

Ripening, Maturity and Cosmic Influences

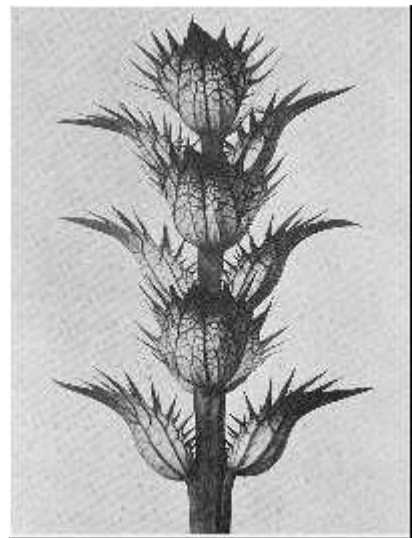
In the last chapter, we proposed the development of an alternative conceptual model of life springing from a natural force. We suggested complementary polarities for how that force manifests -- as center-seeking or periphery-seeking. Now let's expand that discussion with more details.

Expansion and Contraction

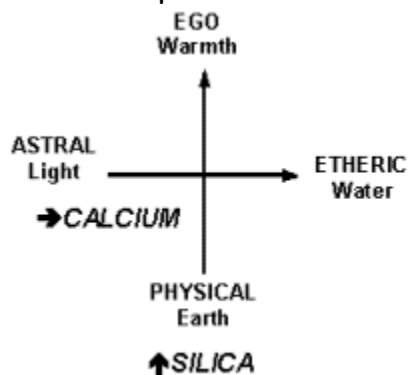
It was Goethe who first described the metamorphosis of plants in this way. He understood that the plants unfolds through a series of stages. Each stage has a period expansion, then a period of maturation or contraction. Goethe saw the alternating stages like this:

Contracted Form	Expanded Form
Seed ----->	<----- Cotyledons
Bud ----->	<----- Leaves
Calyx ----->	<----- Petals
Pistils, stamen --->	<----- Fruit
Seed ----->	

Each node of the plant shows this alternating pattern. First, the concave cup shade of the leaf node expands outward. It supports the convex growth bud, which is contracted into an upward reaching form. The bud generates a new node and the pattern repeats. At the topmost node, the bud is still generating new growth. We see here the repetition of the contracted-center to outward-seeking center.



Steiner explained this alternation as connected to the



two poles of life force.

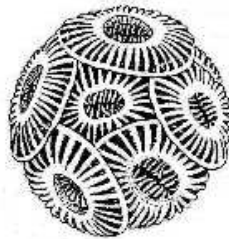
There is an earthy force associated with water, the moon and the element calcium. This force is evident in lush, rounded plant forms, the vegetative part of reproduction and the quantity of plant stuff. This growth pattern originates in the center-seeking polarity.

Its complement is a maturing force associated with light, warmth, the sun and the element silicon. This force hardens the plant, develops a vertical form, assists with bringing the outside or cosmic pattern into the plant. The cosmic nature shows up as quality of the plant, through nutrition, aroma, fruiting and flowering. As we will discuss later, Steiner proposed two special preparations that enhance these polar forces. The earthly force is enhanced with a preparation made from cow manure and the maturation force with a preparation made from crystalline silica.

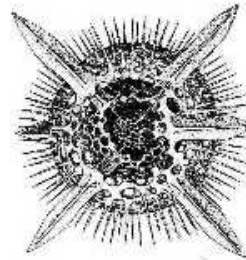
Silica is barely considered as a nutrient in conventional farming because we consider it insoluble. We know that sand or glass does not dissolve. Therefore, how can a plant mobilize silica? Yet silica is found in all plants -- somehow the plant has a way to absorb and transport silica as organic compounds. Silica important where tissues need to be strong. In particular, we find silica at the outside of membranes, providing a receptive, hollow space. Silica helps grain and straw stem to stand up stiffly; it is found in the sheaf and awn of the grain; it toughens plant stems to resist aphids and fungi. Silica counters the effect of excessive nitrogen fertilizer. It reduces the amount of rank growth and develops the effects of light and warmth.

Calcium works with the earth forces. Unlike silica, it is highly reactive in the metabolism of soil and plants. Since it dissolves, it can leach out of soil when there is too much water. Calcium aids soil structure and nutrient availability, working closely with magnesium. It mediates the forces from the moon and inner planets, but does so by pulling in toward the center, acting like a solid gravity-center.

We can see examples of these influences in micro-flora. The calcareous algae has a rounded form; while its polar opposite is the diatom with a shell of silica and a spiky, crystalline form. Think of the calcium form as being squashed together into a compact, solid ball, while the silica edges are being pulled to the outside.



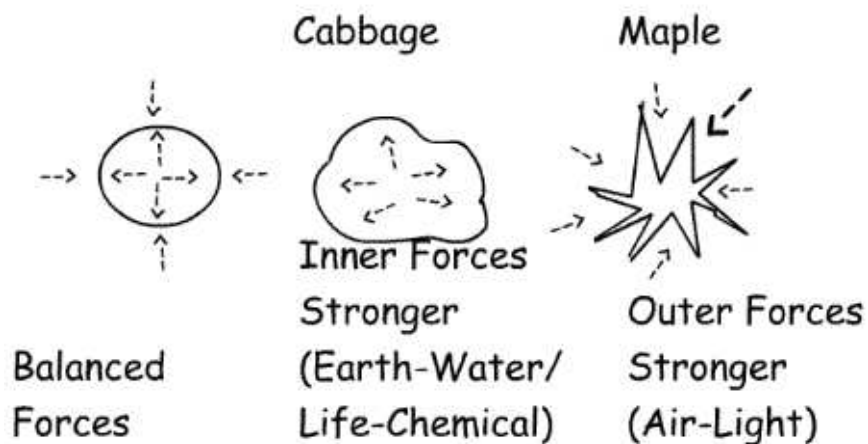
*Oceanic alga
(coccolithophore) with
chalk shell (Capra)*



*Hexactinellid,
diatom with silica shell
(Bannister)*

Dynamic Change

We already mentioned the key characteristics of life -- living things morph -- they change their pattern dynamically over time. How do we describe this process in plants? Keeping with the concept of polarity, imagine that the life-force manifests with two complementary poles. The first is that bulky vegetative growth -- plants produce lush, watery growth in expansive bulk and with rounded leaves. But then the plant changes and matures. The growth becomes harder and drier with leaves that are spiky or fine-toothed. The form of the plant becomes higher and



narrower. Maturation culminates as the plant flowers and sets seed.

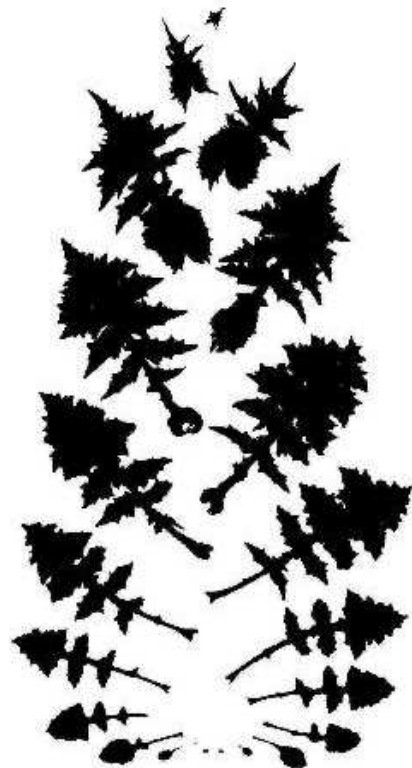
We can see the same principles at work in leaves and plant structures. The cabbage leaf shows lush, water influence in its rounded form. The finely divided leaf of

the maple shows the influence of airy forces.

Now consider the observation that these types of changes happen in the same plant over time. In higher plants, we observe that leaves start out one way but subsequent leaves grow into other forms later. Animals are more flexible -- they can change their bodies and organs as they grow and mature. But plants don't do that. Instead, the old structures stay while the newer structures exhibit differences.

The figure shows the leaf structures of a sow thistle (*Sonchus oleraceus*). The initial leaves are rounded in shape. Small divisions appear in the middle leaves. As the leaves move upward, the divisions get larger until the highest leaves are finely divided. At this point their form exhibits an airy refinement.

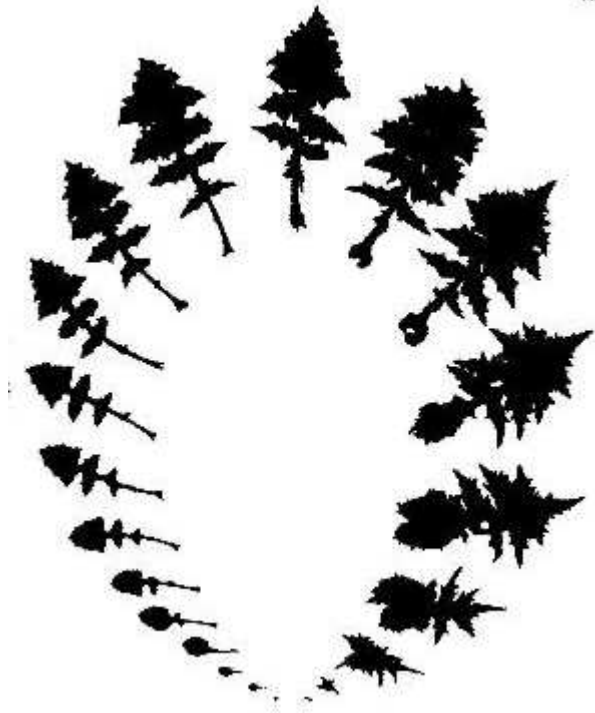
The same leaves can also be arranged in circular



form. Now it is more apparent how the plant goes through an initial vegetative expansion, then transition to more and more finely divided, rarefied forms. Finally, leaves disappear again, having dissipated into a radiating form.

Source: Jochen Bockemuhl, In Partnership With Nature, in Kimberton Hills Calendar, 1988.

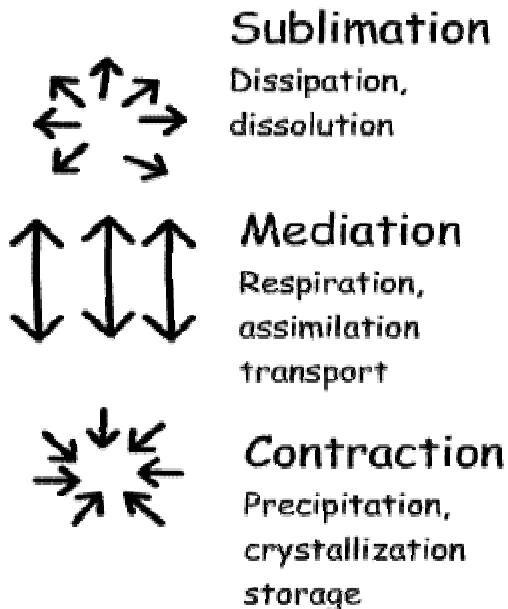
What is happening? There is a qualitative change in the kind of leaf that is developing. Unlike an animal, a plant can't change its organs. So as the plant matures, the leaf-organs take on new characteristics. Starting from vegetative growth, the plant changes to more airy, refined growth. Eventually, the leaves cease entirely -- the plant moves into a completely new phase of flowering and fruiting instead.



3-Fold Processes in Plants

So here is how we start to explain the changes in plants gestures. Given the complementary 2-fold polarity in plant growth, we expect dynamic interactions. That is, the plant will emphasize one type of growth, then focus on the other pole, alternating patterns of expansion/ contraction. The dynamics of interactions show up as processes. The two poles of the growth continuum form two processes, but in the middle is a third mediating between them.

For example, the hard, knarled root shows the condensed nature where nutrients are gathered in. These nutrients are transported upward in the stem; leaves add the products of respiration according to the daily rhythm. The delicate flower dissociates itself into fragrance, pollen and seed. We have already noted how these processes are evident in the way that leaves transform as we move up the plant -- the upper leaves are more lacy and pointed. They show less solid substance and more dissipation. Understanding these processes helps us to be more aware of imbalances. If fruits are too hard and woody, if stems are too weak and watery, we can understand what has gone wrong and how to develop a remedy.



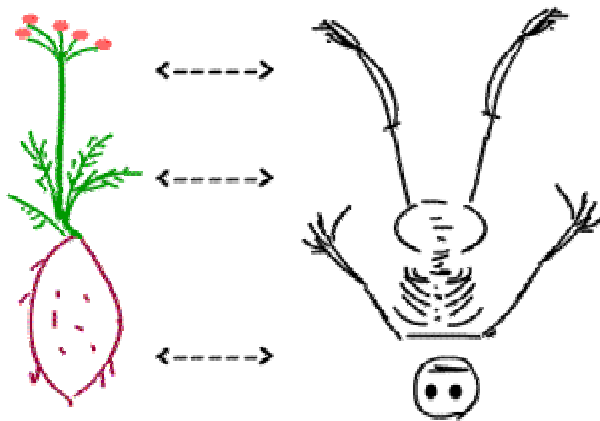
Dynamic Plant Processes

The plant does not have the kind of inner life that animals have; it has no inner organs, senses, feeling or voluntary movement. The exceptions we discussed exhibit these quantities, but only in partial and rudimentary form. The plants are entirely turned outward to the cosmos. Plants are "ecstatic" (Max Scheler, quoted in Storl). The plant's organs are the sun, moon and stars rather than the heart, brain and kidney. This is why plants respond to the heavenly rhythms. Since plants can't move, animals carry on vital

functions, such as distributing nitrogen compounds, enzymes and even assisting reproduction by transferring pollen. In this sense, the plant's hormonal system is carried by animals.

Animals have organs of digestion to break down food and reabsorb it as nutrients the body can use. Where does this process occur in plants? In the soil. Substances are broken down by chewing insects and worms (like teeth), worked on by acids and enzymes of bacteria (like digestion), and reabsorbed by tiny root-hairs and fungi, similar to the hair-like villae lining the intestinal walls. The soil is like the intestine to a plant! No wonder that biodynamics applies the same herbs to the soil that we apply for upset digestion (chamomile).

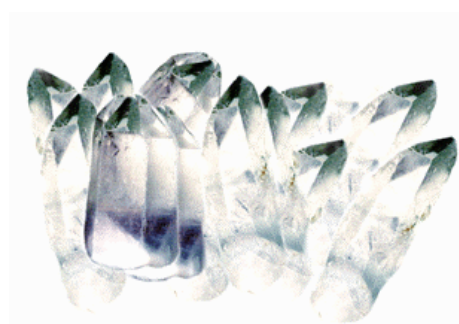
What about the rhythmic system of plants, corresponding to the heart and lungs and blood circulation? There we look to the outer world. The plant follows the day/night cycle of the sun. The seasons affect weather cycles and provide the annual rhythm. Warmth comes from the sun, fixed through the chlorophyll molecule. Chlorophyll is closely similar to hemoglobin that carries oxygen in our bodies. Where is the skeleton of the plant? In the hard forms of the bedrock and animal bones. Where are the songs and sounds of animals? Carried by bird-song and insect chirps.



So in a sense, the plant is an image of the human being, but inverted. In the root, contracting or precipitating forces predominate. Likewise, in the human, the skull is the densest part and thoughts require the most concentration. The leaves, capture the patterns of warmth and rhythm, as we do in our upper chest. The reproductive parts of the plant show dissipation and sublimation of matter;

likewise the bowels and sex organs do the same for animal bodies. This is why, in naturopathic medicine, aliments of the head and nerves respond to roots, while leaves are used for the heart and lungs and flowers for digestive problems.

Life Force



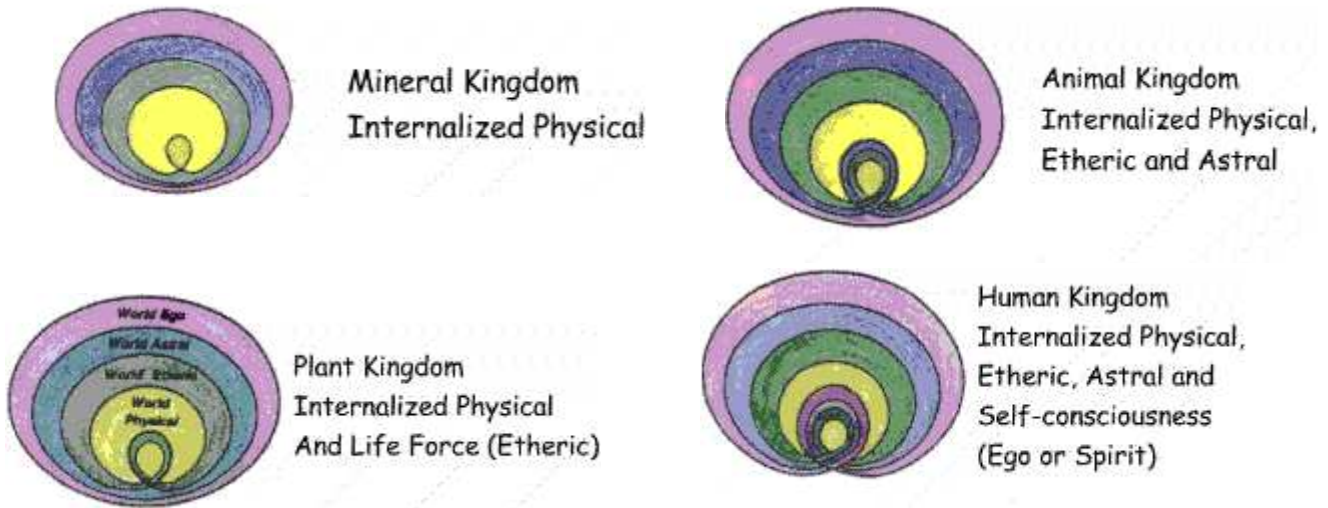
Now we are ready to talk about life force -- what does it mean to say that something is alive? Non-living things can still grow. A crystal in the right solution will grow by adding more material to its existing pattern. But we wouldn't call a crystal alive -- growth in living things is in the qualitatively different. Living things not only grow but they also change, adapt and respond to their surroundings.

The first level of living things is that of plants. Mineral things may possess a physical substance, but plants go a step further in having life-force. In biodynamics, this life force is called "ether". Animals go another step further -- not only do they have the life-force, but they also have a nervous system. The nervous system processes experience and builds up emotions and/or memories. This creates another level that biodynamics calls the "astral". Finally, there is the human being. We add yet another level with self-consciousness or intellect. In biodynamics, this level is called "ego" or "spirit".

It is important to realize that all these levels exist for living things -- different stages internalize them within. Those not brought within the organism still exist in the outside world. Minerals have only their physical body on earth; their life-force exists on a higher plane outside our environment. The same with the ego-level of animals or the astral-level of plants. If there is a truth to this cosmology, that explains why some people feel they can communicate with plants and animals. The famous garden at Findhorn was known for the gardener's claims of being able to

talk with nature spirits. The spirits provided directions that enabled growing healthy vegetables in inhospitable Scotland.

Here are Glen Atkinson's diagrams for the four kingdoms:

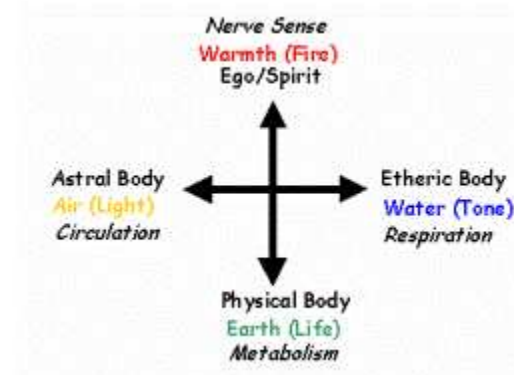


Four Elements

We understand that matter can exist as solids, liquids or gases. A fourth form -- plasma or a highly energized, very diffuse form of gas -- doesn't normally exist on earth but is present, say in the sun's atmosphere. These four states correspond to what the ancients knew as earth, water, air and fire and those categories are still a convenient way to think about their properties. There are four analogous states for life-force or ether as well. These are shown in the table below.

State of Matter	Classical Name	Type of Life Force (Ether)	Plant Component
Solid	Earth	Life	Root
Liquid	Water	Sound/ Tone/Chemical	Leaf/Stem
Gas	Air	Light	Flower
Plasma	Fire	Warmth	Fruit

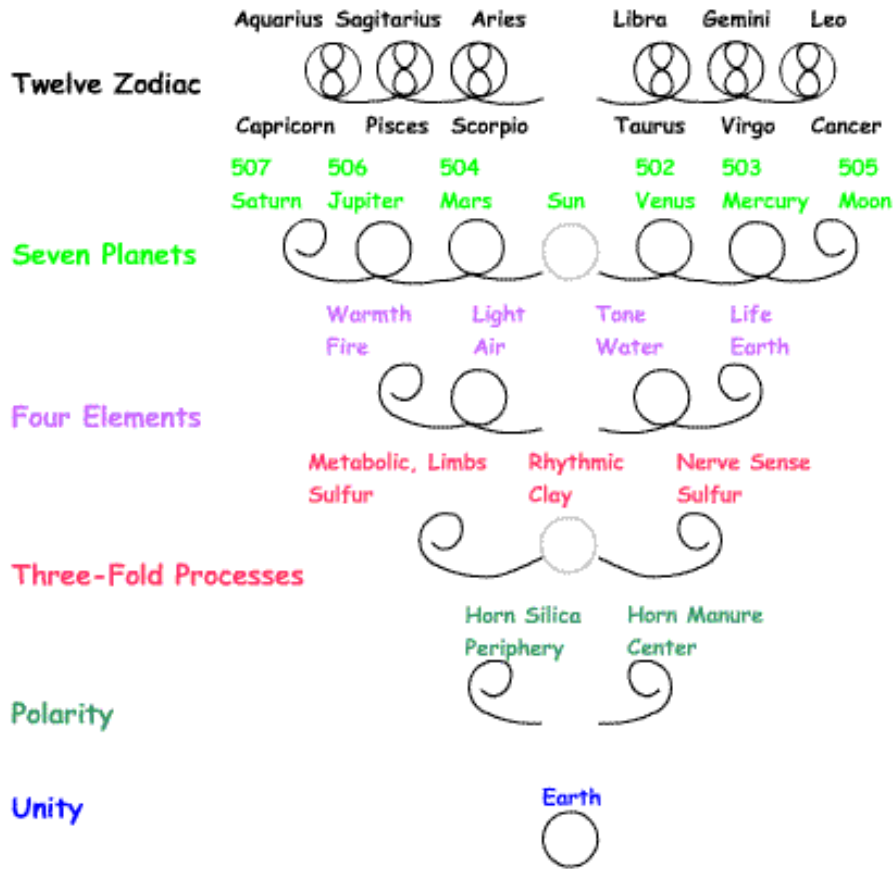
The life ether pairs with solid matter -- it animates physical objects so that they are alive. The sound ether relates to the patterns present in waveforms, so it is not surprising that it pairs with water since liquids demonstrate waves so strongly. It is less clear that the same ether relates to chemical forces but remember that these forces are the result of wave-like electrons present in the atomic shells. Light penetrates through air readily. Warmth ether is highly rarefied and similar to an extension of light ether.



Glen Atkinson points out that the life forces organize into pairs of complementary poles. If we want to expand the etheric part of a plant, it will push back the astral part. So we need to be aware of balancing both poles -- that means we seek to strengthen both, first one and then the other to preserve a harmonious balance.

Refining the Continuum

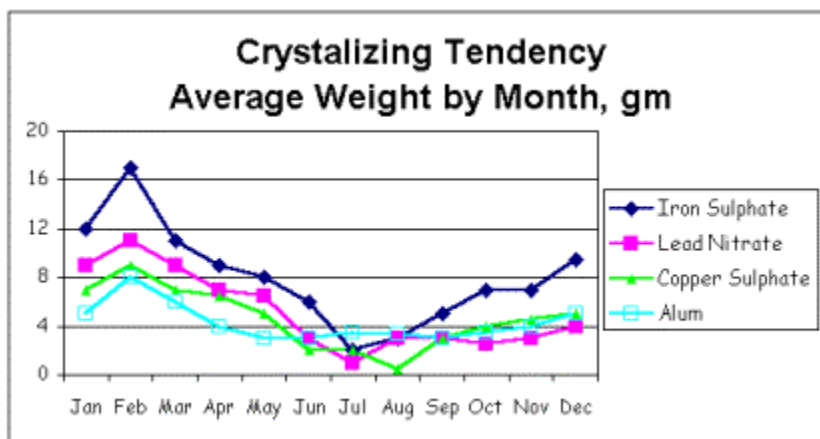
Phew! Does it seem that we have suddenly multiplied into many, many categories. Glen Atkinson also points out how we can think of these definitions developing naturally. We start with a recognition that life is a unity but it manifests along a continuum that can be thought as having two poles -- the yin/yang or center/periphery distinction. But these two poles interact and the next level shows a continuum divided into three processes -- the two poles and a middle intermediary. These interact in turn and the next level shows four types of ether, corresponding to four elements. From the interactions here, we draw to the next level, showing seven categories of astral activities, corresponding to the seven planets. These in turn yield another level of 12 categories at the cosmic level, corresponding to 12 positions of the zodiac. We will discuss these ideas later, but first it is useful to understand that there is a logic in how these categories were derived from observations. Below is Glen's table showing correspondences and influences between these different levels.



Source: Glen Atkinson, *Biodynamics Decoded*.

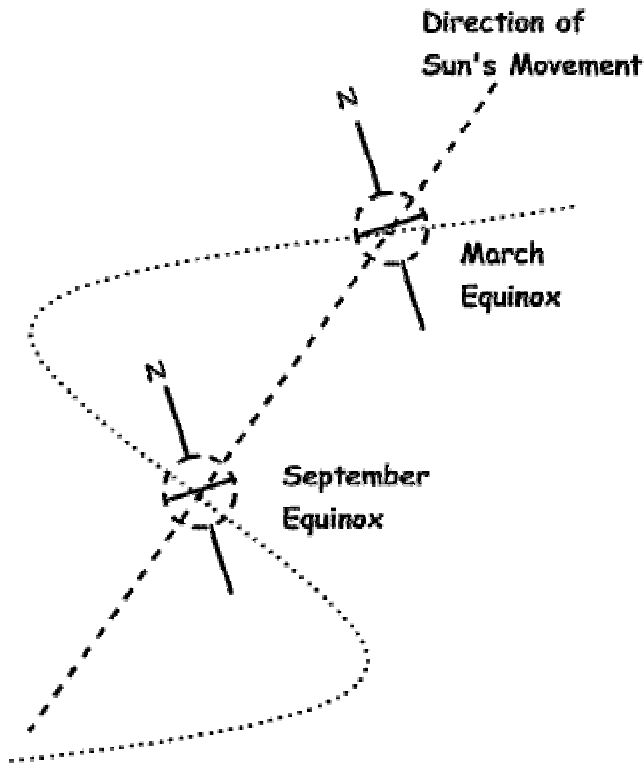
Seasons

The expansion/contraction of growth is but one of the many cyclic rhythms surrounding plants. There is the winter/summer rhythm of the seasons, the monthly rhythm of the moon, the diurnal rhythm of the sun and tides and even the longer-term rhythms of the planets and stars. Seasonal rhythm is especially important to growing plants. Let's start by thinking about how those rhythms work.



This graph shows a series of experiments to determine how readily crystals precipitate out of solution. In each case, a solution of the same concentration was allowed to sit overnight and the amount of

precipitate weighed the next day. One would think that such a simple chemical reaction would always be the same, but that is not the case. Substances crystallize most readily in February, just after the winter solstice. And they are the least willing to crystallize just after the summer solstice. (Source: E. and L. Kolisko, Agriculture of Tomorrow.) How can we explain this observation?

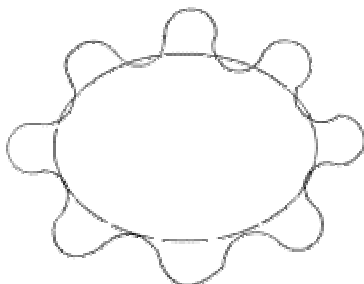


Similar experiments were carried out by Professor G. Piccardi (The Chemical Basis of Medical Climatology, ISBN 0 398 07049 0). Piccardi noted that the ease of crystalization follows the orientation of the earth as it moves through space. That is, the earth moves around the sun while the sun is sweeping through the galaxy. The result is that the earth actually moves in a modified helix.

During March the Earth moves parallel to its equator; during the September the Earth moves in a direction close to its North Pole. The speed of the Earth's helicoidal displacement varies from a maximum in March to a

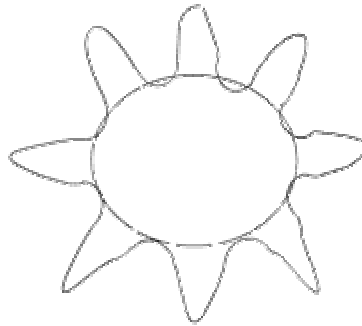
minimum in September. The same is true for both the northern and southern hemisphere.

Steiner explained that forces from the cosmos radiate into the earth most strongly during the periods from mid January to mid-February (in the northern hemisphere). Substances in the earth are freed from other involvement and are best able to accept the patterning information that is coming in from the cosmos. Biodynamics sees winter-time as the period when formative forces in the soil are at a maximum, and storing forces that will be released when plants start growth again in the spring. John and Helen Philbrick describe the seasons shown here.

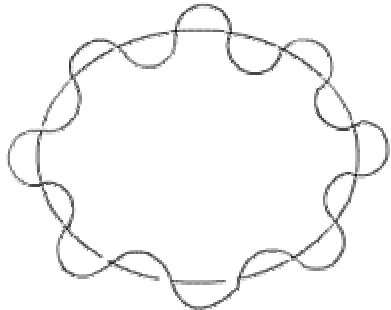


Spring The sun returns and the earth relaxes. Water begins to rise in plants. Plants unfold and begin to grow upward. Humans come out and enjoy being out doors.

Summer The sun is nearest the earth and vegetable life reaches its culmination. The earth is clothed in tall green covering the planet.

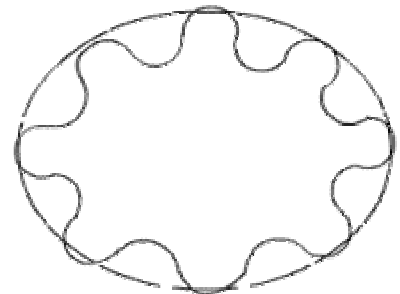


earth at midsummer, culmination. The vegetation, like fur



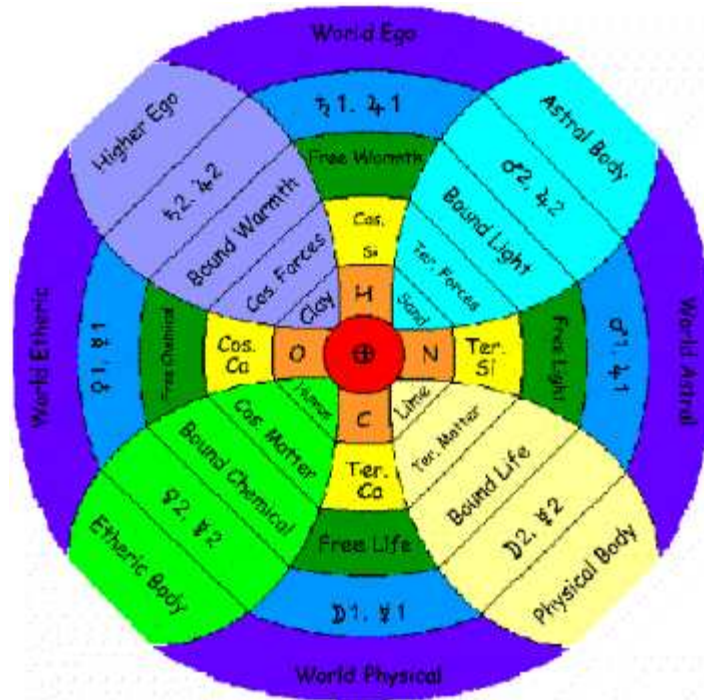
Fall Water in plants descends and plants lose their characteristic form. The sun draws further away. But seeds fall to earth bearing the promise of returning life next year.

Winter Life contracts into the earth. Old plants decay to become topsoil. New life is contracted into seeds and buds. Water is frozen into compact crystals. The sun is far away and life shrinks inward to avoid the cold. This is when the earth and water are dormant and receptive to imprinting from the outside. The effects of these forces are stored in the earth with the help of clay and humus in the soil. Meanwhile, the plants slumbering in thick seed coats and tight buds, are self-contained. When germination occurs, the seed goes through a stage of "chaos" where it gives up its former pattern (stored seed) and accepts a new one (young plant). During the chaos stage, the patterning forces stream into the plant. Later these patterns will reappear in the plant's architecture, color and quality.



The forces are perceived as having different qualities above and below the soil boundary. The ethers absorbed and being used by an organism are "bound" or "living", while those that are still floating in the environment are "free". The "free" forces are not immediately useful to organism and must be captured into a living being before they enter the chain of life. There is a gradation in the Ca/Si poles as well. Very small amounts of calcium (and other mineral dusts) are floating in the air. The floating or cosmic calcium is outside of any single organism but relates to the life-force of Gaia or the world's ether. The terrestrial calcium is available for plants to use as the world's physical body. Similarly, silica in the earth is related to the world's astral nature and will be used by animals as they develop thought processes. Cosmic silica is rarefied and corresponds to what would be

consciousness in the world. If this all seems complicated, Glen Atkinson suggests the summary diagram.



Steiner mentions the roles of some chemical elements. Carbon is the backbone of organic compounds and provides the basic framework upon which the other components are attached. In the physical world, carbon can exist as diamond, the hardest substance. The fact that plants contain so much carbon is reflected in their rigidity. Animals are more flexible -- they get rid of carbon by exhaling carbon dioxide. Where animals need rigidity, they add a skeleton of calcium phosphate. Oxygen permeates all living things -- all rely on oxygen metabolism. Thus oxygen is closely associated with the life-force, or as a carrier of ether. Nitrogen is a bridge between the life forces and the outside patterns. It provides the anchor for astrality in animals, corresponding to the necessity of nitrogen to form proteins. Plants contain little nitrogen and rely on the environment for their astrality. Hydrogen is the lightest of elements. Steiner saw hydrogen as the element that dissolves forms, dissipates and carries substances back to their spiritual, non-manifest pattern.

So how does all this theory of life-force work? Glen explains that plants live within the "free" tone and life ethers. They absorb moisture and fertility from the soil, binding tone and life ethers while giving off light and warmth ethers. Animals are just the opposite -- they absorb free light and warmth ethers as the source of their astrality. They have to digest in order to concentrate "bound" tone and life ethers from their food. Think of ethers are behaving the opposite from matter.

We know that matter disperses from areas of high concentration to low ones -- entropy at work. But life force tends to concentrate, coming in from low areas to high areas -- negentropy or ordering into a pattern.

How does this relate to gardening? Consider growing an aromatic herb like lemon balm. The aroma is an astral quality, related to air and light. So we could enhance the aroma by growing next to a strong astral companion, like nettle. Or by growing on dry, silica soil. To maximize the build-up of light ether, we would harvest just before blooming, while the moon is full and under an air constellation. The first harvest will be the strongest as the plant releases forces it has stored underground all winter. Ideally, we would harvest early in the morning, before the dew has burned off, while the plant still is releasing energy stored at night. The dew will carry off light ether as it evaporates and take some aroma with it.

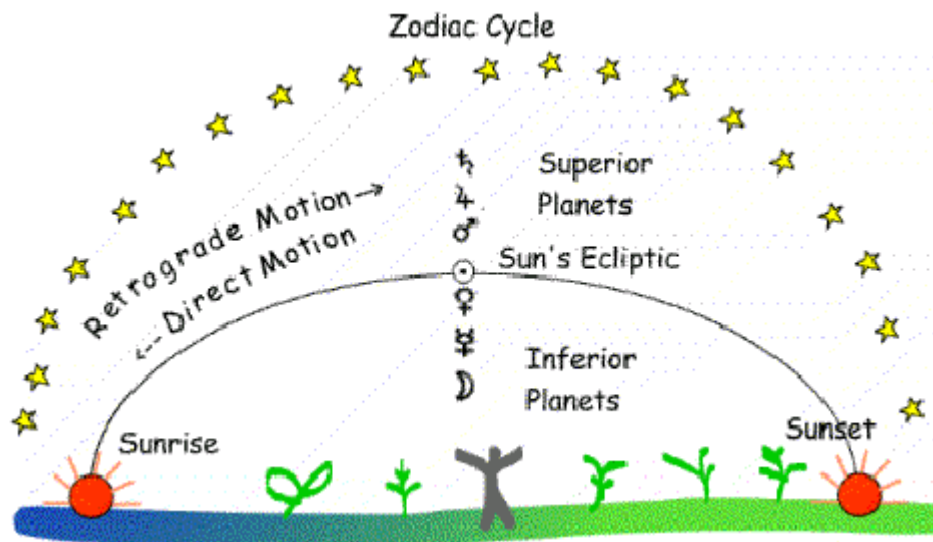
Or say we have an insect attack on our plants. The cause is a diminished etheric activity. We can treat by increasing water with irrigation or mulching or using herbal preparations that enhance ether forces. We are then accessing the free-floating or World Etheric forces active in the atmosphere and drawing them directly into the plant.

Planet Cycles

Astronomy takes a heliocentric perspective -- with the sun at the center of the solar system. If you plan on piloting a space ship, this perspective obviously makes sense. But the plant is rooted on the earth; it isn't going anywhere. From its point of view, the stars and planets appear to move around the sky while the earth stays fixed. This is a geocentric perspective. It may not be "correct" for certain areas of physics but it works fine as an alternative conceptual model when applied to the garden. From the garden, we see the sun rising in the east and setting in the west. Over the course of the year, the sun's path rises up in the summer for long days and settles low in the winter for short days.

The night sky includes the stars and planets. The planets tend to move along the same path as the sun, the ecliptic. But sometimes the planets move retrograde. Actually, this is because the earth in a heliocentric orbit is catching up to them, but from a geocentric perspective it looks as if the planets sometimes move backward. Based on their distance from Earth, the stars are divided into the inferior (closer than the sun) and superior (farther than the sun) groups. The moon's path has a bit of tilt relative to the sun's path. When the moon is below the ecliptic it is said to be in a descending node. When above, it is an ascending node. The stars stay in fixed positions; the ribbon of stars in the same plane as the sun is divided into 12 zodiac regions representing the yearly calendar.

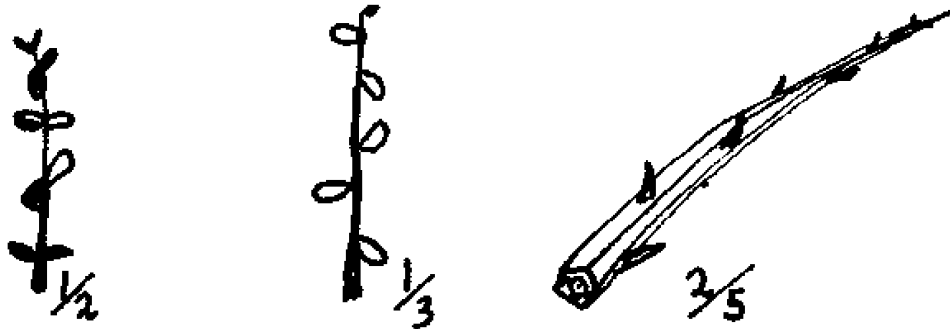
Planets		Zodiac			
♃	Jupiter	♒	Aquarius	♑	Capricorn
♄	Saturn	♐	Sagittarius	♏	Pices
♂	Mars	♈	Aries	♏	Scorpio
☉	Sun	♎	Libra	♉	Taurus
♀	Venus	♊	Gemini	♍	Virgo
☿	Mercury	♌	Leo	♋	Cancer
☾	Moon				



It takes a year for the sun to move around the zodiac; the moon moves around in 27 days; while the other planets have their own rhythms. These rhythms coincide with the growth rhythms of certain plant families -- the rapidly growing annuals are linked with the faster moving or nearer planets. So monocots are influenced by the moon or Mercury, dicots with Venus and the sun. Biennials and shrubs are influenced by the two-year rhythm of Mars and conifers by the longer cycle of Saturn.

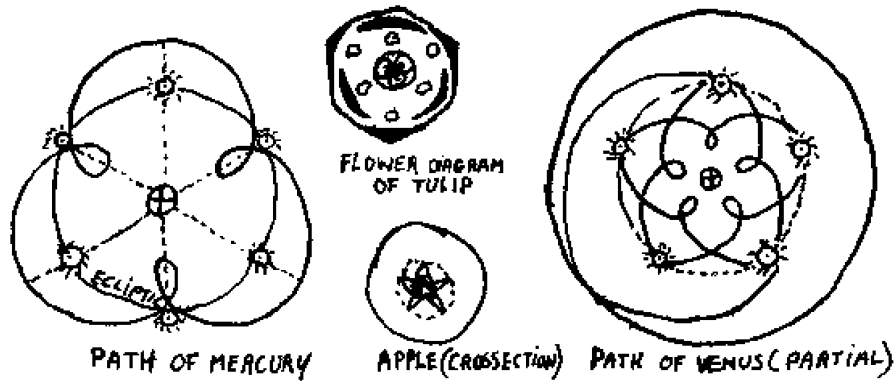
Siderial Cycle	28d	88d	225d	1 yr	2 yr	12 yr	30 yr
Planet	Moon	Mercury	Venus	Sun	Mars	Jupiter	Saturn
Plants	Annuals	Monocots	Dicots	Biennial		Perennial	

Relating gardening to astrology may seem like a stretch, but remember to stay open to alternative conceptual models. The trick is not whether a perspective is "true" -- all the models have some failings. The trick is whether the model gives us a better understanding of complex phenomena and provides practical applications. Remember too, that we are not necessarily dealing with strict causality; it could be synchronicity. The exact mechanism is not as important as whether observations show predictable correlation. Wolf Storl provides some nice examples.



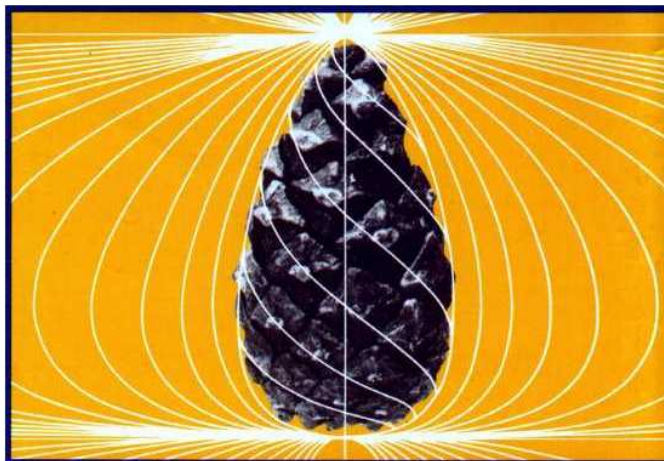
Phyllotaxy is the name for the way leaves are arranged around the stem. Leaves can be opposite each other, or place halfway around the stem for the next leaf. Or they can be in threes, a third of the way around the stem to the next leaf. For the blackberry you go twice around the stem to arrive at the fifth leaf; this is a ratio of $2/5$. In other plants, ratios occur such as $3/8$, $5/13$, $8/21$, $13/34$ etc. The integers in these ratios are not arbitrary but relate to Bodes Law describing how the planets are distributed. For example, the path shape of Mercury and Venus's movements connects to the forms of specific plants.

Mercury performs three loops in the course of a year when viewed from a geocentric perspective. The three-lobed form is repeated in form of tulips and lilies (monocots). Venus forms five loops in eight years ($5:8$) and it's star-shaped pentangle form echoes in core of an apple. It also matches to the blackberry's $2/5$ ratio. Both plants are in the rose family, characterized by 5-petal flowers and an abundance of flowers and fruit. Other annuals show a two-fold form and match closely to the lunar cycle. Plants that store water, such as cactus or most of our juicy vegetables, relate to the moon's influence. For the outer planets, Mars approaches a $3:8$ ratio, which is observed in cruciferae. They tend to be biennial.



The Jupiter arrangement of 5:13 is found in many composites and the figworts (Scrophulariaceae). Deciduous trees, such as the oak, are Jupiter plants. They are long-lived hardwoods with fluid sap. The Saturn ratio of 13:34 is approached by some conifers and can be counted in the spiral arrangements of their seed cones. These are also long-lived trees but with softwood and resinous sap.

Lawrence Edwards, a retired mathematics teacher, has researched the forms of



tree buds using geometric analysis. He started taking daily photographs of tree buds and found that the buds expanded and contracted to an approximate fortnightly rhythm. These periods varied between 13.6 and 14.7 days according to the species of tree. Edwards found that each period correlated to the Moon's alignment with a specific planet and the Earth. When the

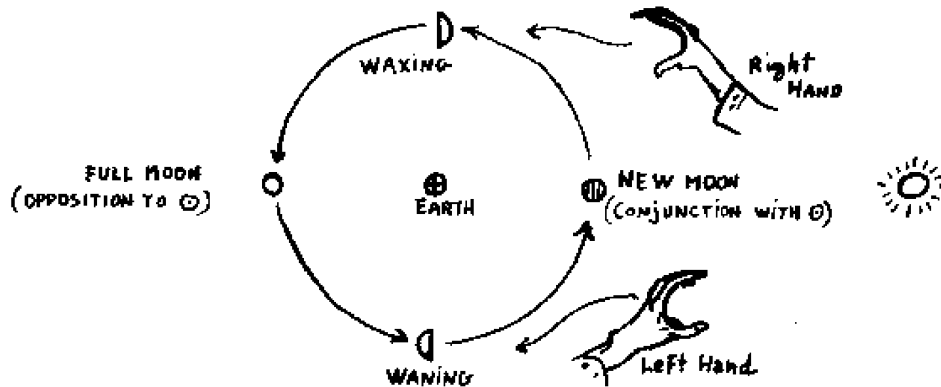
Earth, Moon and planet were in a straight line the buds of the tree were in a more rounded, expanded shape. On the other hand, when the Moon and planet were 90 degrees apart, the buds took on a more oval, contracted shape, sharp at one end and blunt at the other. Even in the middle of winter, buds are doing a rhythmic dance whose tune is called by the planetary movements.

Oak trees have a rhythm "ruled" by Mars and its conjunctions with the Moon. Elm trees are determined by Mercury, Cherry by Moon, Ash by Sun and Beech by Saturn. When the Earth, Moon and Saturn are in a straight line is also the time when the buds of Beech trees or conifers attain their most rounded shape. Edwards has also measured flower buds, seashells, hearts and many other life forms and determined their planetary relationships. Primroses were conducted by the Sun, Geraniums - Oak, Buttercups and Knapweed by Jupiter and Stitchwort by

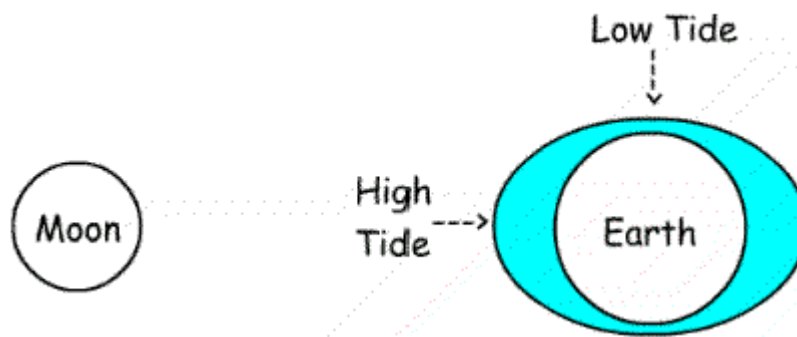
Saturn. He also found that trees growing under power lines continued to do all the "normal" things (germinating, budding, blossoming) but were out of time with the cosmos.

Lunar Movements and Tides

We cannot overlook one of the most obvious rhythms, the moon waxing to full and waning to dark each month. These changes occur as the moon moves into full sunlight or shows only her shadowed face to us. The right hand rule is a useful way to check whether the moon is waxing or waning when you see it in the sky.



The movements of the moon cause tides on Earth. The moon's gravity pulls the ocean's water and creates a bulge. There is also a corresponding bulge on the opposite side of the Earth and in between the water is pulled away for a low tide. As the Earth rotates, the bulge follows the side facing the moon so there is a high/low tide about every 6 hours.



The sun also creates tides but is further away. The sun's influence is most noticed when the sun and moon align for extra high tides. Another effect is that the moon's orbit is not perfectly circular. Tides are highest at the perigee, when the moon is closest to the earth and lowest at the apogee. Living things are sensitive to tidal forces. For example, an aquarium of oysters was transferred to the Midwest, miles from the ocean. Yet the oysters started to open their shells in regularity

with the time that high tide would have occurred, had there been an ocean (Brown, *Am. J. Physiol.* 178:510-4, 1954).

The tides are an illustration of the affinity that water has for the moon and the lunar cycle. The flow of water, such as sap in plants follows moon phases. Old timers knew that to get dry firewood, it was best to follow the moon's phases. Of course, a physicist can compute that tidal forces are extremely minute for the amount of water present in an organism. But direct causality is not the point. Even very small forces applied rhythmically can have the effect of amplifying other cycles.

Imaginative Perception

At this point, the discussion may appear to be unbearable technical; indeed, biodynamics is very detailed in describing its theoretical base. But it would be incorrect to leave the impression that this is an intellectual exercise. Biodynamics finds that logical thought and creative imagination are not exclusive, but rather complementary aspects of the same approach. Wolf Storl suggests this example:

Walk through the woods in late fall or early spring, just before sunrise. Delicate frost crystals, growing on the bare, black branches sparkle in the light of pre-dawn. Quickly, the first beams ray over the hill and strike the branch. The crystals disappear at the touch of the sunrays, filling the still grove with rustling, sounding like footsteps or squirrels scurrying about as they fall into the dry leaf mulch. This lasts for a moment until the sun is up higher and then all is still again. The hoar-frost is gone.

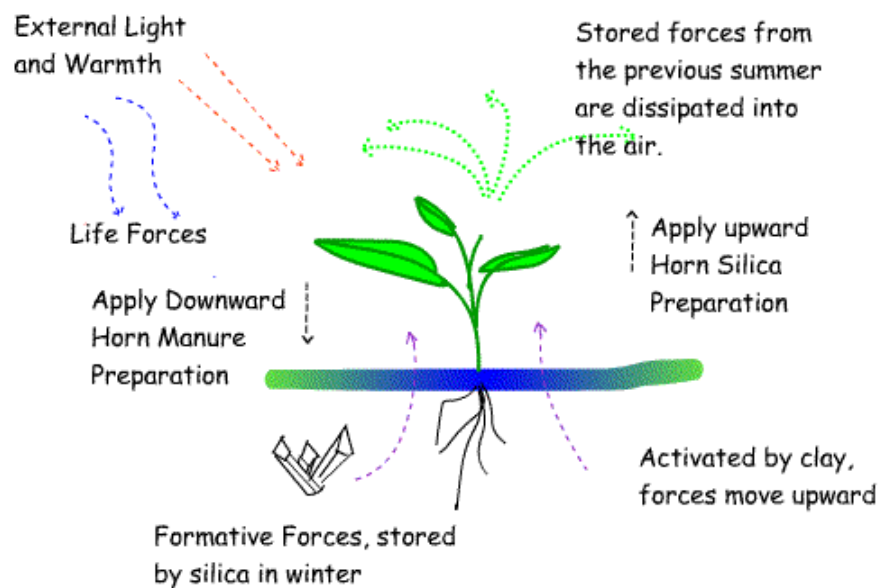
Now we could describe that phenomenon in mechanistic terms. The hoar-frost forms as the temperature drops below the dew-point and water condenses on surfaces. Since the temperature is below freezing, the water precipitates out as crystals clinging to the twigs. As the earth rotates, it comes under the sun. Solar radiation warms the dark twigs first so the water melts; the crystals lose their point of attachment and fall to the ground. The impact of the ice falling creates sound waves. Shortly, the air temperature is warmed to the point that the ice melts, drips into the mulch and seems to disappear.

Or we could describe the phenomenon using the meta-language of images that have been passed down through our culture. Helios, the sun king, is approaching; heralds in pink and tender blue vestments announce his approach. Gnomes and dwarves, who work with the crystallizing forces of nature with ores and gems in the dark

recesses, do not like to see the sun directly (they prefer to hear about the sun through what the growing plant roots tell them during the summer). And they certainly are not on speaking terms with the dumb sylphs who dance on the sunbeams. So they scramble back into the earth, causing rustling sounds as they try to snatch up their precious crystals, losing most of them to undines, the water spirits who turn the crystals into liquid.

The imaginative explanation may be inconsistent with the reigning scientific paradigm but it effectively presents gestalt that may be better for holistic understanding. Mental pictures may communicate better than verbal discourse. The gardener who clings to the mechanistic paradigm will be tempted to see the soil, the plant and the animals as machines. No wonder we have agriculture based on NPK fertilizers, fossil fuel inputs and financial business models. Biodynamics stresses living thoughts to understand living systems. Biodynamic practitioners enjoy personalizing the growth influences as if they were living creatures in order to emphasize the vitality of the life force. It's a nice picture to imagine that your garden is surrounded by invisible elves and spirit helpers -- it doesn't matter if it's literally true or not, as long as you are having fun.

The Place Of The Plant



Earlier we discussed the plant form in terms of the earth-Calcium versus sun-Silica polarity. Life force (etheric force) enters the earth strongly over the winter when there is little surface life to block its entry. As spring occurs, these forces are released and join in the plant's growth. Unlike the animal, the plant never internalizes astrality. Astral forces circulate in the environment; and reach the plant through insects, worms and other animal forms. Too much etheric can drive

off the astral, resulting in plants that are overly lush and soft. The environment responds by sending in insects to restore balance by eating the plants. Or too little etheric results in the plant reaching toward maturity too fast -- it bolts to seed. But always the astral works on the plant from outside. In the calyx formation of flowers, the plant makes an attempt to form organs. In doing so, it loses vitality, hardens, ceases growth and dissipates itself into color, scent and aerial pollen. Later, it contracts itself into a tiny, hard seed in order to resume vegetative growth next season. As we will discuss, we help these processes by applying the cow manure preparation to the soil and the silica preparation into the surrounding air. So we need to be aware of balancing both poles -- that means we seek to strengthen both, first one and then the other to preserve a harmonious balance.

Summary

In this chapter, we expanded categories along the continuum of growth forces. We already observed a 2-fold distinction between center-seeking and periphery-seeking. This polarity is identified as connected to Calcium and Silica. The way that plant maturation develops over time leads to seeing a 3-fold level of processes and a 4-fold level of elements. Plants sense natural rhythms of the planets and zodiac. We also suggest that different life forms manifest different levels of life-force and awareness.

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