

Methods of Seed Regeneration

According to Georg Wilhelm Schmidt
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**Translated from the German Original by Reinhard Rosch
March 2015**

INTRODUCTION

This report is a summary of the work of G.W. Schmidt in the field of seed regeneration. G.W. Schmidt has worked for many years on the development of methods for breeding seed material for cereal crops. His work builds on the research of his father, Martin Schmidt, which was done between the years 1945 and 1964. Martin Schmidt, in turn, received his inspiration from the "Lectures on Agriculture" (Landwirtschaftlicher Kurs) given by Rudolf Steiner.

G.W. Schmidt's strategy for generating cereal seed material is based on making targeted use of the etheric forces as outlined by Rudolf Steiner.

Anthroposophy posits that, for healthy growth, plants need not only the conventional media such as soil, light, water, nutrients and a favourable climate, but also some finer emanations, the so-called etheric formative forces. Steiner describes the four etheric forces, namely Life ether, Chemical ether, Light ether and Warmth ether; these closely relate to the four elements Earth, Water, Air and Fire.

The correlation and effects of the etheric formative forces presented here are based on work done by Steiner, Wachsmuth (1965) and Hagemann (1979, 1973). The effects of the etheric formative forces in the area of plant cultivation is presented in this paper in the form of tables and diagrams. The authors are aware that this form of presentation is somewhat narrowly structured; however, for didactic development of the individual etheric spheres of influence, such a rigid structure is needed to better understand the subject matter. For continued research in the field of etheric formative forces, it will nevertheless be necessary to loosen this rigidity and introduce some mobility; after all, in a natural growing environment here on Earth, the etheric forces are continuously mingling and interpenetrating. In reality, we never deal with the effect of only one etheric force in isolation. In the continuation of this research and practice involving the etheric forces, there may arise the need to move beyond the here presented structure and assignments; just as in the research presented here, the test results made it necessary to rework the assignment of the planetary effects. For example, Steiner categorized the planets in his "Lectures on Agriculture" (Landwirtschaftlicher Kurs) into inner and outer planets with respect to the Sun's ecliptic. However, in the course of G.W. Schmidt's research, it became necessary to move from a twofold to a threefold scheme to account for all the planetary effects. The planetary map (Figure 4) gives some important clues with regard to this matter.

A summary of the plant breeding work by Martin Schmidt, Georg Schmidt's father, has appeared under the "Barsinghaeuser Berichte," Folio No.50. This work is basically a literature survey and is sourced mainly from reports authored by G.W. Schmidt and E. Erdmenger (1971) as well as by E.v. Wistinghausen (1967). The latter works show evaluation and statistics of test results in the plant breeding research undertaken by these three authors.

1. AIMS OF SEED REGENERATION

In the past, ecological agriculture has very much neglected the theme of seed regeneration and although the movement was growing, the use of conventional seed material persisted. In the recent past, more attention has been focused on the theme of seed procurement and particularly seed production for ecological farming. This focus was driven especially by the increased use of genetic engineering in the field of conventional seed production. This momentum resulted in the following problems:

- Conventional plant varieties are bred specifically for high yields, conditional on the heavy use of mineral-based fertilizers and chemical pesticides. As a side effect, the seed material became independent of locality.
- Experience with conventional agriculture points to an ever-increasing susceptibility to fungi and virus based diseases.

For the above reasons, seed production will play an ever-increasing role in ecological agriculture. In ecological farming, the basic requirements for seed material are readily available quantities of seed varieties that are suitable for the location and exhibit inherent robustness. For this purpose, new methods of seed production have to be found, which correspond to the specific requirements of ecological agriculture.

The method of seed regeneration developed by G.W. Schmidt consists basically in guiding and directing the forces of the environment into the plant and then ensuring that their effect persists over the following plant generations. G.W. Schmidt's strategy aims to use the etheric formative forces for the regeneration of seed material so as to arrive at locally adapted seed varieties. In this process, he distinguishes four plant functions, which play an important role in plant breeding and which can be facilitated through the use of four different etheric forces. Etheric forces, as described by Rudolf Steiner, are also called formative forces. These forces work on the plant's basic properties, in particular mass generation (Life ether), structure and resistance (Light ether), reproduction (Chemical ether) and nutritional quality (Warmth ether).

G.W. Schmidt designed the seed regeneration process in such a way that the plants to be used for seed generation are cultivated in different environments so that the plants are exposed to correspondingly different formative forces, for instance by alternating "closer to winter" sowing with cultivation in the mountains and in low altitude locations.

Through this rigorously enforced variation of cultivation conditions, G.W. Schmidt claims to achieve an equally high variability in the resulting seed material. Once he has reached that stage of development, this highly variable seed material will then be cultivated in the ultimately destined locality. Plants best exhibiting the desired characteristics are next selected for the final seed production.

The aims of this seed regeneration program are:

- Increased resistance to fungi, insects and viral diseases;
- Generation of robustness towards weather extremes, such as cold snaps, drought, extreme precipitation and storms;
- The production of good yields on poor soils with a minimum of fertilization, using ecological methods;
- To enable seed generation from crops with little change in character traits of the cultivated plants over many generations.

2. BASICS

2.1 THE FOUR PLANT FUNCTIONS

Through experimentation and observations, G.W. Schmidt identified four basic "Plant Functions," each one of which concerns specific qualitative aspects of plant growth. This work is supported by work his father, Martin Schmidt, carried out and outlined as well by Rudolf Steiner in his "Lectures on Agriculture." He calls these basic plant functions

- Generation of material,
- Generation of form/structure,
- Reproduction,
- Nutritional quality.

All four qualities work with different intensities in each plant. Below are some examples of these plant functions or qualities.

Generation of material: This concerns the creation of plant mass, that is, the yield of total plant mass. With squash there is a strong tendency towards mass creation especially with respect to the fruit. The organs of this plant tend to be thick, massive and coarse – nothing dainty.

Generation of form/structure: The generation of form or structure is considered in opposition to mass building. Form/structure expresses itself in the plant in the form of very detailed, intricate structures, such as the leaves of Yarrow or Horsetail. The whole plant structure is intricate, with virtually no flat surfaces. G. W. Schmidt determined experimentally that support of form/structure generating forces strengthens the ability of the plant to resist noxious organisms.

Reproduction: This concerns the ability of the plant to reproduce. Pennyroyal is an example of a plant that produces enormous amounts of seeds and can have one or two generations of plants in a single year, thereby easily producing up to 800 new plants.

The polar opposite to the reproduction capacity of a plant is the nutritional value (quality), where one is traded off for the other. Nutritional value is more than just mass. It is what makes for a good quality end product, for example, a good quality bread. Nutritional value finds expression in taste, aroma, appearance, colour, etc.

2.2 THE FOUR ETHERIC FORMATIVE FORCES AND THEIR CORRELATION TO PLANT FUNCTIONS

The four previously outlined plant functions or qualities, which we recognize in specific plants, can be taken as the physical manifestation of formative forces. They can be perceived as the manifestation of the four etheric formative forces and they correlate in the following manner:

- Life ether furthers mass formation;
- Light ether furthers structure and resistance;
- Chemical ether furthers reproduction;
- Warmth ether furthers quality.

Earth and Cosmic Forces: The four etheric forces represent both Earthly and Cosmic forces. Earthly forces stand in polar opposition to Cosmic forces. The Cosmic forces are Light and Warmth ethers, with the corresponding plant functions of structure and quality. The Earthly forces are represented by the Chemical and Life ethers, with the corresponding plant functions of reproduction and mass generation. What is here designated as Earthly or Cosmic shall be further outlined in specific examples. Certain structures and growth characteristics in plants indicate on the plant under consideration what is Earthly and what is Cosmic (refer to Tables 1 and 2).

Polar Opposite Forces: Cosmic and Earthly forces can be further differentiated. For each Earthly force, there is one opposing Cosmic force, thus forming two pairs of polar opposite forces, as follows:

1. Life ether and Light ether;
2. Chemical ether and Warmth ether.

An increase or an excess of one force or plant function occurs at the expense of the other force or corresponding function. For example, an emphasis on mass formation has as a consequence a corresponding reduction in structuring and plant resistance capabilities. The plant will exhibit massive growth and indistinct but very large leaves.

The etheric forces are described below, not in their customary order of Warmth, Light, Chemical and Life ethers, but rather in the sequence which results when paired as polar opposites: Life and Light ethers, and Chemical and Warmth ethers.

Figure 1: Schematic of the Etheric Forces

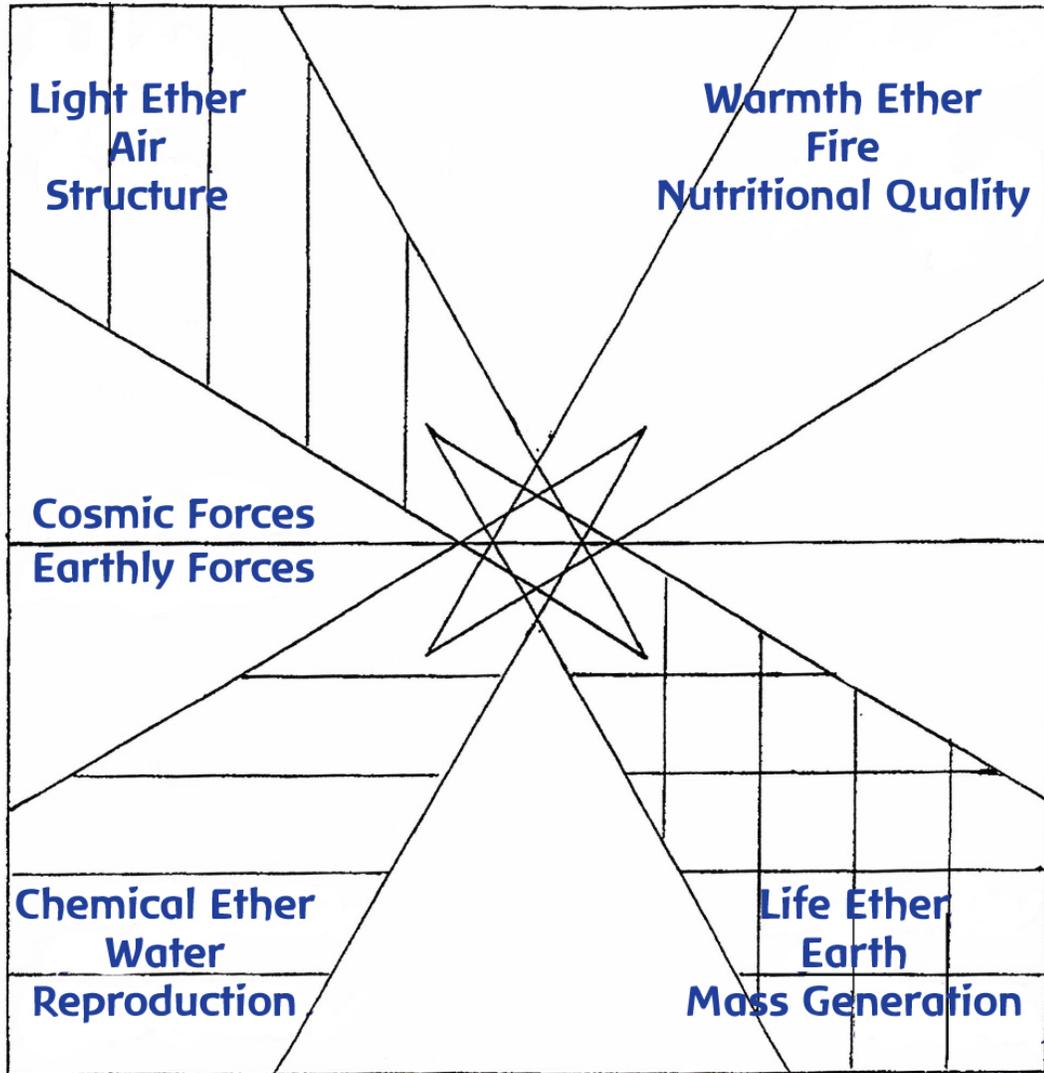


Table 1 General Earthly and Cosmic Growth Tendencies

Earthly Qualities	Cosmic Qualities
Life Ether and Chemical Ether	Light Ether and Warmth Ether
Emphasis: Mass Formation, Reproduction	Emphasis: Structure, Quality
Short-life rhythms	Long-life rhythms
Spreading, flat surfaces	Radial quality, strongly bordered surfaces
Asymmetric	Symmetric
Changeability, variability in form	Structured
Conical forms	Parallel forms
Emphasis on the horizontal :	Emphasis on the vertical:
<ul style="list-style-type: none"> - horizontal/shallow root system - branching of flower stems - multiple trunks (in trees) 	<ul style="list-style-type: none"> - tap root - no branching of flower stems - single trunk (trees)
Elliptical, rounded forms	Pointed forms
Coarse leaf forms	Sculpted leaf surfaces
Leaf edge unstructured	Leaf edges
	<ul style="list-style-type: none"> - scalloped - toothed
Leaf position random, no symmetry	Leaf position ordered, symmetrical
EARTHLY	COSMIC
Strongly branched flower stems	Very little branching in flower stems

In this paper, we look at the subject matter from four different perspectives: firstly, from the position of plant characteristics; secondly, from the position of the four plant functions; thirdly, from the position of the classical Greek elements as representative of the etheric forces and fourthly, from the position of the actual etheric forces.

Furthermore, the seed regeneration measures are differentiated according to their Earthly versus their Cosmic effects on the plants. In some cases, we will also consider the interaction between the four ethers and the seed regeneration measures.

Table 2 Earthly and Cosmic Growth Tendencies in Grains

Earthly Growth Forms	Cosmic Growth Forms
<ul style="list-style-type: none"> - Higher life expectancy - More robustness - Thick, broad leaf , especially the leaf closest to the ear - Stronger, stiffer straw - Larger number of rows of grains - Emphasized glumes in the cross-section of the spike - Conical form of the glume structure 	<ul style="list-style-type: none"> - Reduced leaf structures and narrower leaves - Slender, more elastic straw, thinning between last leaf and spike - Loose spike, large space between rows of grain kernels - Emphasized grain kernels in the cross-section of the ear - Parallel structure of the glumes - Pronounced formation of awns - Superior baking quality of the grain

2.3 IN WHAT WAY DO THE EHERIC FORMATIVE FORCES WORK ON PLANTS ?

The four plant functions, namely Generation of Material, Generation of Form/Structure, Reproduction, and Nutritional Quality, were described as outcomes of the effects of the etheric formative forces. The four etheric formative forces were differentiated as Earthly and Cosmic and two of each form polar opposites. We will now consider in which way these etheric forces affect the growth process of plants.

First, we must distinguish between direct and indirect action. With direct action, the effect of the forces on the plant takes place in the atmosphere above the ground. In the case of indirect action, the forces radiate into the ground and affect the plants from below.

Furthermore, one can view the four plant functions as reflecting the activities of Sun, Moon and planets, as these are the originators of the etheric forces. In Rudolf Steiner’s "Lectures on Agriculture," he gives indications about the effects of Sun, Moon and planets in the realm of plants. (This section is a condensation of research by G.W. Schmidt, F. Erdmenger (1971) and M. Schmidt.)

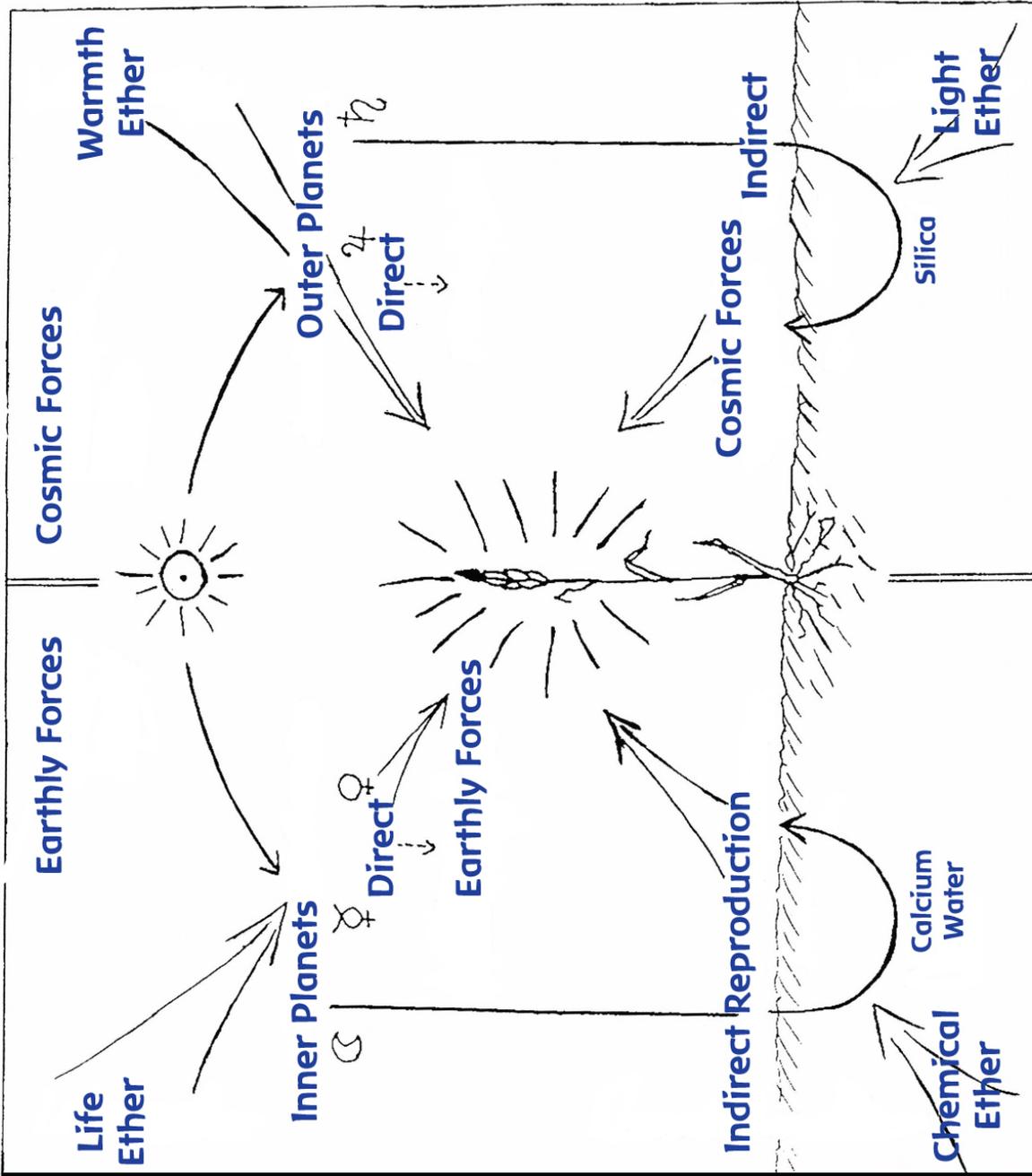
Considering the Moon and the planets Venus, Mercury, Mars, Jupiter and Saturn, one must distinguish between the inner (towards the Sun) and the outer (away from the Sun) planets (explained in detail in section 4.5.1.2). In this context, Moon, Venus and Mercury are designated inner planets. The outer

planets are designated Mars, Jupiter and Saturn. The power of the Sun supports the inner as well as the outer planets' actions. (In section 4.5.1.2, the planets will be further differentiated.) Both groups of planets work directly, that is, out of the realm above the Earth's surface, or indirectly, as a reflection from the Earth's surface (see Figure 2).

In the generation of mass, Moon, Venus and Mercury work directly on the plant. They ensure a proper relationship of the plant towards the soil nutrients. The forces of Moon, Venus and Mercury, both direct and indirect, are drawn into the ground by calcium and from there passed on to the plant through clay.

The ability of the plant to reproduce is enhanced by the activity of the lunar forces and to some degree also by Venus and Mercury. In this case, Moon, Venus and Mercury work indirectly on the plant. Calcium and clay act as mediators of these forces, but water is the predominant mediator in the form of dew, mist and soil moisture.

Figure 2: How the etheric forces affect plant growth, according to G. W. Schmidt, E. Erdmenger, 1971



The planets Jupiter and Saturn work directly upon plant quality or nutritional value. They do this through the air and warmth forces that surround the plant.

The indirect forces of Jupiter and Saturn work through reflection from the ground on structure and resistance of the plant. The mediating agent of these Cosmic (indirect) forces is Silica (Kiesel).

This section described the transmission of the etheric forces originating from the planets and the way in which they affect the growth of the plants. In section 4.5.7, the effect of the planetary forces will be considered with the question of how seed generation can be affected over many generations through judicious choice of planting times.

2.4 EARTHLY MANIFESTATIONS OF THE ETHERIC FORMATIVE FORCES

Although the etheric formative forces are non-physical in character, their effect on the physical aspect of nature is recognizable to sense perception. In the realm of plants, they work in the area that was described earlier as the four plant characteristics. Generally they work in nature, for instance in the weather, through the four classic Greek elements, that is, Earth, Water, Air, and Fire, or through the four aggregate states: solid, liquid, gaseous, and warm, where, of course, “warm” cannot be considered an aggregate state as far as our conventional natural science is concerned. One could also assign colours to the etheric forces (see Table 3). It could be quite helpful in understanding this paper if the drawings were to show these corresponding colours.

Table 3 Etheric Forces, Greek Elements, Colour

Kind of Ether:	Life Ether	Light Ether	Chemical Ether	Warmth Ether
Force Pair:	First pair	First pair	Second pair	Second pair
Greek Element:	Earth	Air	Water	Fire
Aggregate State:	Solid	Gaseous	Liquid	Warm
Colour:	Red-violet “Peach-blossom”	Yellow	Blue	Red
Plant Function:	Mass Generation	Structure/Form Resistance	Reproduction	Quality

2.5 INNER LAWS WHICH GOVERN THE WORKING OF THE ETHERIC FORCES

The working of the etheric growth forces is governed by an inner order.

- 1) **First Law governing the working of etheric forces:** The more one-sided etheric forces are, the more they tend to restrict the unfolding of life. For this reason, one rarely finds a living environment that is governed by only one etheric force. Some examples of environments where only one etheric force predominates are as follows.
 - a) Fire (Warmth ether): In deserts there is very limited scope for life.
 - b) Air (Light ether): At high altitudes one soon reaches levels where life becomes impossible.

- c) Water (Chemical ether): In the depths of the oceans life forms are severely restricted.
- d) Earth (Life ether): In deep mines there are no favourable conditions for life. Animals often seek out caves to die.

- 2) **Second Law governing the working of etheric forces:** Regions in which there is a lack of etheric forces can hardly support life. Examples include the polar regions where there is no warmth, when there is a drought and in the deep shadow of a dense tree canopy shading the ground.
- 3) **Third Law governing the working of etheric forces:** The synergy of the etheric forces , that is, if they are in perfect balance, will produce the most abundance of life and the best resistance to outside threats.

Take the following example. In spring, the Light ether, yellow in colour, rays into the Earth and the Chemical ether, blue in colour, streams upwards, synthesizing the colour green on the Earth's surface. This is the time of increased growth in plants, typically the time between Easter and WhitSun. Light ether and Chemical ether are in perfect balance. With the addition of the Warmth ether in May, there is a synergy between these three ethers, increasing the growth in plants even further. Ultimately, the Warmth ether will lead to a decrease in the availability of water towards the end of May. Through the synergy of these three ethers, growth will result in the generation of a maximum amount of plant mass, as is evident in the fast growth of grains and the first hay crop.

- 4) **Fourth Law governing the working of etheric forces:** In the transition zones where the various ethers interact, there occurs the most variability and versatility. These transition zones can be readily identified in the landscape, such as river banks, forest edges, hedges and the edges of a field. The etheric force configurations at these zones where different landscapes converge are enhanced and give these locations a special character with an abundant vitality. When it comes to the protection of natural habitat, these zones take on a very important role and are considered by conservationists as biospheres; they harbour a vast multitude of life forms in the plant and animal categories. Any interference in these biospheres by humans can cause vast and irreparable damage to the ecology of that area.

3. INTRODUCTORY MEASURES FOR SEED REGENERATION

Georg W. Schmidt has generated a template for the process of seed regeneration, using the example of cereal grains. For other agricultural crops, this template will require appropriate modifications (see Table 4). The process can be segmented into four phases. The diagnosis of the initial conditions is followed up by these four steps:

- 1. Loosening,
- 2. Establishment of a plant biography,
- 3. Stabilizing,
- 4. Stress tests.

Schmidt estimates that the process of seed regeneration will typically span 10 – 15 years. With self-pollinating plants, this process tends to be faster than with non-self-pollinating plants (for example, rye). In any case, it is assumed that biodynamic compost and field preparations be used. The test plot will have at least a fourfold crop rotation, where only the crop requiring cultivation (hoeing) will receive a light composting. There shall be no additional manure added.

Typical initial conditions of the seed material are documented before the regeneration process. Next, three regeneration methods are described. These are change of locality, climate and sowing time with respect to time of year and time of day.

3.1 INITIAL CONDITIONS

Before the process of seed material regeneration is initiated, the seed material must be properly diagnosed, namely, what are the relationships of the following plant functions: Mass Generation vs Structure and Resistance; Reproduction vs Quality?

According to Georg W. Schmidt, plant varieties that have been raised in an organic or even in a biodynamic way and/or heritage varieties, especially if they originate from a mountainous area, are well suited for seed regeneration. At the same time, modern high yield varieties have been included in the trials.

3.1.1 Examples of Initial Conditions

Seed material origin:

a) Modern High Yield Varieties: High yield and appearance are uniform and more or less independent of conditions at the location and of the geography where they are grown. The maturing grain is often pale in colour and with little gloss. These varieties require large amounts of fertilizers and pesticides. Second generation yields tend to decrease markedly, making it necessary to buy new seed material for every succeeding year for economic reasons. Concentration on modern high yield varieties has led to a narrowing of the genetic material, which is also referred to as gene erosion. From the viewpoint of etheric forces, these varieties have little ability to benefit from or respond to the etheric formative forces originating from the geography or from the planetary level.

b) Heritage Varieties: These varieties usually reflect the characteristics of the landscape of origin and the care in seed material handling by the local population. They are adapted to the landscape of origin. Compared with the high-yield varieties, their yield tends to be markedly lower. However, resistance to fungi and pests is stronger. There tends to be little variability when reusing the seed material. From an etheric point of view, the implication is that the people and the landscape have had an influence in forming the etheric body of these varieties. Often, these varieties are no longer maintained by plant breeders. Heritage seed material has an abundance of varieties, making them ideal targets for seed banks in order to gather and stock gene reserves for future use.

c) Dinkel, Emmer and Einkorn: These are the predecessors of our modern wheat, originating from the region of Persia from about 6000 BC. G.W. Schmidt sees in these strains the “Ur” (ancestor) plant of our

present wheat; these plants are not tied to a specific locality or time. These varieties developed at that time have resisted any changes over time and have also maintained their characteristics independent of locality and climate, that is, they are more or less invariable with space and time. Considering the etheric forces, the implication is that these varieties have a densely structured, relatively unchangeable etheric structure.

Frequently Observed Weaknesses:

a) Degeneration of the seed material. This implies atrophy of all fundamental plant properties, such as reduction in germinating ability, loss in plant vigour, poor fruiting, falling yields and inability to support further generations. Therapy involves exposing the seed material to revitalizing and regenerating forces. Top priority is given to the strengthening of the regenerating forces with the help of the Chemical ether. When considering the etheric formative forces, there is a reduced effect of all four ethers present in this particular variety.

b) Selectively bred excessive mass generation. These are plant varieties which, particularly on soils that were not fertilized at all (for example, biodynamic farms), tend to develop dark green, large, massive leaves. They act as if there is an excess of nitrogen in the soil. This one-sided imbalance in the Life ether leads typically to a sensitivity towards fungi. This can be a particular problem on biodynamic farms, where fungicides are not used at all. The therapy involves a reduction of the mass-forming ether forces over the next generations of the seed material, while simultaneously strengthening the formative/resistive forces. When considering the etheric formative forces, the Life ether needs to be reduced and the Light ether needs to be strengthened.

3.2 LOOSENING

Loosening is the first phase in the process of seed material regeneration as per G. W. Schmidt. The steps in this phase include exposure of the plant to changing cultivation conditions over the next few generations.

Varying cultivation conditions include the following: time of year, time of day of planting, change of location with regard to local climate, over-ranging regional climate, as well as topological, geological and soil variety characteristics such as mountain, valley, etc. Through this “shock therapy,” that is, the drastic change of cultivation conditions, the genetic pattern sequence passed on from generation to generation is loosened up and sensitized. The plant re-acquires a certain genetic mobility in the process of trying to adapt to the different localities. When viewed from the point of etheric forces, the changes in cultivation conditions are intended to give the plant a certain etheric mobility.

Perceptible effects of these measures result in the situation where certain cereal plants break out of the rigid form of the originally bred, very uniform varieties. They extend their structure, later also their flowering spikes. These plants are carefully selected for further breeding. During this cultivation phase other reactions by these plants include the following:

- Stretching of the inter-nodal distance at stalk and spike;

- Generation of new colouring nuances on stalk, nodes and spike;
 - At maturation, tendency towards glossy surfaces;
 - Possibility of type variance, considered a sign of newly acquired loosening in the plant genus.
- The following sections include some examples.

3.2.1 Type Generation

G.W. Schmidt reported on a wheat variety, which was one of the subjects of his plant breeding efforts that had been cultivated biodynamically over a time period of about 20 years. This particular variety diverged spontaneously in the same year at two different locations into more than nine different types: darker and lighter wheat varieties, with and without awns, with Dinkel-like spikes, with dense, short spikes (as in Mediterranean varieties) and with “normal” spikes. The new varieties remained stable over the following years. Similar occurrences have been observed also in other grain varieties and as well in plant breeding institutions in Europe and on the American continent. This is a phenomenon that is generally undesired by conventional plant breeders, however, in this approach to plant breeding, these spontaneous divergences are desired and promoted for the purpose of developing new plant varieties.

Schmidt speaks of the newly generated varieties of wheat, or grains in general, as the base or original form, which is an integral part of any of the plant varieties.

3.2.1.1 Attempts at Explaining the Mechanism of Type Generation

a) After years of careful observation, the following influences were cited, which singly or together can be considered as trigger factors for spontaneous type generation:

- Twenty years or more of biodynamic cultivation;
- Use of a well-established and maintained plant breeding facility;
- Carefully planned and executed sowing processes;
- Change of locality;
- Through careful guiding of the formative forces, new impulses from the environment can come to fruition;
- Each new year brings a new constellation and climatic “signature;”
- The influence of the caring plant breeder.

b) From a genetic viewpoint, the following questions arise.

- Have initially concealed cross fertilizations become apparent? Wheat is self-fertilizing, but can cross up to a level of about 3%.
- Is one faced with a divergence of the original variety because of the genetic biography of the seed material?
- Have quiescent DNA segments been revived?
- Have chromosomes undergone mutations?

From these considerations the question arises, could the plant breeding measures developed by G.W. Schmidt open up the possibility to exert direct influence on the genetic activity of the plant?

Schmidt has heard from a conventional plant breeder, who observed the same phenomenon of divergence into several different wheat varieties, which appeared to be caused by an extreme locality change for the seed material (to South America).

The above-described phenomenon was also observed by Schmidt for a different wheat variety, with a slight variation. In this case, two new forms of spikes were generated. In the following year, this divergence continued. Thus, type generation took place over a number of cultivation periods.

3.3 CHANGE OF LOCATION

Here the plant is exposed to the most varied influences, whereby the plant is not viewed as an isolated organism but as part of a complete organic ecosystem. There are the organs of the landscape as well, such as mountain or valley, fertility, dryness, slopes with different exposures, the geology of the area with a soil base of calcium or silica and the resulting top soil layers. There also tends to be a diverse range of micro climates and locality dependent growing conditions. The effects of nutrient supply, light, wind, water ecosystem and warmth as resulting from the four elements, can vary considerably with respect to each other.

In these localities, the four Greek elements, representing the physical manifestation of the etheric forces, work in variable ways on the plants and leave their imprint right from the time of sowing. In this way, the four plant properties are influenced by the locality right from the start (see also section 4.4.4).

Cultivation in locations that are

- Mountainous,
- With south, south-east or eastern exposure,
- Silica content in the soil or sub-soil,

support the structure/form of the plant. For instance, in mountainous locations, exposure to warmth, frost and light tends to be much greater than in valleys. With regard to the etheric forces, it is implied that the Light ether and the Warmth ether have a much greater effect on the plant and thus strengthen the plant properties of form/resistance and quality.

To strengthen the Earthly etheric forces and the corresponding plant properties of reproduction and mass generation, locations with characteristics such as the following are particularly suitable:

- Valley location;
- South-west and western exposure (moisture, the “weather side”);
- Calcium content in soil or sub-soil.

These conditions increase the vitality and variability of the plants. Here water acts as an effective medium for the Chemical ether, for instance, water in the form of precipitation, fog, dew and soil moisture. Change of locality as a tool for plant material regeneration makes use of the research in the area of “Ether Geography,” as outlined for instance by Hageman (1973).

3.4 CHANGE OF CLIMATE

The location change makes use of the local ether-geographical conditions of the particular landscape to bring about plant regeneration. In the case of climate change, the plant will be exposed to variations of maritime or continental type of climates. In the case of continental climate, the Light ether and Warmth ether, through the elements of Air and Warmth (Fire) will have stronger effects. They promote the properties of structure and quality in the plant. The influence of the Chemical ether, working through water, is attenuated. In the case of a maritime climate, this is of course correspondingly different.

3.5 TIME CHANGE

Just as a change in location as described in the preceding sections affect plant properties, so also can a change in timing of planting. The changes with respect to sowing time concern annual as well as daily time rhythms.

For winter grains, there are given optimal planting times dependent upon the location. One can still plant a short time before or after these recommended optimal times. For regeneration of the seed material, one may intentionally deviate from these locally conditioned times as far as possible. Thus, the planting time can be “closer to summer” or “closer to winter.” Local weather conditions determine whether the planting time is “closer to summer” or “closer to winter,” that is, for “closer to summer” there must still prevail summer-like weather conditions, while for “closer to winter” there may already have been a week of cold weather, possibly with night frosts.

3.5.1 Closer to Summer Planting

With early sowing, the plant has a longer developmental phase before the weather turns cold, that is, the plants are exposed for a longer period of time to summer-like climatic influences. The result is more vigorous growth, so that the plant starts already at that time to bulk up. This enhanced growth characteristic continues into the next spring and summer. In such a vigorous growing phase, the plant is able to form more plant mass, which can lead to higher yields in grain and straw than for late-seeded plants. The emphasis on vigorous growth extends with late-seeded grains right into the area of the spike, which basically forms the regenerative pole of the plant.

Closer to summer planting exhibits the following characteristics:

- a) More bulking up;
- b) Longer stalks;
- c) Increased kernel capacity;
- d) Spikelet with stronger glume structure (rye);
- f) Conical shaping of the glume structure (rye);
- g) Proportionally larger glumes;

h) Better for baking (bread quality).

(glume = the chaff around each grain seed, often carrying an awn, that is, a strong bristly hair)

The changes in form, such as longer stalks, more bulking, emphasized glume structure and larger glumes indicate an emphasized growth characteristic of the plant. This increased growth potential extends right into the spike itself, which represents the regenerative pole of the plant. In the spike, the glumes, that is, the chaff hulls surrounding the individual grains, are noticeably more defined. With rye, this results in a glume structure that is noticeably wider than the kernel row, when compared to the closer to winter planting of the same year. Also, the glume structure tends to be more conical/tapered in shape than the winter-seeded variety. The emphasized mass generation of the summer-seeded plant is also the basis for an increased number of kernel rows along the longitudinal axis. The increased mass generation can be attributed to the effects of the Life ether in conjunction with the Chemical ether.

Practical experience has shown that the closer to summer seeded grain produces a better quality bread; it tends to taste better and rises better and has smaller, more even pores (bubbles in the dough).

Thus, in closer to summer seeded grain, one Earthly and one Cosmic plant function are emphasized, namely mass generation (yield) and nutritional quality (bread quality) (see Figure 5). However, these advantages come at the cost of reproductive strength and structure/resistance of the plant that is seeded closer to winter. Thus, it is necessary to alternate between closer to summer and closer to winter cultivation.

3.5.2 Closer to Winter Planting

Closer to winter sowing (for example, winter rye) strengthens the following plant characteristics:

- a) Higher survival rate;
- b) Increase in the spacing between kernel rows;
- c) Widening of the grain bearing area (rye);
- d) Pronounced parallel formation of the glumes (rye).

Higher Survival Rate

The higher survival rate results in a more robust reaction of the plant towards winter mold and pests, and this higher survival rate can be seen as a result of strengthened regenerative forces. These are mediated through the influence of lunar forces, which have a decisive influence on the reproductive processes in plants. The reproductive forces of the Moon are working through the water. Naturally, the soil holds more moisture in the case of closer to winter sowing; the seed, imbedded in the wet soil at that time, will soak up this moisture and is thus more exposed to these lunar forces.

Thus, the higher survival rate should not so much be seen as inherited from the mother plant but as the effect of the reproductive forces of the water, working on the seed material.

Lengthening of the grain bearing area
Widening of the grain bearing area
Pronounced parallel formation of the glumes

These changes are part of the morphological structuring of the grain plant and are constituents of the cosmic form elements of these plants (see Table 2). The lengthening of the grain spike (increased spacing between grain layers) is a result of the stretching of the inter-nodal distances in the spike. Cause and effect can be analyzed as follows. The effect of frost on plants is a result of increasing Cosmic forces, resulting in a trend of hardening off the stalk. To more precisely analyze the effect of these Cosmic forces, it helps to see a connection with the silica element; the more “woody” stalk is a result of the silica, which in turn acts as mediator of the Cosmic formative forces. See also G.W. Schmidt, E. Erdenger (1971), Steiner (1924), M. Williams (1993).

Through the closer to winter sowing, similar to the closer to summer sowing, one Earthly and one Cosmic plant function is activated, namely reproduction and structuring.

Some of the effects of this closer to winter and closer to summer cultivation are also known in conventional agriculture, even if they are known under different designations and the effects ascribed to different causes. In conventional agriculture, these are referred to as early and late cultivation respectively (or summer wheat vs winter wheat). Examples show that knowledge of the connections between susceptibility to damage and cultivation time, with respect to customary local cultivation time, exists, however, the interpretation of the facts differs. See Fischbeck et al. (1982) and Heitefuss (1987). Quoting these authors:

With late sowing in the fall, the weather tends to be cool and thus the growth conditions for harmful organisms are as a rule less than ideal. Late sowing reduces the probability of damage due to the following crop diseases:

- *Mildew (Erysiphe graminis) – risk of damage only with larger doses of nitrogen;*
- *Winter mould (Fusarium nivale) and Typhula rot (typhula incarnata);*
- *Frit fly (Oscinella fri) – risk only at very early sowing of barley;*
- *For potatoes, earlier achieving of age-conditioned resistance against virus pathogens.*

Early sowing in fall (closer to summer sowing) results in larger yields for most cultivation areas in Germany.

3.5.3 Time of Day

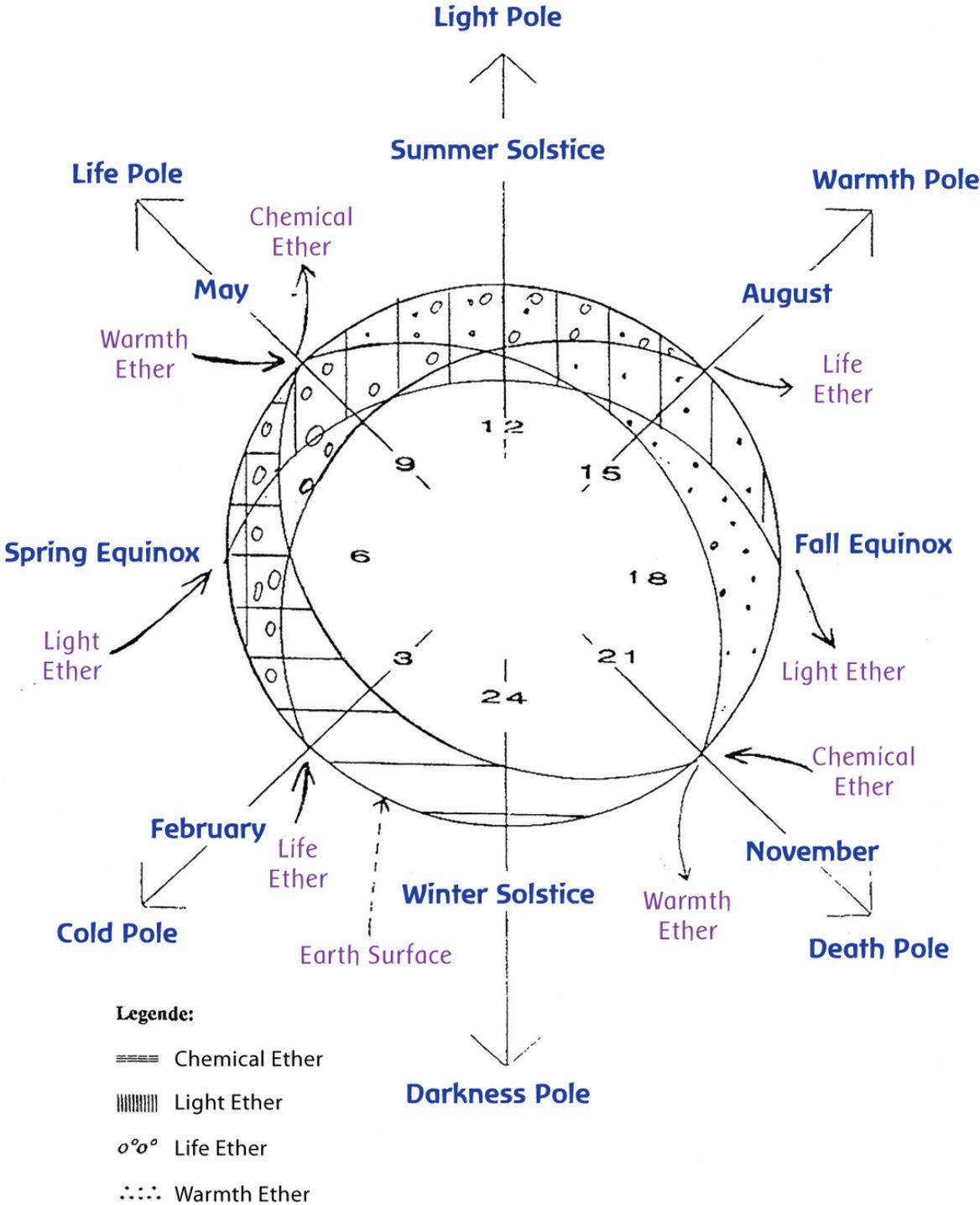
According to Steiner (1925) and Wachsmuth (1965), not only are plant and landscape to be regarded as living organisms, but also the Earth as a whole. The Earth is enclosed in layers of etheric formative forces. There are times when these etheric envelopes are contained within the atmosphere of the Earth, and times when they are within the Earth proper, where they can work directly on the plants. Of importance in this “breathing” process is the beginning of the in-breathing and the point where it reaches a maximum and is about to reverse, for instance for the Life ether (see Figure 3).

This breathing process takes place on a large scale within the seasons and on a smaller scale within the hours of the day.

For example, in the process of improving seed material, sowing in the evening over multiple generations exposes the seed material twice daily to moisture, namely evening and morning dew. This exposure to the Chemical ether mediated through the water, over the course of a few years, can result in a susceptibility to fungal diseases, a negative when furthering reproductive strength.

With early morning sowing, the Light ether begins to work and the Life ether is approaching a maximum. Sowing at noon exposes the seed material to both Light and Warmth ethers. See Wachsmuth (1965). More information can be gleaned from the protocol of a lecture given on April 22 and 23, 1993 (reference number 43).

Figure 3: Year and Day Breathing of the Earth



4. GENERATING A PLANT BIOGRAPHY

The loosening phase serves to make the plant susceptible and open to change. First, signs of change become noticeable. In the following phase, the actual therapy starts. The plants are intended to take up new impulses during each successive growing season. G.W. Schmidt calls this phase the generation of a new plant biography. The plant breeding or regeneration measures enable the plant to develop new, and until then, not apparent properties and to pass these new properties on to the following plant generations in a most stable manner. The sequence of the herein described measures is not critical. Carefully trained observation of the plant's progress will lead to each next step. Some measures of the loosening phase may need to be repeated, new ones may be added, such as, extreme climate changes, the fruit stand bed, one-sided preparation application and sowing according to the constellations. Here, sowing time according to the constellations takes on a predominant role. The relevant astronomical basics are explained further on.

4.1 SUMMARY OF THE EFFECTS OF THE DESCRIBED MEASURES

During the phase of "generating a plant biography," the plant can acquire a new relationship to the environment in which it is to be raised. This environment includes the agricultural facility with its particular cultivation procedures, as well as the field location with its particular etheric geography and the overall sensitivity of the plant to the influence of the planetary constellations. These changes in the relationship of the plant towards its environment can bring forth new inherent properties. These include:

- Progressive development of the properties that resulted from the loosening phase; stretching of the inter-nodal spacing, generation of new colour shades of the stalk, as well as new glossy appearance;
- Formation of a larger root system, extending to a greater depth;
- More stability;
- Increased resistance to damaging organisms;
- Increased robustness towards weather extremes, such as drought, storms and cold snaps;
- The plant can more easily handle droughts and other climatic extremes, such as drought, storms and standing water;
- Increased ability to extract nutrients from the surroundings, so that the plant can thrive even on poor soils and produce adequate yields;
- The plant acquires new robustness against fungi;
- For modern high-yield versions, the uppermost leaf, next to the spike, will change to a narrower and smaller form. Thus, it returns back to the form that one should expect according to the metamorphosis of that last leaf before the fruit stand.

4.2 EXTREME CLIMATIC CHANGES:

Multi-Year Cultivation in Mountainous Regions, in Southern Climates and in Coastal Areas

These measures have similar effects as described in the sections "Change of Location" and "Change of Climate." However, the effect of these measures is extended here over several years and the geography dependent effect of the ethers is more extreme. Cultivation in mountainous regions (600 – 1300 m elevation), on a granite base (silica), and cultivation in more southern regions promotes form and intricate structure. Sea shore locations enhance reproductive strength and loosening (see section 3.2).

4.3 THE FRUIT STAND BED

This is a seed bed with a special arrangement of the seeds from one spike of grain that reflects the order of the kernels as they appear on the spike or "fruit stand." This form of sowing expresses the inherent order, namely the natural laws that govern the growth pattern of the plant, such as Earthly or Cosmic characteristics, as they originate from the etheric poles of the fruit stand. The fruit stand bed was developed by Martin Schmidt on the basis of the rye spike and is now often just referred to as the (grain) spike bed. In the development of the spike bed, Martin Schmidt made use of Goethe's ideas on plant metamorphosis. According to Goethe, the whole plant is mirrored in every one of its individual organs. Every organ of the plant reflects the individual strengths or weaknesses of the plant. Schmidt also based his work on the suggestions by Rudolf Steiner (1925) to explore which specific characteristics of a plant are Earthly and which are Cosmic in nature.

Thus, Martin Schmidt designated the spike as an organ of the plant and placed the individual grains into the soil in the same order as they appeared on the spike. A description of the spike bed using the example of the rye spike is as follows. The grains of the rye spike are arranged on the axis of the spike in opposing pairs on either side of the axis and each successive pair is displaced upwards by a small distance and at right angles to the preceding pair. Two pairs, that is, four kernels are considered one layer; in other words, each layer consists of four kernels. The layer numbered "one" is the lowermost layer on the spike and the layers above it are successively numbered. A container with rows of four compartments each is used to hold the kernels as they are removed from the spike. Each row of compartments is numbered corresponding to the number of the layer from which the four kernels came. From this container, the first four kernels are sown out into row one of the spike bed and this is repeated for each successive layer. Thus, the spike bed is a narrow bed with four plants in each row and as many rows as there were layers. With grains that have more than four kernels per layer, there are correspondingly more plants per row. Where there are grains missing in a layer, the corresponding place in the row is left empty. This will be carefully noted in the records. The kernels are typically seeded out with a spacing of 10 cm in each row and with 10 cm distance row to row.

The different layers of the spike typically produce plants with differing characteristics. Experience has shown that the spike has a root pole and a leaf pole. Furthermore, the spike has a "Cosmic" pole, which passes on the Cosmic qualities to the next generation, and correspondingly an "Earthly" pole which passes on the Earthly qualities. At the center of the spike the two forces interpenetrate. At the lower end of the spike the Cosmic forces predominate; this is the root pole. In the upper part of the spike, the

Earthly forces predominate and this is the flower pole (see Figure 5). For plant breeding, the kernel layers are selected in such a way as to obtain the desired balance between Earthly and Cosmic forces for the plant species. More information about the spike bed can be found in E.v. Wistinghausen (1967), M. Willms and G.W. Schmidt (1995).

4.4 ONE-SIDED INFLUENCE OF THE PREPARATIONS

In biodynamic agriculture, use is made of the two preparations, Horn Manure and Horn Silica, which are sprayed directly on the cultivated acreage. Preparations consisting of yarrow, stinging nettle, oak bark, chamomile, dandelion and valerian are applied in a specific way to the compost and affect the plants via the compost.

In the work of regenerating seed material, certain of these preparations are used. The plants are situated on mounds of earth. These mounds have previously been treated with selected preparations. G.W. Schmidt has experimentally determined which preparations promote Earthly and which promote Cosmic form elements of the plants.

The biodynamic preparations enable involvement of the elemental beings in the cultivation process. These spiritual beings can thus have an influence in the effect of the four elements on the plants. More information can be found in the protocols of the "Zukunfts-Institut," the Institute of the Future.

4.5 SOWING AT SPECIFIC CONSTELLATIONS

So far, we have only looked at the cultivation times in relation to the seasons and the time of day. In both cases, this involves solar rhythms. Now we will look at sowing times with respect to the constellations of the planetary system. Since this is a somewhat unusual subject matter, the author has deemed it necessary to establish some basic astronomical foundations.

The realm of the planetary system is the source of the etheric formative forces. Certain constellations can promote and strengthen the four plant functions, namely

- Generation of material,
- Generation of form/structure,
- Reproduction and
- Nutritional quality.

This might at first seem dubious, however, certain influences belonging to this category are universally accepted, such as the influence of the Sun on the plants as a function of time of day and season.

The Moon as a planetary body also has a very noticeable effect on the Earth, discernible in the oceanic tides. Less known is the research in the area of chronobiology, which has found that the life rhythms of certain animals are synchronized to the lunar phases, such as mating only at the Full Moon. Also, some people react to various phases of the Moon.

Table 4 Phases and Measures in the Process of Seed Regeneration

PHASES	GOALS	TOOLS	MEASURES	METRICS
Diagnosis of the initial conditions	Analysis of the starting conditions of the seed material	Use of diagnostic check list		
Loosening	Enlivening of the seed material to enable the genetic variability for the seed material for the succeeding work phase. Loosening of any genetic rigidity	Development of a therapeutic strategy in the form of a “loosening process” based on a suitable protocol considering the starting conditions enumerated in the above checklist	<p>Frequent changes in sowing time and localities with the following criteria:</p> <p>Measures to further Earthly plant functions Sowing times</p> <p>Evening: furthers Chemical ether Morning: furthers Light ether</p> <p>Closer to Winter for Reproduction Closer to Summer for Mass Formation Closer to Winter for Quality</p> <p>Locality: Valley W/SW side Weather side Silica base</p>	<p>Generation of increased vitality: Phenomenological and genetic basis</p> <p>Examples: lengthening of stalk or fruit stand</p> <p>increased colour and sheen</p> <p>possibility of new type generation</p>
Plant design and development	<p>Generation of new plant type adaptable to specified localities, with designated properties</p> <p>The specification extends to the phenotype as well as the genotype.</p> <p>Of concern are properties and combinations thereof such as: form, structure, resistance, quality, nutritional value, mass generation and eproduction</p>	<p>Development of a location specific and type (goal) specific selection strategy</p> <p>Formulation of a plan to adapt the plant to the specific location</p> <p>Use of a development aid such as the spike bed</p>	<p>Multi-year cultivation and selection of location specific varieties with suitable breeding objectives, avoiding one-sidedness. Alternating different measures.</p> <p>Vitalize and support adaption process via measures that will:</p> <p>further Earthly plant functions further Cosmic plant functions</p> <p>Multi-year cultivation in coastal areas mountainous areas</p> <p>Effect of BD preparations: Horn Silica Horn Manure (Life, Chemical ether) (Light, Warmth ether) Yarrow (vitalizing) Yarrow (vitalizing) Nettle (vitalizing) Nettle (vitalizing) Oak bark (lime) Dandelion (Light ether) Chamomile (lime) Valerian (Warmth ether)</p>	

Table 4 Phases and Measures in the Process of Seed Regeneration (continued from previous page)

PHASES	GOALS	TOOLS	MEASURES	METRICS
Plant design and development			<p>Sowing with the constellations: Reproduction Quality, Structure Vitality Resistance 2-5 days before Jupiter, Saturn Full Moon</p> <p>Sowing time of day effect: Evening Morning Closer to winter</p>	
Stabilizing phase	Stabilizing of seed material	Multi-year cultivation following local customs, maintaining unchanging local conditions	Multi-year cultivation under observation with gently regulating corrections and final selection	Insensitive to environment, genetic stability
Stress test	Exposure to multi-year stress tests to examine robustness towards long and extreme external influences		<p>One-sided cultivation with exposure to extremes:</p> <p>Earthly Soil compaction Draught Soil acidification Heat Standing water Cold Poor soils & locations</p>	Weakness, sensitivity and one-sidedness of seed strains become apparent and are eliminated
Adaptation to destined locality	Adaptation of the seed material to the climate and the cultivation process used in the production location		Multi-year cultivation with continued selection process to maintain productivity of the seed material	

4.5.1 Planetary Constellations and Sowing Time

4.5.1.1 Heliocentric vs. Geocentric View of Planetary Movement

The customary view of planetary movement is the heliocentric view. This heliocentric perspective is from above, looking down on the Sun and the planetary orbits, with all the planets moving in concentric circles or, more accurately, ellipses around the Sun. However, when observing the night sky from the Earthly perspective, it is not possible to see it as such. Taking the observer on the Earth's surface as a central reference point, the Sun and stars revolve around the observer. Seemingly the observer is fixed at this central location and the starry night sky is revolving around him or her. This is referred to as the geocentric view.

To successfully observe and correlate the effects of the Sun, Moon and planets on the plants requires the use of the geocentric view. The planets affect the Earth in exactly the same way as they are visible from the Earth.

To make a mental bridge from the heliocentric to the geocentric way of thinking, one has to mentally move the reference system from the Sun to the Earth. The Earth now appears stationary and the Sun moves around the Earth along the heliocentric trajectory of the Earth.

One special effect of the geocentric view is that the planets now describe loops on their trajectories. These loops are only seemingly loops; they appear because of the differing angular velocity of the planets around the Sun. In tracing a full (heliocentric) revolution of the Earth, this is what happens when the Earth, say, passes a slower moving planet. There seems to be a movement of the planet towards the Earth, then a halt in its position, then a movement away, finally another halt and a movement towards the Earth again. It is a similar movement to what one would see when passing a slower moving vehicle in a faster moving one. For more information on the basics of planetary movement, see Mudder (1980).

4.5.1.2 Geocentric Sequence of the Planets

When observing the planetary realm from a geocentric point of view, the following is the apparent planetary sequence. The Earth is at the center, around it revolves the Moon, then the planets Mercury and Venus, next the Sun seemingly moving on the heliocentric trajectory of the Earth. Beyond the Sun appear the planetary trajectories of Mars, Jupiter, Saturn, Uranus, Neptune and Pluto. The latter three outermost planets have not yet been investigated sufficiently with respect of their influence on plant growth. Thus, they are not included in the following discussion of the planetary effects on plant growth, but require more research and experimentation with respect to their constellation effects on seed regeneration. See G.W. Schmidt (1985).

The trajectory of the Sun takes on a special role, as the dividing line between the near or inner and the far or outer planetary realm. The median distance between Earth and Sun is defined as 1 Astronomical Unit, 1 AU. All planetary trajectories or segments thereof and the corresponding planets that are more distant from the Earth than 1 AU are depicted in Figure 4 as lying outside of the Sun's trajectory, that is, in the far or outer planetary realm. Conversely, all planetary trajectories or segments thereof and the

corresponding planets that are within the distance of 1 AU are depicted within the Sun's trajectory and are referred to as near or inner planets. According to their geocentric trajectory, the planets are thus divided into near and far planets, depending on whether they are less or more distant from the Earth than 1AU; the Sun itself belongs to either group.

The outer or far planets are Mars, Jupiter and Saturn, where strictly speaking, only Jupiter and Saturn have true outer trajectories, while Mars occasionally loops into the inner planetary realm, that is, whenever Mars is closer to the Earth than the Sun. This occurs at the time when Mars is in opposition to the Sun. For this reason, G.W. Schmidt labels Mars as an alternating planet or "Wechsel planet" (see Figure 4).

The inner planets are Earth, Moon, Venus and Mercury. Here again, Venus and Mercury reach with their trajectories into the outer planetary realm. This happens whenever, from a geocentric point of view, these planets are behind the Sun as seen from the Earth and thus they are also designated by G.W. Schmidt as alternating planets or "Wechsel planets."

Strictly far or outer planets are

- Jupiter ♃
- Saturn ♄

Alternating or "Wechsel" planets are

- Mercury ☿
- Venus ♀
- Mars ♂

Strictly near or inner planets are

- Earth ⊕
- Moon ☾
- Sun ☼

4.5.1.3 Opposition, Conjunction, Trine

Whenever the Earth is lined up exactly, that is, in a straight line, with two planets, including Sun and Moon, we speak of an opposition or conjunction.

In the case of an opposition, the Earth is situated in a straight line between the two planets. As seen from the Earth, if the Sun is in opposition to a planet, the planet will rise as the Sun sets, so the planet will be visible throughout the night. This occurs in the case of a Full Moon; the Moon is in opposition to the Sun. Figure 4 shows the instances of an opposition of a planet with the Sun and the opposition is indicated by the symbol $\overset{\circ}{\text{P}}$.

In the case of a conjunction, both planets are in line on the same side of the Earth. At the time of a conjunction with the Sun, the corresponding planet will not be visible from the Earth, as in the case of a

New Moon, when the Moon stands between the Earth and the Sun. Figure 4 shows the instances of a conjunction of a planet with the Sun; the conjunction is indicated by the symbol σ .

In the work of plant regeneration, one is concerned exclusively with the opposition, conjunction, or trine alignment involving the Moon. Thus, we consider the Moon in opposition, conjunction or trine with a planet or the Sun.

In a trine, there are three planetary bodies involved; however, they are not positioned in a straight line, that is, at 180 degrees towards each other, but at an angle of 120 degrees. In a trine of the Moon to a planet, the Moon is situated on one leg, the planet on the other leg of the 120 degree angle, with the Earth at the point of intersection. Of additional importance are the signs of the Zodiac in which the Moon and planet stand during that trine (see section 4.5.6). Note that the angular velocity of the Moon is much higher than that of the planets, so one could consider the planets almost stationary in comparison to the Moon. For a particular lunar orbit, this will result in two trines, and which trine is selected for the sowing time depends on the situational constellations and particularly the phase of the Moon (see section 4.4.7).

4.5.2 The Role of the Moon

When working with constellations in the field of plant regeneration, the Moon plays a key role as a mediator. It mediates and influences the effect of the Cosmos upon the Earth. It can either act a) in the way of a mirror, or b) mediate the forces of the constellation in which it stands.

a) At Full Moon, the Moon mirrors the Sun's light and projects it indirectly to the Earth. It plays this role not only with regard to the Sun. If the Moon stands in opposition to any planet (a Planet Full Moon), then it will mirror that planet's forces onto the Earth. If it stands in conjunction to this planet, that is, between the planet and Earth, then it will shield the Earth from the effect of this planet.

b) The Moon not only acts as a mirror, it can also be a mediator. The Moon does this primarily for the constellations. It will mediate the effects of the particular sign in which it stands.

4.5.3 The Significance of the Constellations of the Zodiac

When considering the constellations, one has to differentiate between the constellation symbols and the actual heavenly bodies making up the constellations. The constellation symbols have been neatly placed at 30-degree intervals along the plane in which the Sun appears to circle around the Earth. The graduation starts with the sign of Aries. In Figure 4, the constellation symbols are shown at the perimeter, with the repeating pattern of 30 degrees each. However, in the area of seed regeneration, it is not the symbols, but the actual position and extent of the heavenly bodies themselves representing a constellation that is of importance; there is a definite divergence in the graduation from the neat 30-degree scheme. In Figure 4, the actual position and extent of the configuration of stars representing each sign of the Zodiac is indicated and arrows between these constellations show the angle where one constellation ends and the next begins. Here the graduation starts with the spring equinox, that is, the point where the Sun is located when day and night, at spring time, are exactly equal and this point is at

the present time in the constellation of Pisces and wanders very slowly in the direction of Aquarius. Many of the planting and biodynamic calendars and planetary maps show slight differences in the delineation of the constellations; the directions given in the "Sternenkalender" (1995) are used here.

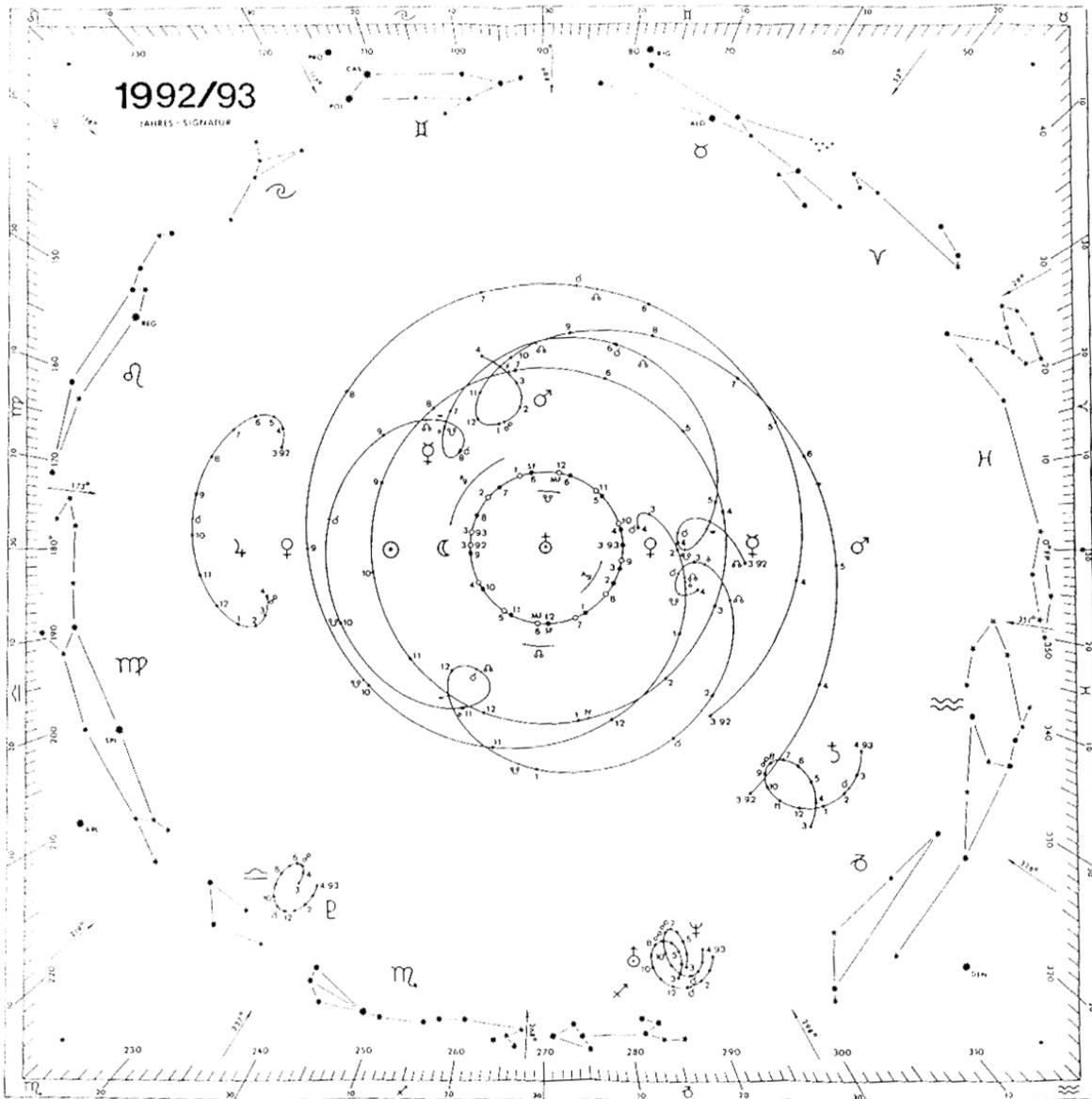
When using the constellations, the following rules are suggested:

- For planets, Moon or Sun standing in an angle of 6 to 8 degrees between two constellations, both constellations shall be assumed to be effective;
- If a planet stands at the center of a constellation, it is assumed to be held there.

The location and extent of the constellation symbol and the constellation star configuration do not coincide. One reason is the differing arc length of each constellation star configuration, the other is the migration of the equinox point. About 2000 years ago, the spring equinox point stood in the sign of Aries. At that time, the arc location of the actual constellation and the constellation symbol coincided. The then existing arc location of the constellation symbols, coincident with the actual constellations at that time and the equinox point, were assumed fixed in position relative to each other and this was adopted as a standard (Mulder (1980) page 45). However, due to the migration of the equinox point with reference to the fixed stars (the constellations), the constellations shift with respect to the location of the constellation symbols continuously. Thus, the constellation symbols are presently almost one constellation width displaced from their corresponding constellation. See Mulder (1980).

It is the actual twelve constellations that work on the plants, not the symbols. Their effects are mediated through the Moon as it passes in front of them, or via one of the planets, for example, in the case of a trine.

Figure 4: Geocentric planetary mapping, according to G. W. Schmidt



The plant organs, namely root, leaf, blossom and fruit, are strengthened through the Moon, as it passes corresponding constellations. These four plant organs are not identical with the previously described four plant functions. Nevertheless, their strengthening can also be understood in the context of the etheric forces. They correlate to the etheric forces as follows:

Table 5 Plant Organs and Etheric Forces

Etheric Force	Life Ether	Chemical Ether	Light Ether	Warmth Ether
Element	Earth	Water	Air	Fire
Plant Organ	Root	Leaf	Blossom	Fruit

Research by Maria Thun (Thun, 1985, 1994) shows that the above plant organs correlate well with certain constellations. Also, there exists a correlation between the constellations and the four elements.

Definition: When working with constellations, a trine is represented by three constellations that are located 120 degrees apart. When connecting these constellations, the connecting lines form a triangle. The resulting trine is characterized by properties of the three constellations, which influence corresponding plant organs. (These are different from trines involving two planets, as in section 4.5.1.3).

Table 6 Plant Organs, Elements and Constellations

Plant Organ	Root	Leaf	Blossom	Fruit
Element	Earth	Water	Air	Fire
Colour	Red-violet	Blue	Yellow	Red
Constellation (Trines)	Virgo Capricorn Taurus	Cancer Scorpio Pisces	Gemini Libra Aquarius	Leo Sagittarius Aries

The effect of constellation trines, mediated via the Moon, can be overshadowed by other constellations. Detailed experiments in that area were done by Maria Thun. See Thun (1994), Thun, Maria & Matthias (1994), Thun (1985), and Aschenbrenner (1982).

At the time of sowing, the Moon conveys to the plant an etheric force corresponding to the constellation in which it is standing. This force impulse serves to enhance the growth and the quality of the corresponding plant organ. This influence is effective only for that particular harvest year. The force impulse is insufficient to remedy a weakened plant organ or a plant function for the following generations. If that is a requirement, it is necessary to work with the planets. What then is the useful effect of the constellations? The constellations have to be considered because they can aid or hinder the constellation-driven seed regeneration process. The Moon as well as the planets are acting as mediators of the constellation forces, as they are passing in front of the constellations (see section 4.5.6).

4.5.4 Timing for Conveying Etheric Forces to the Plant

When working with plant regeneration, it is at the time of sowing that the plant will be able to receive etheric force impulses. For any means of imparting etheric forces to the plant, be it through change of locality, weather, season, time of day or constellation, the time of sowing is decisive. And of crucial importance is the contact of the seed with the mineral-bearing soil, not the contact of the seed with, for example, a mulching layer.

Once the seed contacts the soil, it will start to swell if there is enough moisture. Complicated processes in the dissolution and transformation of the nutrients in the seed take place to support the germination process. This is referred to as the transformation “chaos.” Just at that point of time, the nascent plant organism is receptive of the etheric forces that stream in. (Research into the chaos phenomenon indicates that even minute changes in initial conditions can lead to vastly differing results.) The time between seeding and germination can be anywhere from days to weeks, with some tree species taking even one to two years. Regarding the impact of the etheric forces on the plant, however, the first contact of seed with soil is crucial. This is when the ether body of the seed starts to transform. At the point of sowing, one speaks in this connection of a Cosmic fertilization, while the Earthly fertilization takes place at the blossoming stage. The effect that timing of sowing has on the growth of the plant cannot be mitigated at a later time through any means, such as fertilization or other treatment.

This topic has a parallel in human society. When setting a horoscope for a person, the time of birth is all important. Only a more in-depth analysis would require the time of conception.

It is of note that observable results in using constellations for the regeneration of seed material are possible only if the seed material has been sensitized to the etheric forces in preceding generations. The ways to achieve this are mainly the use of biodynamic preparations and an establishment of certain “biography” pertaining to the seed material, as described for instance in the section on “loosening.”

Differences in soil fertilization can easily overshadow the results of working with the constellations. Therefore, during tests, direct fertilizing of the test beds should be avoided. Any fertilization that is applied should consist of well-rotted compost, where the compost is not intended as nutrient to the test plants, but strictly used to enliven the soil.

4.5.5 What is the Effect of Sowing at Specific Constellations?

After extensive testing, G.W. Schmidt had come to the conclusion that sowing time according to the constellations strongly affects plant growth. This becomes particularly obvious when comparing a seed bed set up under a favourable constellation with another one done under a hindering constellation. A favourable constellation would have the Moon in opposition or in trine to the selected planet. An unfavourable constellation occurs with the Moon in conjunction to that same planet, that is, 14 days before or after the favourable constellation. In addition, it is useful to have a third bed for comparison that has neutral timing, that is, neither aiding nor hindering, to generate a zero reference. Constellation planting can result in large growth differentials in the following characteristics:

- General vitality;
- Germination strength;
- Root formation;
- Size, shape and colouring of stalks, stems, branches and roots;
- General resistance to fungi and pests;
- General resistance to weather extremes such as cold snaps or droughts.

Relative to the zero reference, these plant characteristics were noticeably to considerably enhanced when sowing occurred during a planetary opposition and correspondingly inhibited when the sowing occurred during a planetary conjunction.

4.5.6 Planets – Moon – Etheric Forces

The source of the etheric forces is the planetary realm. Every planet mediates a specific etheric force. The correlation of planets to etheric forces is shown in Table 7. See Hagemann (1973), Wachsmuth (1965).

Table 7 Planets, Plant Functions, Etheric Forces

Etheric Force	Life Ether	Light Ether	Chemical Ether	Warmth Ether
Force Pair	Force Pair 1		Force Pair 2	
Element	Earth	Air	Water	Fire
Colour	Red-Violet	Yellow	Blue	Red
Plant Function	Generation of Material	Generation of Form/Structure	Reproduction	Quality
Planet (including Sun and Moon)	Sun Earth	Jupiter Venus	Mars Moon	Saturn Mercury

Which constellations are suitable for mediating etheric force impulses?

Whenever the Moon stands in opposition to a planet, for example, Moon in opposition to Jupiter, that planet's corresponding etheric forces are mirrored back to Earth. Sowing at that point in time will cause the corresponding etheric force impulse to work upon the seed and thus have its effect on the plant. For this phase of plant growth, the particular constellation impulse is irreversible and is detectable two to three generations further on.

In the case of the conjunction, the Moon stands in front of the planet and covers it. The forces that the planet would otherwise direct towards the Earth are thus reflected back instead of reaching the Earth. Effects on the plant are reduced germination ability, inhibited growth and lower vitality.

The mediated etheric forces tend to be lower in the case of a trine, thus opposition is preferable. In the case where weather conditions are not suitable for planting and planting time cannot be delayed another four weeks until the next opposition (Planet Full Moon), does the trine offer a reasonable compromise? Which constellations should be best used for this trine? The physical location of the constellation used for the trine will quantitatively change (increase or decrease) the etheric forces of the Moon, Sun or planet. Therefore, if the planet mediates a Cosmic etheric force, that is, the Light or Warmth ether, then the trine should involve a constellation that also relates to these Cosmic etheric forces. For example, with Saturn trine Moon, Saturn mediates the Warmth ether. If the trine occurs in constellations that relate to the Warmth or Light ether, then the etheric forces of Saturn can be enhanced. If the trine occurs in constellations that relate to the Water element, then the etheric forces of Saturn can be hindered (see Table 6).

A planet trine the Moon results in an angle of 120 degrees as seen from the Earth. This angle will also result in a trine of two Zodiac signs of the same element (for example, Aries/Fire and Leo/Fire), neglecting the insignificant angular divergence due to the finite extent of the Zodiac signs. It is possible to have the planet trine the Moon lined up with two Zodiac signs of the same element. For example, Jupiter (Light ether) in a trine with the Moon, where Jupiter stands in the sign of Gemini (Light ether), and the Moon stands in the sign of Aquarius (Light ether). With the planet in opposition to the Moon this cannot happen, as the planet and the Moon always stand in Zodiac signs that belong to two different trines. More details are found in HERA Forschungsstelle f.d. oek. Landbau (1994) a,b).

4.5.7 Examples of Using Constellations for Sowing

The inner planets generally are connected with the plant's reproduction processes. Here the Moon with its Chemical ether forces takes on a leading role. Besides the reproductive processes, it also strengthens and vitalizes the plant. However, take note that excessive reproductive strength is achieved at the cost of a generally increased susceptibility to fungus.

One should consider the effects of the Moon not only in the constellation "Moon in opposition to Sun" (Full Moon), but also as a process that evolves as the Moon transits from New Moon to Full Moon. In this phase, the Moon augments its vitalizing effects continuously. One can work favourably with the vitalizing effects of the Moon when exposure lasts from one week before the Full Moon until the Full Moon. After the Full Moon, the lunar effects start to reverse and these effects become devitalizing.

The outer planets, Jupiter and Saturn, enhance the Cosmic plant functions and form elements (see Table 1). Here Saturn takes on the most important role. The constellation in which the Moon is in opposition or trine to Saturn enhances the vertical part of the plant, such as a weak stalk or tap root, or with a tree, the trunk. This effect was only observed for Saturn rising. This "rising" is analogous to the height of the Sun rising and of course the height of the Sun rises with each day starting at the winter solstice (Sagittarius) and then falls again starting at the summer solstice (Taurus). For the descending period, from the sign of Gemini to Scorpio, the effectiveness of Saturn is weakened.

To strengthen the resistance of a plant, one can use the constellation in which the Moon is in opposition to Jupiter. If it is not possible to plant the seed because of weather or interfering constellations, one can use the alternative of planting when the Moon is in trine with Jupiter.

When working with the outer planets, Jupiter and Saturn, the Moon should be in its decreasing phase. During the week before a New Moon, the Moon is less involved with mirroring the Sun. Its effect upon seeds is now devitalizing and with that there is also a decrease in the susceptibility to fungi. The best time to convey the forces of Jupiter and Saturn to the plant is when they are in opposition to the Moon. As an outer planet, Jupiter also enhances the Cosmic form elements.

When the Moon is in opposition (or trine) with Mercury or Venus, one can use this moment for regenerative work in the fruiting area, for instance, when working with fruit trees. See HERA Forschungsstelle f.d.oek. Landbau (1994) a,b).

4.5.8 Inopportune Times for Sowing

Constellations can both enhance and hinder the etheric forces.

Hindering occurs when there are:

- Too many conjunctions working simultaneously;
- Many planetary alignments involving 90 degree angles;
- Lunar and solar eclipses;
- Lunar or planetary nodes;

Explanation: The orbits of the planets and the Moon are tilted with respect to the Sun's path, namely the ecliptic. Thus, there are two points where their paths intersect with the ecliptic. A planetary (including the Moon) node occurs when the corresponding planetary body goes through one of these intersections. When the planetary body cuts through the ecliptic from below, we speak of a rising or ascending node, and when the planetary body cuts the ecliptic from above, a falling or descending node. Thus, there are two nodes for each planetary revolution.

- In the breathing rhythm of the etheric mantle of the Earth, the month of November exhibits the least synergy between the etheric forces (see Figure 4). Accordingly, this month should be avoided for sowing in the work of plant regeneration. See HERA Forschungsstelle f.d.oek. Landbau (1994) a,b).

4.5.9 Priorities for Sowing

The order of the following priorities was established by G.W. Schmidt based on years of active research. It begins with the locally accepted sowing time and ends with the position of the Moon in front of the signs of the Zodiac. The priorities are:

- The locally accepted sowing time;
- Next, decide closer to summer or closer to winter sowing time;
- Should the locality play an important role;
- Consider the local weather;
- Time-of-day can be used to balance out the generation of one-sidedness;
- Selection of a suitable phase trend of the Moon;
- Which planetary impulse is important for the plant in this phase of regeneration work;
- The effect of which sign of the Zodiac shall the Moon mediate.

Experience has shown that farmers, through use of the outlined procedures, can have considerable influence on the development of the plant from its seed.

Often weather or time pressures jeopardize the well-laid out schedule of all these seed timing parameters. However, as a first and important step, it is necessary that at least some of these parameters are conscientiously and thoughtfully implemented. More information on seed timing with the constellations can be found in HERA Forschungsstelle f.d.oek. Landbau (1994) a,b).

4.6 CLOSER TO WINTER SOWING

The customary time for sowing “closer to winter” is here (in Germany) the time between December 20th and January 15th spanning the time “between the years,” that is, December 25th to January 5th. In southern Germany, this time is referred to as the rough nights or the holy nights. The local population understood that this time was different from the rest of the year and in some way special. This impelled G.W. Schmidt in the 1970's to experiment with sowing grain and vegetable crops in this time span and evaluate the results.

For sowing, days without effective constellations were selected. The soil was previously covered with a mulch, such as hay, to prevent it from freezing. After the sowing, the soil remained uncovered.

Plants sowed during this time span showed quite remarkable traits:

- Increased resistance when exposed to drought;
- In wheat, increased resistance to *tilletia caries* and *tilletia controversa*.
(German: Steinbrand, Zwergsteinbrand)

These traits were maintained over two to three generations in neutral cultivation. The unexpected results present a strong impulse for further research into these phenomena and also into the remarkable effects connected with this particular seasonal time. See: HERA Forschungsstelle f.d.oek. Landbau (1994) a,b.)

5. FINAL MEASURES

5.1 STABILIZING PHASE

In the loosening phase, the plant is made sensitive and easily modifiable. In the following “therapy phase” (= creation of a plant biography) new impulses from the surrounding environment in a wider sense work on the plant and certain, until then unobserved, properties make their appearance. This must be followed up with a phase during which the desired new properties are fixed and the plant is stabilized, with the aim of making the new properties invariant over the succeeding generations. For this purpose, G.W. Schmidt recommends consistent, invariant cultivation conditions. Even after the stabilizing phase, the plant will require attentive monitoring and care.

5.2 STRESS TEST PHASE

In this phase, the robustness of the newly regenerated plant variety shall be tested. These tests aim to determine how consistent and strong the newly acquired etheric forces work in the plant and whether the plant is able to use the acquired etheric forces to moderate the effect of one-sided cultivation conditions. This phase will typically extend over two to three years. On the one hand, G.W. Schmidt has defined growth hindering conditions as conditions where the Earthly forces of Life ether and Chemical ether are abnormally enhanced by the physical properties (such as earth-solids and water-liquids):

- Soil compaction
- Standing water
- Acidification.

On the other hand, conditions that enhance the Cosmic forces, namely Light ether and Warmth ether, via the elements Air and Warmth (Fire) are:

- Drought
- Heat
- Cold, cold snaps
- Change of location.

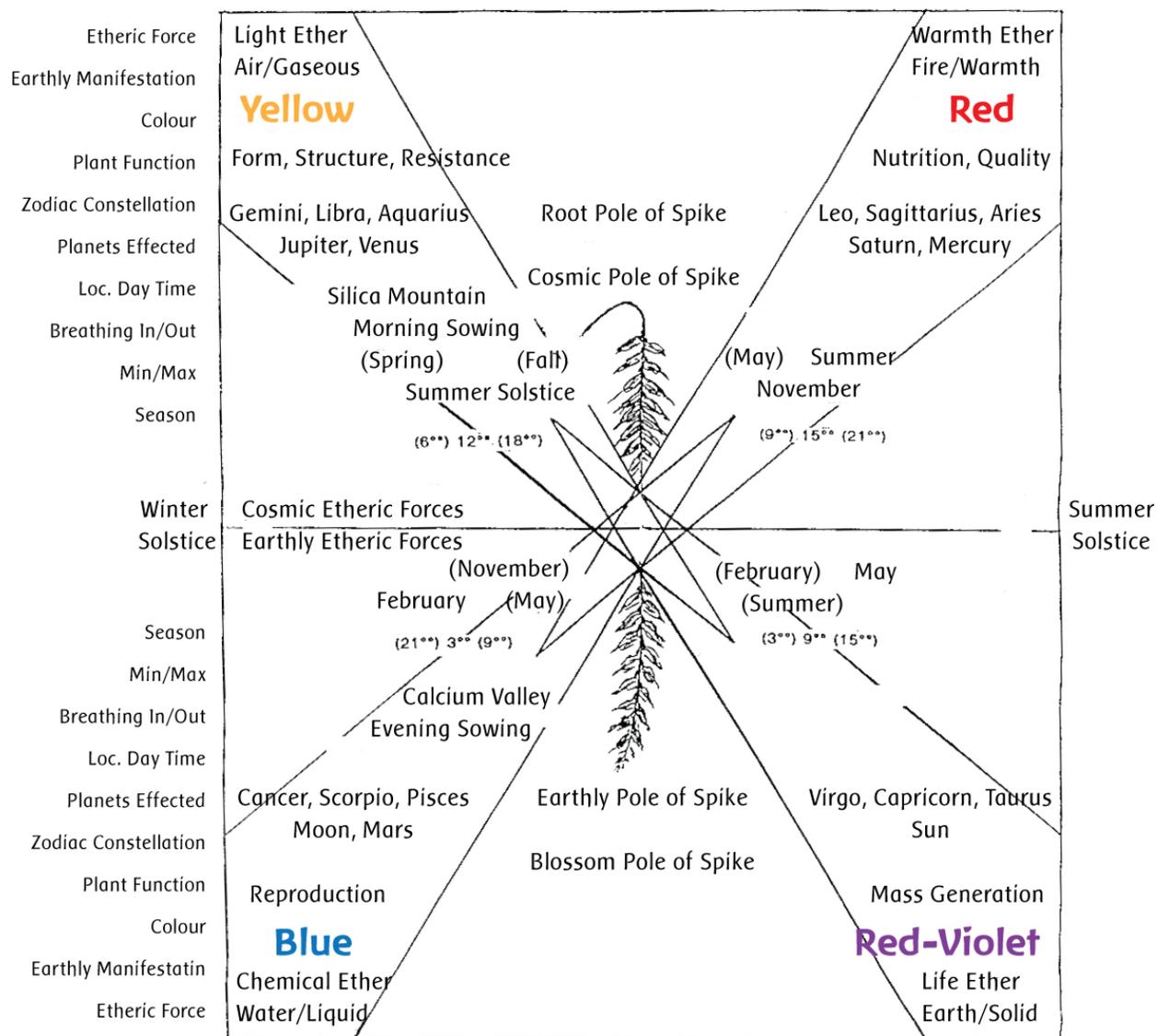
(There is also additional stress posed by high tension electric transmission lines and electro-magnetic fields.)

Breeding lines that show weakness in this phase will require further regeneration or are eliminated. In the following, G.W. Schmidt describes the necessary steps for the adaptation of the breeding line to the intended environment and the move towards mass cultivation.

Table 8 Assignment of Selected Properties to the Four Ether Forces

Etheric Force	Life Ether	Light Ether	Chemical Ether	Warmth Ether
Greek Element	Earth	Air	Water	Fire
Aggregate State	Solid	Gaseous	Liquid	“Warmth”
Colour	Red-Violet Peach Blossom	Yellow	Blue	Red
Planet (including Sun, Moon) Mediator: Moon	Sun Earth	Jupiter Venus	Mars Moon	Saturn Mercury
Zodiac Signs Planet Hindering/Enhancing Mediator: Sun, Moon, Planet	Virgo Capricorn Taurus	Gemini Libra Aquarius	Cancer Scorpio Pisces	Leo Sagittarius Aries
Plant Function	Mass Generation	Structure/ Resistance	Reproduction	Quality
Noticeable Characteristics	Plant Mass Yield Plan Growth	Resistance To Pests	Reproduction Vitality Plant Growth Fungus Resistance	Nutrient Quality Bread Quality
Form Elements (see Table1)	Earthly Form Elements	Cosmic Form Elements	Earthly Form Elements	Cosmic Form Elements
Examples	Massive Growth	Structured Leaf Borders	Elliptic, Round Forms	Taste, Aroma Sheen, Smell Pitch, Etheric Oil
Breathing of the Ether Mantle Seasons: (Inbreathing)	(February) May,	(Spring) Summer Solstice	(November) February	(May) Summer
Peak (Outbreathing)	(Summer)	(Fall)	(May)	(November)
Time of Day In Hours	(3:00), 9:00, (15:00)	(6:00)12:00, (18:00)	(21:00), 3:00, (9:00)	(9:00), 15:00, (21:00)

Figure 5: The Earth's Seasonal and Daytime Breathing Rhythms



6. SHORT OVERVIEW OF THE RESEARCH DONE BY G.W. SCHMIDT

Continuation of the research work of his father, Martin Schmidt:

- Extension of the regeneration of rye to other food crops and trees
 - Correlation of tree species to planets
 - Correlation of planetary effects to formative principles and plant functions.
- Establishment of dedicated plant breeding facilities, in order to achieve uniform baseline cultivation conditions. This is to avoid the inherent rotational cultivation for trial plots that are an integral part of a producing farm.
- Regeneration of farm or settlement environments, forests as well as former industrial areas. The landscape regeneration is based on the view of the landscape as a self-enclosed organism with its own specific ether geography.
- Development of a planetary map, depicting the planetary orbits from a geocentric point of view, as well as monthly constellation tables for optimum sowing times to achieve targeted objectives in the area of plant regeneration.
- Development of measures for the re-enlivening and regeneration of food crop varieties, with consideration of the four etheric forces. Among these measures are the following.
 - a) The spike bed and its extension to other fruit stands: ear, pod, panicle, cone and the tree as such.
 - b) Use of the Earthly and Cosmic rhythms in the form of
 - Season
 - Time of day
 - Closer to summer or closer to winter sowing
 - Planetary constellations
 - c) Experimenting with biodynamic preparations in general and particularly for compost.
 - d) Long-term cultivation in mountainous environments.
 - e) Alternating high range and valley cultivation.
 - f) Testing over several years of regenerated species in neutral cultivation for genetic solidity.
 - g) Founding of task forces for the development of new crop varieties.
 - h) Establishment of dedicated plant breeding facilities, experimental plots and tree nurseries.
 - i) Continuation of the foundational research in the areas of use of the etheric forces and in the work of regeneration of seed material, development of improved tree species, and ecological land redemption.

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