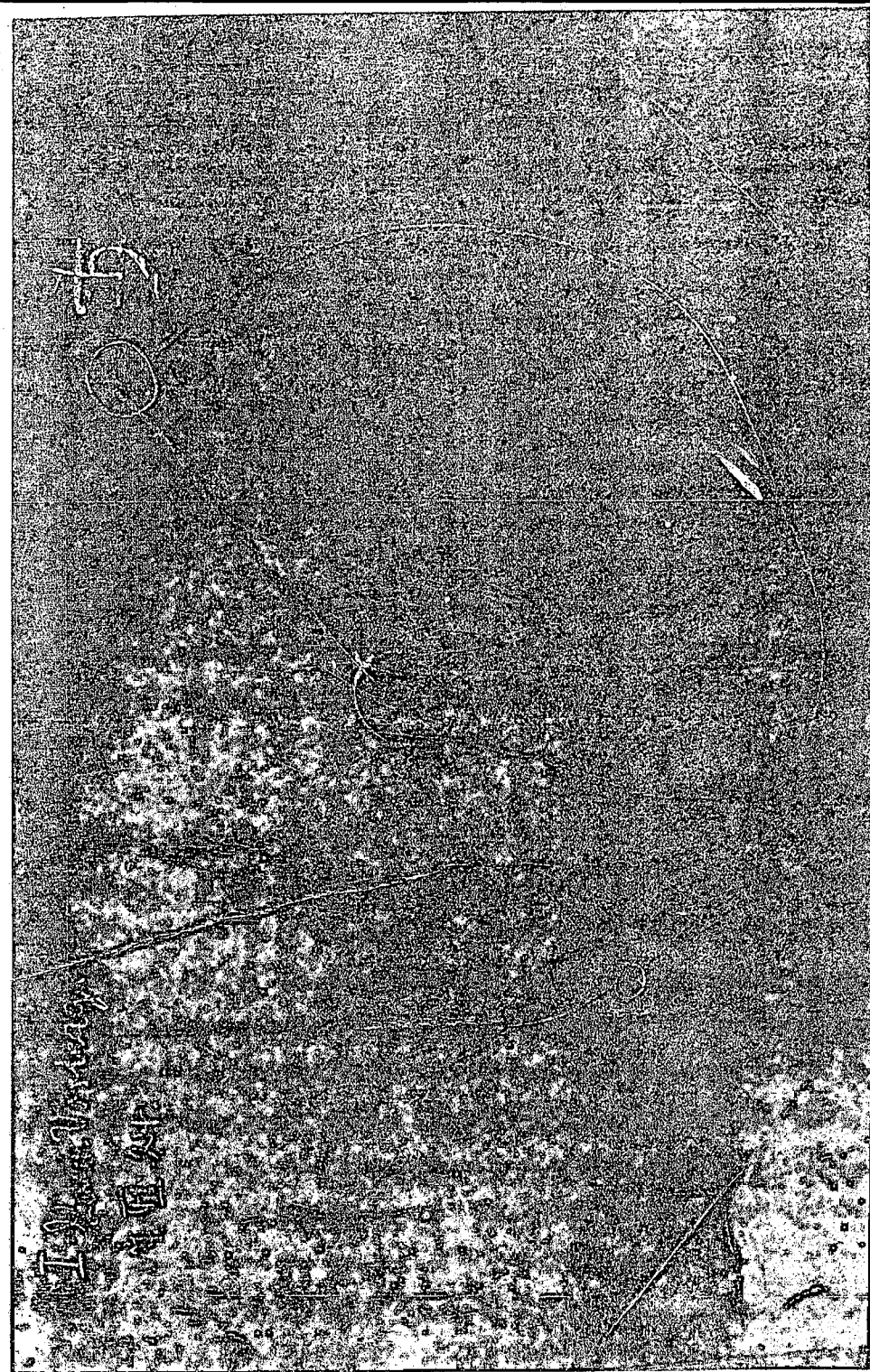
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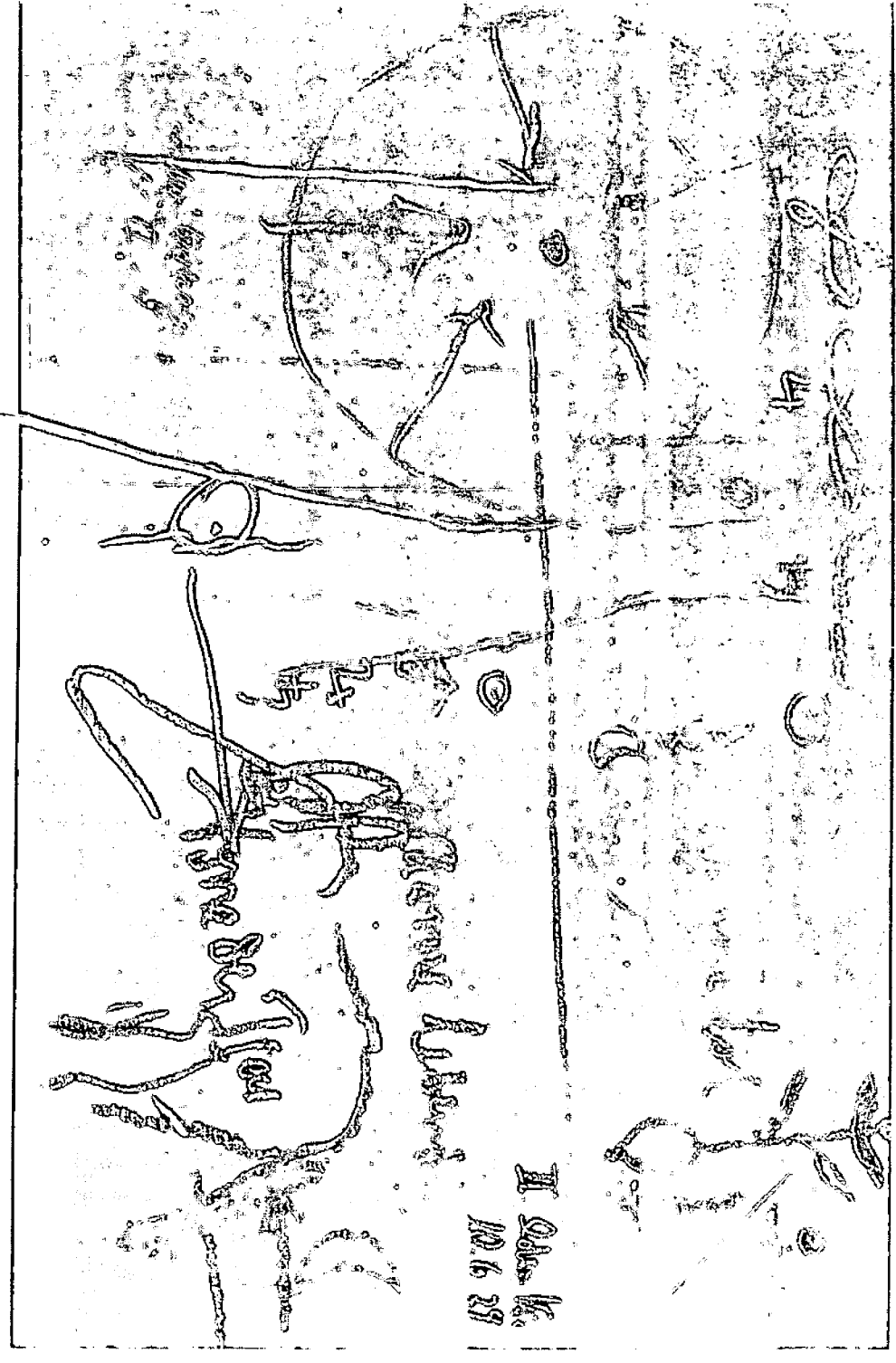
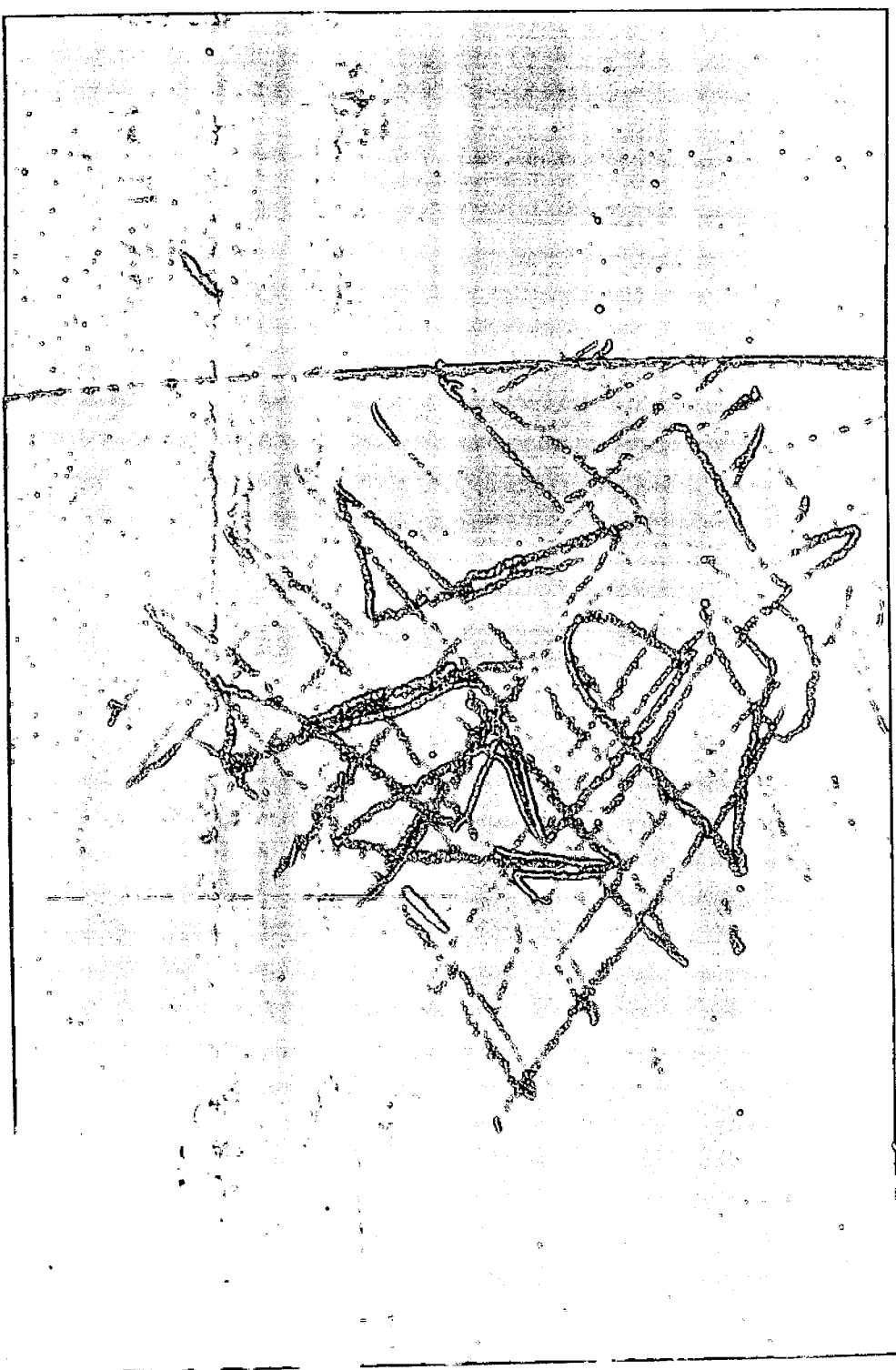
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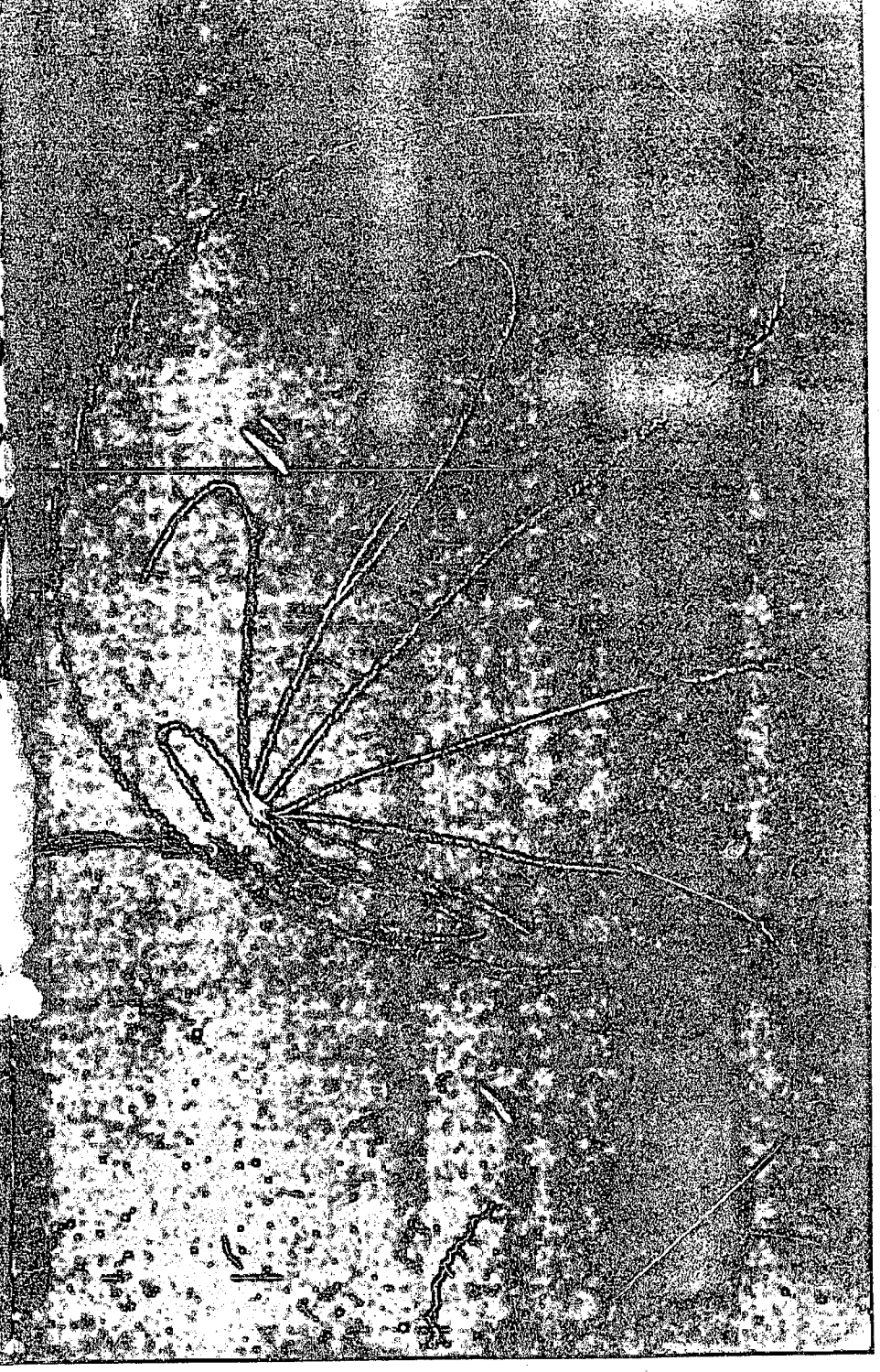
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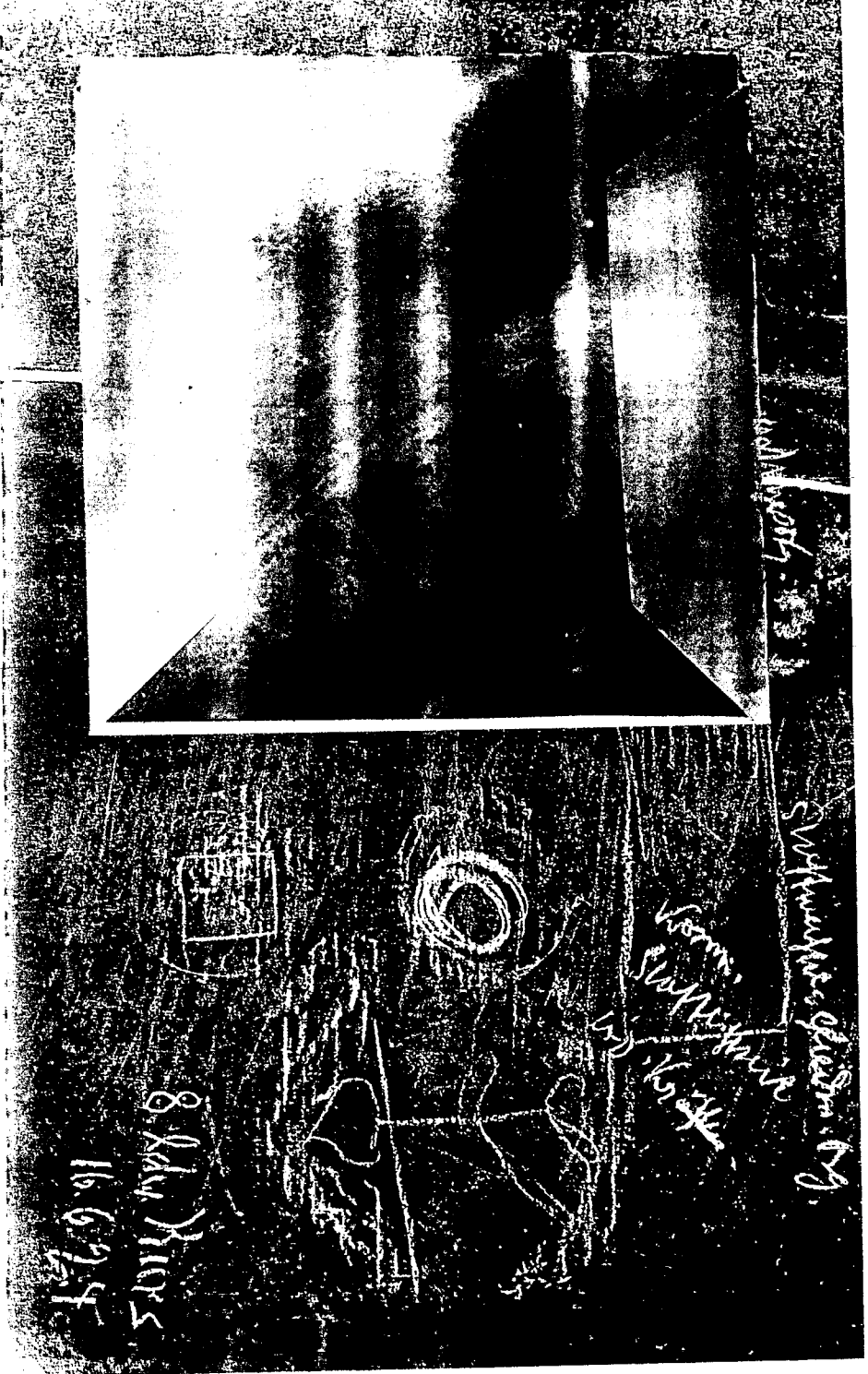
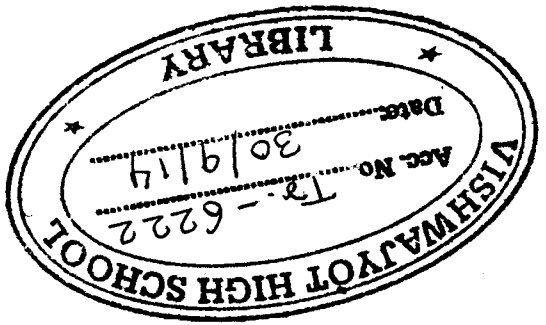
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8. Adv. Xiors  
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