Hugh Lovel

Consciousness and Catching Carbon

Home Made Fertiliser

"Is it then so great a secret, what God and mankind and the world are? No! But none like to hear it, so it rests concealed." - Johann Wolfgang von Goethe

My 40 year love affair with the twin disciplines of biochemistry and farming have me convinced that nitrogen is the carrier of intelligence, the basis of sensitivity and its vehicle in the chemistry of consciousness. I did not invent this hypothesis, though I predict increasingly we will see it tested along with its corollary, that the human brain is a quantum computer. A growing understanding of quantum non-locality and entanglement seems to be closing the curtain on an era of institutionalised denial of telepathy, clairvoyance, astral travel and prayer.

At the bottom line, how we get nitrogen in our diet from infancy onward has an enormous influence on the psychic clarity and integrity of our consciousness. The hypothesis that the nitrogen quality in the food we eat influences the development of our consciousness is a message of empowerment for those seeking enhanced self-development.

Smart Nitrogen

While materialists believe we are our bodies, those who chose to explore a higher spiritual reality view their bodies as vehicles for spiritual development. Both beliefs rest on there being a chemistry and physics of consciousness, sensation and desire. Truly there is an extremely sensitive, fast reacting and versatile element at the atomic level that seems to access memory so that every time it reacts it does so in the same way.

This element is nitrogen, the basis for DNA and the amino acid chemistry of our nerves. Nitrogen is so sensitive to the potential of sharing electrons that it easily is the cleverest, best informed of all elements. As such it is the ultimate narcissist, triple-bonding with itself to form a gas that is virtually inert.

Biological nitrogen fixation depends on seducing nitrogen away from its self-absorption. This requires nature to work cohesively and intelligently in an extremely fine way, considering how sensitive nitrogen is. Despite its efficiency, natural nitrogen fixation requires abundant biological energy-which depends on photosynthesis, which depends on efficient carbon chemistry. In sum, nitrogen fixation depends on how well we catch carbon.

Industrial Nitrogen Fertiliser

Of course, industrial nitrogen fixation also relies on the chemistry of carbon, though this is neither efficient nor ecologically friendly. Moreover, most of this 'cheap' nitrogen is applied as urea, and roughly half vaporizes as nitrous oxide.[1] The real rub, however, is that artificial nitrogen fertilisers consume up to 30 times their weight in soil carbon to become protoplasmic. This resulted in the average carbon level in most of the world's crop land falling below 1%. Prior to the use of artificial nitrogen fertilisers it ranged around 3% and better.[2] If at this point we must get off the artificial nitrogen treadmill and restore the biological carbon-and thus the life-in our soils.

Building Soil Carbon

Forests have long proven their capacity for natural nitrogen fixation and carbon capture. The rub is that forests build living carbon onto the land rather than into it as do savannahs and prairies. When grasses photosynthesise they feed the soil via root exudation with roughly a third of the carbon they take out of the atmosphere. Grass ecologies develop stable soil biology that fixes nitrogen, elaborates nutrients and builds deep fertility.

Fire, arguably humanity's most formidable landscape management tool, can return the bulk of a forest's carbon to the atmosphere; meanwhile firing grass lands only burns off the surface carbon and what was built into the soil via root exudation and manuring remains. Hence the world's most fertile virgin grass lands-soils

such as Africa's Serengeti, the Asian Steppes and the American Great Plains-were generated by grass and seasonal grazing.

Attaining Greater Clarity

While the above information may surprise or distress some, it should not distract from the social consequences associated with chemical nitrogen fertilisation. Let us not forget the role of nitrogen in consciousness. How we get nitrogen from our food makes an enormous difference for our consciousness Since the widespread application of industrial nitrogen, modern society marinates in a heady stew of instant gratification that more and more is salted with personal ambition, illusions and petty jealousies.

We see this in the rise of fast foods and the loss of intellectual, political and economic integrity. Long term diseases remain intractable even though immediate concerns such as trauma are dealt with brilliantly. Science myopically has become divorced from any meaningful context where goodness and beauty are on par with truth. Increasingly more and more is catalogued about less and less. We race ahead at 200 km/hr with blinkers in front of our eyes, merely glimpsing reality out of the corners of our eyes.

Global Culture

There is no denying the power and immediacy of our global culture. It is on, full tilt, but is far from whole or even wholesome-divorced from nature. Gardeners and growers of all sorts tend to hear one or another version of 'Why worry about building soil? Are you nuts or something? Why go to all the trouble of enlivening your soil when you can buy fertiliser? What a waste of time and energy!'

When nitrogen's intelligence comes from the living, cohesive web of nature that surrounds, sustains and shares its beauty and humour with us, there's good reason to prefer consuming natural nitrogen foods from ones garden, locality and region. Consider the value of food whose protein chemistry derives from biological nitrogen fixation and digestion rather than haste and greed.

All through the 20th century when it seemed chemical fertilisers were cheap their stunning results encouraged us to ignore the hidden costs, even when earthworms disappeared along with the teeming food chain that supported them. Our soils got hard and sticky while nitrates leached away the readily available silicon, calcium and trace minerals. Soils fused when wet, shed rain and eroded, and we continued got less for more.

Presently agriculture relies on water soluble fertilisers even though around the world food production is limited to water availability. Water, along with CO_2 and nitrogen, comes from above-but how wise are we in our use of nature's gifts? Between hardening our soils and deepening our creeks we are speeding most of our rainfall away, making flash flooding and erosion a norm. Then what follows is drought. The use of salt fertilisers on crop land scalds soil microbes, burns up soil carbon and made crops thirsty, watery and weak-all of which invites pests and diseases and further draws us into a dangerous dance with poisons. The results can no longer be ignored; progressive degradation of our best land along with a rise in degenerative disease. If humanity survives children will be asking grandparents, 'Why did people ever put poison on food?' Our sensible and only choice is to learn to work wisely with what nature's free gifts.

Weather, Droughts and Floods

We have ignored hydrogen's affinity for carbon. This fundamental attraction is illustrated by the current theory that petroleum hydrocarbons were formed from carbon and hydrogen inclusions within the earth's mantle that subsequently cooked up in fracture zones.[3]

Though weather is hard to predict, it is clear that carbon attracts rainfall, particularly the blanket of living carbon on the earth's surface. When rain forests are cleared the loss of carbon coincides with decreasing rainfall, and the same is true for agricultural land which is left bare. Not too surprisingly, in the last 150 years somewhere around 70% of the world's topsoils have been lost; and the abuse of artificial nitrogen fertilisers in most of what remains has depleted soil carbon, making rainfall increasingly problematic. About half of the CO_2 vented into the atmosphere since the industrial revolution has dissolved into the oceans and reacted with the calcium or magnesium in seawater to form carbonates which settle to the ocean deeps. The other half

has added to an insulating blanket around the earth that seems to have raised global temperatures. Large expanses of permafrost in Russia and North America have thawed adding even more carbon to the atmosphere as methane, and portions of the ocean's frozen methane clathrates may also thaw and surface.[4] Consequently there's been much more evaporation in the equatorial oceans while only a slight rise in surface ocean temperature has occurred. This increase in moisture and warmth has led to greater expansion of the troposphere near the equator.

Of course, there is more moisture in the atmosphere than ever in historical times-unless we count the time of Noah - and it has to fall somewhere. By felling forests, ploughing surface vegetation over and burning up soil carbon with nitrogen fertilisers we ensure over the same while that more and heavier rains fall in fewer and fewer places. Thus with deforestation, desertification, mining, urbanization and agricultural abuse we are seeing more of both droughts and floods.

If we want rain to permeate and cling to the soil we need to re-build soil carbon. Soil life, which opens the soil up and makes it absorbent, is carbon based. Moreover, if we want to slow down global warming it would be very helpful to store more sunlight as soil carbon, especially when this is a fundamental necessity for nitrogen fixation. Self-Sufficiency and Getting Nitrogen Right

When plants take up nitrogen as chemical salts (e.g. ammonium, urea or nitrate) their chlorophyll is watered down and photosynthesis is impaired, no matter that it makes them look lush and robust. But if they take up nitrogen as amino acids their chlorophyll is assembled without salt nitrogen interfering. Then their protoplasm is dense and photosynthesis is efficient. This means that if we want to cool the planet down and store surplus solar energy in the soil's biological flywheel then nitrogen fertilisers must be used sparingly and wisely to reverse soil carbon depletion and re-enliven the intelligence of the soil.

Though we cannot reverse the present situation overnight, we gradually and deliberately must give up nitrogen fertilisers and restore nitrogen fixation in our soils. This would put the current atmospheric surplus of CO2 and water to intelligent use. We would build life and complexity[5] back into our soils as well as the food we eat. The fact that many environmentalists are obsessed with fighting plants that 'don't belong' simply shows how far out of focus social thinking has drifted. Nature votes for whatever flourishes where potential is going to waste. Building natural nitrogen fixation into the food chain might well be called 'getting nitrogen right'. When we get nitrogen right everything else tends to fall in place. Wherever we get nature to thrive cohesively and self-sufficiently we engage the interest of nitrogen. One of the fundamental dictums of environmental self-sufficiency is the biological products removed from a garden, farm or landscape should not exceed ten per cent[6] of its total biomass production.

The other 90% of what nature produces-for example, crop residues-must recycle back into the soil to sustain and enhance its life. Thus to get nitrogen right we must work toward self-sufficiency.

Tasty Nitrogen

Taste a pellet of chemical nitrogen at the fertiliser store and you might be quick to spit it out. Its flavour will yield insight into why chemical nitrogen shuts down biological nitrogen fixation. Nitrogen is at its most inspiring whenever things are tasty. Digestion, which provides the embodiment of intelligence, is an animal activity that makes nitrogen available as freshly digested amino acids. From protozoa upward, intelligence is linked with smelling, travelling, tasting and digesting the most appealing bits. In the process unused amino acids are released along with whatever breakdown products of protein chemistry are excreted.

In order to really understand what engages nitrogen we need to understand sensation and desire. Though they tend to be neglected, taste and smell are fundamental in the evolution of consciousness, which depends on nitrogen quality. This shows up in such things as the fact that to get nitrogen right it helps to use such savoury inputs as seaweeds and sea minerals.

Some Misconceptions

It is not inspiring that scientists of the past century thought of nitrogen fixation as something legumes did, ignoring the fact that legumes were merely hosts for nitrogen fixing microbes. Strangely, no one seemed to ask why legumes made such beloved hosts. This ignored the fact that legumes draw oxygen into the soil making calcium and other minerals available for nitrogen fixation. Because they release four to six times as much calcium to the soil biology as is used by their microbial symbiotes to fix nitrogen, legumes give a wonderful boost to nitrogen fixation with whatever crop follows.

Agricultural scientists tended to assume the amount of nitrogen fixed could be measured by assaying a legume's nodules-if no nodulation occurred no nitrogen was fixed. Since grasses did not nodulate they were treated as though they meant nothing to nitrogen fixation. However, via root exudation, they supplied far more biological carbon to the soil foodweb where nitrogen fixation required abundant energy.

By 1975 soil microbiologists working outside of agriculture had catalogued upwards of a thousand different microbes that free fix nitrogen in the soil given available calcium and enough energy and most having nothing to do with nodulation.

Realistically, agricultural schools and researchers were captive to the false doctrine that artificial nitrogen was the energy efficient way to feed the world. Funded by industry, they taught the form of nitrogen applied made no difference and chemical nitrogen was equivalent to biological nitrogen.

It was ignored that nitrogen fertilisers flooded nitrogen fixing microbes with soluble salts that amounted to their own waste. The fact that grasses tend to clean up these waste while feeding energy into the soil foodweb was studiously avoided, while an understanding that many grasses host nitrogen fixing microbes as endophytes living within their leaves and stems was not even on the horizon of agricultural microbiology.

This was science at its worst, wearing blinkers in the service of industries that supplied artificial nitrogen for virtually every agricultural application as if it was cheap, efficient and wise. This sold an enormous amount of nitrogen fertilisers, but it also illustrates the dangers of disguising self-interest as science.

Growing food that provides for raising consciousness requires learning nature's delicate mechanisms for giving crops the natural nitrogen needed to make things tasty. This is a challenge, and learning by doing is a practical way to get started. While alternatives to soil destructive methods such as clean cultivation, mono-cropping, herbicides, pesticides and fungicides are being experimented with, the basis of growing good food is soil fertility. Recipes for restoring it would be most helpful.

Making Vermiwash and Vermicompost

Also known as earthworm leachate, homemade vermiwash is valuable as a food source for microbes that activate soil biology and nutrient reserves.

. Collect old bathtubs or similar tanks. Caulk screens in the drains and plumb on an overhang over a low wall or at a slight slant on blocks so buckets will fit beneath the drains.

. Fill with a balanced mix of manures, green/soft and brown/tough materials including 10% clay-rich soil, rock powders and grit. Earthworms, after all, have gizzards instead of teeth and they need grit to grind their food.

. Use materials from one's own property or locality to help nature work in a cohesive, intelligent way in regard to the nitrogen in the environment. Home gardeners may shred their leaves and garden wastes along with lawn clippings and kitchen scraps, judiciously seasoning the mix with clay, rock powders, bone meal, ashes, kelp and sea minerals.

. Use local weeds to meet specific needs for minerals such as sulphur, zinc, phosphorous, copper, etc.

. For microbes that make your soil thrive, use your soil.

. To emphasize available nutrients use more manure and less clay or rock powder. This favours bacteria, protozoa and the small, red earthworms found in manure piles, making the vermiwash rich in small molecule compounds

. To emphasize insoluble but gradually available nutrients use more woody/siliceous material such as shredded bark for a humus rich actinomycete/mycorrhizal leachate. Also increase the proportion of clay, rock phosphate and siliceous rock powders such as crushed basalt or granite

. A wooden cover will attract life force and shed rain.

. Water with a couple litres every other day for vermiwash.

. Finished material, including earthworms, can be used for such things as potting plants or kicking off new tanks.

. Ideally biodynamic soil activator should be included. Fulvic and Humic Acids Fulvic and humic are names based on moleceular size that are used to categorize complex organic acids. Usually these are formed when organic materials like cellulose are broken down into simple sugars and built back up again by microbial activity.

These terms are also applied to extracts made from organic deposits such as peat, leonardite or soft brown coal. Fulvic acids are relatively small molecule carbon complexes that bacteria can absorb along with their amino acids and chelated minerals. Their larger humic cousins are higher molecular weight compounds that complex with clay and are more accessible to soil fungi.

Symbiotic mycorrhizae and actinomycetes store surplus amino acids and minerals in stable, high molecular weight carbon compounds which aren't available to most bacteria and which don't reveal their contents on soluble tests. This is nature's wisdom at work, as these microbes store future food supplies in the soil like bees store honey in the hive.

Most growers are taught that all nutrients must be soluble, but nature knows better. Ideally nutrients should be insoluble but available-otherwise they tend to get lost with the result that biological nitrogen fixation is impaired. Potassium Silicate Watering Solution The most common deficiency seen in both agriculture and human nutrition is silicon. Its deficiency makes crops vulnerable to weeds, diseases and pests and it often result from soil mismanagement-particularly artificial nitrogen fertilisation-which makes this liquid fertiliser nearly universal in importance. Potassium Silicate Watering Solution makes plants efficient and resilient, ensuring strong cell walls, transport vessels and connective tissues. It also improves photosynthesis, assuring protoplasmic density while making plants tastier.

Taste, smell and related digestive/nutritive processes play a central role in engaging nitrogen.

This recipe ensures strong cell walls and transport vessels making plants immune to diseases and insects, but it also improves photosynthesis, making plants tastier. Taste plays a central role in the nitrogen cycle, which means the more you use this formula on your crops and recycle their residues as compost or vermiwash the better you will engage nitrogen.

Used with vermiwash, it can be a mainstay in most fertility programs whether for home gardens, market gardens, orchards, vineyards, flowers or herb production. It would even make lawns more resilient to weather, insects and diseases while making them smell cleaner and have more shine.

. Burn a large quantity of high silica plant matter and collect the ash. Any silica rich plant material will do. Rice hulls (not bran) are excellent and even bamboo ash works. Mill ash from burning bagasse is available at some sugar mills at industrial prices and is rich in both potassium and silicon. If silica rich ash is hard to obtain it may help to include half a kilo or so of diatomaceous earth.

. In a 20 litre pot simmer 2 - 3 kilos of high silica ash with half a cup of solubor or boric acid in 15 litres of water while stirring for 30 minutes. Measure boron with care as too much can burn seedlings and young plants.

. Carefully cool, strain and filter the solution. [caustic] . While still warm, add a heaping tablespoon of biodynamic horn clay and potentize homoeopathically[7] for 20 minutes.

. Combine with vermiwash at a rate of 250 mls of potassium silicate per litre of vermiwash. Dilute this concentrate at least half and half with water (more is better) and apply to the soil in garden, orchard or vineyard as needed.

- . This formula can be overdone, so limit applications of combined solution to once a fortnight or at most once a week with pumpkins, squash, sweet corn, cucumbers, capsicums, okra or anything with a tendency to get lush, weak, bug bitten or diseased. For tomatoes, which can be especially lush, the proportion of potassium silicate to vermiwash can be doubled or even quadrupled.
- . Residual ash should be recycled via compost/vermiwash production, incorporated into solid fertilisers such as humified compost or scattered on grain, pasture or hay land.

Application
Generally Potassium Silicate Watering Solution (with boron added) should be watered in. Keep in mind when using foliars, that boron must get to the roots to produce sap pressure. Boron has long been poorly understood while silicon has mostly been ignored despite it being the basis of nutrient transport, which starts with calcium. Use boron along with potassium silicate and vermiwash as a mainstay in almost any fertility program.

Keep in mind these ingredients are all naturally occurring except solubor or boric acid, which are permissible in organic certification programs where boron deficiency is documented. Combine potassium silicate with vermiwash at a rate of 250 mls of potassium silicate per litre of vermiwash. Dilute this concentrate at least half and half with water (more dilute is better) and apply to the soil in garden, orchard or vineyard as needed. Boron and silicon usually enter plants via actinomycetes and mycorrhizal fungi, which are delicate and easily damaged by the usual rates of salty NPK fertilisers.

Vermiwash and Potassium Silicate Watering Solution feed these microbial symbiotes, increasing their nutrient uptake, especially boron, silicon, calcium, amino acid nitrogen and zinc.[8] An Australian recipe uses the dried foliage of Australian she oaks[9] or bull oaks[10], while In North America and Europe horsetail[11] is often preferred. In either case one burns a large quantity of high silica plant matter to ash and collects the ash. The ash of any silica rich plant material will do, as for example, rice hulls (not the bran) are brilliant and even bamboo ash will do. Mill ash from burning sugar cane bagasse is available at some sugar mills in vast bulk at industrial prices and is rich in both potassium and silica. An industrial version (not organically certified) made from high purity potassium silicate powder was researched by the USDA and found to be the most effective preventative for fungal problems in both wheat and tomatoes.

Caution
Like everything, this formula can be overdone, so it may be best to limit applications to a litre of dilute solution per fortnight per plant with pumpkins, squash, sweet corn, cukes, zukes, capsicums, okra or anything else with a tendency to get too lush, weak, bug bitten or diseased.[12] For tomatoes if they are especially lush the proportion of potassium silicate to vermiwash can be doubled or even quadrupled. If organic certification is a concern keep in mind that these ingredients are all natural materials except solubor or boric acid, which are permissible in most organic certification programs due to widespread boron deficiencies in most cultivated soils.

Remember, neither gardens nor farms should ever smell, much less taste, like heart attack alley in the garden shop. Growing food should be one of life's most luxurious sensory experiences, brimming with aroma and flavour.

Biodynamic Soil Activator
Essentially biodynamic preparations[13] are homeopathic remedies intended to strengthen both the soil's mineral release, nitrogen fixation, digestion and nutrient uptake and the atmospheric photosynthesis, blossoming fruiting and ripening. While each preparation is designed to improve one or more of the environmental processes essential to making agriculture thrive, the entire spectrum of process are all needed-nothing should be left out.

Biodynamic Soil Activator is a compound remedy that includes all the biodynamic preparations in one easy to use application. Preparation Draw ten litres of water in a twenty litre bucket. If the water is chlorinated leave overnight or stir for thirty minutes to outgas the chlorine. Water ideally should be warm, and may be

warmed with sunlight, wood or gas heat. However, electricity is not ideal and the water may be better left cold.

Stirring

Add one teaspoon of Biodynamic Soil Activator to the ten litres of water. With arm or stirring stick, stir round and round to create a strong vortex. The water becomes ordered or organised into laminate layers so that the cooler, denser water moves to the middle and sinks while the warmer layers seek the edges and rise. Remove arm or stick. The appearance is one of a spinning funnel. Reverse the direction of stirring and the water will churn and froth in chaos until a new vortex is formed. Reverse directions again, and again, back and forth, for twenty minutes. Each time a new vortex is established a new generation of order is created. Order and organisation are the basis of life, as living organisms are self-organising. Creating generation after generation of order results in an evolution of order. This charges up the remedy with life force and imparts the intentions and vibrations of the stirrer to the water. Then what one thinks, one grows. Spraying

The Biodynamic Soil Activator should soak into the soil, much as does the dew. Ideally is sprinkled in the late afternoon in large droplets, though any time will do. Each drop radiates up to six feet, so there is no need for uniform coverage. A pail and a wallpaper brush or whiskbroom is sufficient for applying this remedy to a thirty metre radius around a Field Broadcaster.

Function

This remedy boosts the digestive and nutritive activity of soil microbes as well as more complex participants such as ants and earthworms. This boosts both the lime polarity where plants get their Ca, Mg, N, P and K and the silica polarity where photosynthesis, blossoming, fruiting and ripening occur. Part Two: "Prediction is difficult, especially the future." -Niels Bohr

Given that the nitrogen chemistry of our DNA and our nervous system is the physical basis for awareness, sensation and desire, the quality of our nitrogen diet influences the development of our consciousness. Engaging nitrogen requires abundant energy and providing nitrogen that elevates our consciousness requires efficient photosynthesis to feed nitrogen fixing microbes so they manufacture complex amino acids. Thus raising consciousness depends on catching carbon.

High energy agricultural ecosystems give us a complex nitrogen diet that supports clarity, refinement and integrity as a natural result of good methods, while farming with synthetic nitrogen fertilisation and monocropping depletes soil carbon to feed a crude, selfish consciousness that wastes valuable resources and ignores the greater good. Establishing complex, high energy soil, plant and animal ecosystems requires fine tuning fertility and cropping to catch sufficient carbon for nitrogen fixation.

Nitrogen is responsible for taste and smell which are our two best methods of analysis, and we can tell we are on the right track when our food is savoury and loaded with character. Our present food distribution networks do not supply this kind of food, and in an uncertain world where food distribution is increasingly subject to interruption and contamination, growing our own food or supporting those who do in our local community is our best option.

To get nitrogen right in home gardens and local farms we can start with Vermiwash and Potassium Silicate Watering Solution to strengthen the soil foodweb surrounding plant roots to better deliver complex nitrogen. As we go we will better understand how to grow food that wakes us up with its quality.

Why Be Concerned?

We all have an inner urge to realize our potential. Being self-aware, we strive to become more than what we are. Walking our talk takes a lot of energy and our force of personality or strength of character-which we call guts-comes from how well we combine our food and breath and release carbon dioxide (CO_2). Personal energy abundance for us and our offspring depends on how well we harvest carbon in agriculture.

Bounteous energy is required to assemble the complex amino acid chemistry that provides the basis not only for genetics, but also for sensation, desire and intelligence. Building a bridge from thought to action depends on nitrogen's versatile interactions with a wide array of elements between the chemical opposites of silicon and calcium. While materialism sees only the tangible-including warmth and light-as the source, those who acknowledge higher realms still must consider that for some reason we need the physical world.

Silicon, Calcium and Body Chemistry

At the calcium polarity we find muscles, bones, cell nuclei and the four carbon-ring amino acids in DNA, while at the silicon polarity we have skin, hair, nails, transport vessels, cell walls and the three sulphur containing amino acids found in connective tissues. Photo multiplier techniques show that silicon polarity amino acids emit and absorb billions of photons per second in a process called biophotonic luminescence, and it seems this siliceous luminescence integrates cellular activity despite wide variations between cells and organs.[14]

This means if we look at our bodies as a dynamic interplay of photons, we are luminous beings whose various activities are rendered coherent by biophotonic luminescence; while from the viewpoint of substance we are merely carbon based life forms made up mostly of water seasoned with nitrogen, silicon, calcium and trace minerals.

Agriculture's Biochemical Sequence

When building fertility to grow tasty food it helps to know that some fertilisers apply in nearly all cases while others should only be used as needed. In working out prescriptions based on soil tests, knowing agriculture's biochemical sequence helps address shortages and imbalances so we can grow refined, complex, value packed food. A study of plant processes reveals certain elements must function for others to work properly. This is useful, as the early elements in this hierarchy must be addressed before later issues can be improved. Life as we know it is carbon based, and life processes require sulphur as a catalyst in the cell walls and connective tissues where organisation arises. Once syntropy[15] is triggered and life arises, the biochemical sequence begins with boron stirring up silicon to create fluidity. Only a trace creates sap flow sufficient to transport nutrients such as calcium and amino acid nitrogen from the soil foodweb to where growth occurs.

With sulphur, boron, silicon, calcium and nitrogen to support it, the plant's key priority is photosynthesis where magnesium combines with amino acids to make chlorophyll and phosphorus transfers the captured energy into sugars made from CO2 and H2O. Then sugar and its by-products go wherever potassium, the electron messenger, directs them.[16]

Boosting Sulphur

Organisation is the basis of life, which arises out of chaos at boundaries where syntropy and entropy meet. Sulphur, along with potassium, silicon and zinc as co-factors, prepares the way for organisation to arise at the edges and boundaries of leaves. The more extensive and interactive these boundaries are the more abundantly life arises. Yarrow (Achillea millefolium), with its finely divided leaves, has an exceptionally strong sulphur process, and thus the biodynamic yarrow remedy, can be used homoeopathically to engage sulphur from soil reserves. While sulphur may fall freely with the rain, this often is not enough when 50 parts per million (ppm) is desired on soluble soil tests[17]. Small amounts of sulphur are present in vermiwash and humic acid inputs, but if soluble soil tests indicate this is inadequate sulphur can be applied as gypsum (aka plaster, as in gypsum wallboard). Keep in mind when building soil carbon that we may need to supply small amounts of sulphur regularly as it can easily tie up in clay/humus complexes. Since herbs with finely cut leaves organize and concentrate sulphur we also should be aware that these plants can be harvested for mulch or composted for a sulphur rich vermiwash to support the sulphur process. Phosphorous and Energy While calcium follows silicon in the biochemical sequence, it would not do to lime our soil only to find there was no room for rock phosphate (aka apatite, a calcium/silicon phosphate).

Thus in fine tuning fertility we should look at phosphorous next.

Phosphorous (P) is the energy bridge between silicon and calcium. It stores energy via photosynthesis and releases it again from root exudates for soil microbes. Since fixing nitrogen is the most energy intensive processes in the soil, it is small wonder that many nitrogen fixing microbes also solubilize phosphorous.

Analogous to what happens in the soil, our brains require abundant P as consciousness and motivation take lots of energy to produce a flow of silicic acid down nerve fibres to tense muscles, while calcium and magnesium, along with potassium and sodium, are required for muscles to relax again. Thus P is also the link for muscular activity. In herbal medicine, valerian (Valeriana officinale) switches on the P process in the soil as well as relieving cramps and muscle spasms. A lack of P in plants shows up as wine red petioles and leaf tips, but this does not tell us how much P is actually in the soil or what should happen to make it available-hence the need for total soil tests. Particularly on pastures, soluble tests may show only a few ppm P while a total test (using aqua regia) may reveal a thousand ppm or more. Although many soil organisms can release insoluble phosphates, soils may only need a carbon source such as vermiwash or molasses combined with a small amount of soluble P to provide the energy to unlock reserves. Once energy release is working robustly, nitrogen fixation and potassium release can function smoothly. Phosphorous best shows the need for both soluble and total tests to see what is actually there. Often P is plentiful in soil reserves. Only when the total test is low should large amounts of P be added.

Bone Meal and Bone Ash

Here is where either bone meal or a soluble bone ash extract can provide sufficient P along with its co-factors to get the release of P in the soil going. Bone meal may be available from animal processors who steam clean bones and grind them up as a dry product. Otherwise fresh bones from local abattoirs or eateries along with the occasional road kill can be cleaned up by composting and then burned for bone ash. Bones should never be wasted, and regardless of how they are obtained it is best to clean any flesh off to avoid objectionable odours.

Sometimes knackers process carcasses by cooking the meat off them and then processing the bones. On the other hand waste bones, including heads, may be available from abattoirs or processing facilities and they may be ground up with a stump grinder or wood chipper and incorporated into composts. If clean, or once clean, they may also be burnt.

Small scale growers may render bones to ash using their wood heaters, or perhaps by open pit burning. Burnt bones may come from almost any source and some burn more easily than others. Once burnt, they can be crushed and their phosphates extracted using vinegar and heat. If a little elemental sulphur is also needed, here is a good place to add it.

To jump start the soil's phosphorous process this crude phosphoric extract can be diluted and combined with vermiwash-ideally with a homeopathic dose of biodynamic valerian flower juice. Application rates will vary according to soils and their needs. Solid residues can be added to composts up to about 8 or 10% of the total raw materials, or they can be scattered thinly under fruit trees and flowering shrubs.

Liquid Fish and EM

If fish frames, scales and related wastes are available, grinding these up and fermenting them in water can yield a product with a good balance between silicon, calcium and phosphorous along with enough nitrogen to jump start nitrogen fixation in the soil. Be forewarned this tends to be quite smelly in the early stages may need some Effective Microbe (EM) culture to stabilize its nitrogen chemistry. Nevertheless, well-digested fish waste can supply all the ingredients needed for nitrogen fixation and phosphorous release. Activated EM is a complex, synergistic microbe culture of anti-oxidant producing phototrophs, yeasts and lactic acid bacteria. This can be home brewed from an EM Mother Culture using water, molasses and Mother Culture at rates of 20:1:1 up to 40:2:1 to produce a low surface tension, antioxidant microbial solution. On soil or foliage this can be applied monthly at a rate of 5 L/Ha.

Local or regional sources of Mother Culture should be sought, as brewing it is a fairly technical process involving salt and other additives to make a low pH/lactic-acid-stabilized culture. Although stable, this is usually not desirable for field applications, but is used to on-brew activated EM which emphasizes the phototrophs, conserves loose nitrogen and reduces odours as well as improving nutrient uptake and correcting a wide range of disease conditions.

Humified Compost and Compost Extract

Many imagine compost is simply broken down organic matter that is ready for consumption by plants. All too often composters break down wastes with little concern for the complexity and stability of the end product. They even may test for soluble N, P and K assuming a high analysis is better. Unfortunately such soluble products grow better weeds than crops while polluting streams and groundwater. If soluble N is high these products often reek of ammonia and other volatile amines. Nature is far wiser where, much like bees store honey, beneficial microbes such as actinomycetes and mycorrhizal fungi store loose nutrients in clay/humus complexes where they later can be accessed by similar crop symbiotes.

Often weeds are nature's way to sop up loose nutrients when humification has not occurred. Commonly this loose nutrient condition occurs during the first three weeks after ploughing down a green manure crop when bacterial breakdown of vegetation runs rampant and nutrients are released. If we plant before the humus builders/digesters take over we get a field of weeds that competes with our crops. In composting, the initial 'hot' phase produces simple sugars, amino acids and soluble salts. Humus building organisms clean up this heady brew by tying up amino acids and minerals in large clay/humus complexes that are insoluble but nonetheless are available to the microbes that stored them. Not only do these clay/humus complexes conserve fertility, they provide the most beneficial forms of nitrogen and other nutrients.

In most soils humus working microbes can be awakened using a humus rich food source such as compost. This feeds the right organisms for further humus formation wherever root exudation feeds carbon into the soil foodweb. At some point re-enlivened soils become self-fertile and self-sustaining as occurs in nature.

Humic and Fulvic Extracts Microbial activity can be boosted using humic and fulvic extracts-such as vermiwash-either in transplant water or liquid injects when planting seed. Often in market gardening, as well as broadacre and pastures, these inputs economically feed soil microbes where they do the most good-on new roots. In garden and small farm applications such liquid formulas as vermiwash can be used at planting, and also be sprayed on stunted areas in pasture and broadacre paddocks.

However, when dealing with large scale grazing or broadacre it can be more efficient to buy liquid humic and fulvic extracts made from leonardite or brown coal. While these are a compromise with self-sufficiency they can be helpful to feed nutrients to the soil foodweb so that progress toward self-sufficiency can move along.

Sea Minerals and ORMEs

Unless one lives on or near the ocean sea minerals-which once leached to the sea from the land-may have to be purchased. Sea minerals are the residue left after sodium chloride is extracted from sea water[18]. Only fully evaporated (aka macrobiotic) sea salt contains all the minerals in the sea. Since supermarket buyers overwhelmingly prefer free running salt, the 'sea salt' produced by sea water evaporation is marketed, leaving behind a dense, oily pot liquor that usually can be obtained in bulk at reasonable prices. At rates from 1 to 5 litres per hectare per year, this bounty of the sea should never be wasted. Moreover, it contains ORMEs. Orbitally Rearranged Mono-atomic Elements (ORMEs) occur when large numbers of atoms of an element align their electrons so they resonate as a single atom, becoming superconductors and virtually weightless as well as difficult to detect. Nuclear physics has only begun to shed light on these elements, despite allusions to their seemingly magical properties tracing back to ancient Egypt and Suma. Living organisms behave at the gross level in ways that once were thought possible only at the atomic level, and ORMEs seem to account for many of the puzzling features of plants and animals which mimic quantum behaviour at the atomic level. For example, how can virtually ALL the photons striking chlorophyll molecules transfer their energy into sugar? To achieve such total efficiency they must act in complete unison as waves rather than particles. Or, how can we detect a solution of zinc sulphate at the top of a very tall tree almost the instant it is poured on the soil at the roots? If large collections of atoms resonate in perfect electronic alignment-as evidence suggests-then theoretically they should behave as one, exhibiting super conductivity and virtual weightlessness regardless of how many atoms they once were. We see this sort of mono atomic behaviour when we chill helium until all its electrons share the same base state and it becomes both a super conductor and weightless.

Recent research indicates something similar can occur even with gold, platinum or iridium.
ORME rich sea water extracts can be obtained by raising the pH of sea water to 10.78 using sodium or potassium hydroxide.[19] This heavy, white precipitate can be separated from the original solution and used in agriculture with results-such as high yield and disease resistance-that often seem startling. Small quantities on the order of 2 or 3 L/ha, are recommended per application with the understanding that this experimental.

Calcium Nitrate and Molasses

One last input for where tall, woody annual weeds, such as thistles, amaranths, ambrosias, etc. grow prolifically. Such weeds indicate an imbalance of soluble potassium compared to available calcium. Tipping the balance from potassium to calcium encourages clovers and other calcium rich plants such as daisies to take the place of the tall woody weeds. This can be done when sowing-or even after weed emergence-by boom spraying 2-5 kg of calcium nitrate along with 5-10 litres of molasses dissolved in 400 litres of water per hectare. This amounts to a 3x homeopathic dosage, as it is barely enough calcium nitrate to flick a stick at. Yet it can shift the dynamics beautifully to shut down tall woody weeds. Many organic certification programs prohibit calcium nitrate, and indeed at the conventional rates of 75 to 250 kg/ha this harsh fertiliser is far too salty. However, most organic programs allow trace minerals to be added at considerable dilution in their soluble salt forms as long as soil and leaf tests indicate they are deficient, and it could be argued that this dilution falls within that range and simply adjusts the calcium/potassium balance to encourage beneficial species while discouraging undesirable ones.

Where We Stand

Lest we forget, modern society is fundamentally agrarian. Those things that are amiss-such as selfishness, crime, disease and environmental destruction-are rooted in agricultural practices based on conflict rather than a cooperation-as though we were in some sort of a war with weather, pests, weeds, diseases and faltering fertility. The notion that killing solves our problems goes back to the Biblical story of Cain and Abel, and it is just as seductive and unwise today as ever. Age old wisdom teaches understanding and forgiveness as the path to perfection. Discovered in the 20th century, Chaos Theory and the Butterfly Effect illustrate that even the tiniest of changes in dynamic systems, such as human society, can have profound consequences downstream. In short, we have free choice and our choices matter-which is something to keep in mind while choosing what we eat.

Endnotes:

1 Nitrous oxide (NO_2) is 300 times as potent a greenhouse gas as CO_2.
2 Commonly soil tests report organic matter by multiplying 1.72 times the detected level of oxidised carbon.
3 It once was assumed that petroleum was a fossil fuel since it was usually found on the edges of sedimentary basins such as the Gulf of Mexico. As deeper and deeper drilling technology developed it became apparent that petroleum was abundant at depths that threw this hypothesis into question. Old ideas die hard, but the notion that petroleum, like coal, is a fossil fuel is losing favour amongst geologists.
4 Methane is a 20-fold more potent greenhouse gas than CO_2.
5 Carbon is the basis of life as we know it. Catching carbon is the principle necessity of all farmers, rather than mining the soil.
6 Farms seem to get in trouble when they export more than 8 - 10% of their annual biomass production. The internal farm economy must come first with export secondary in order for a farm to generate its own fertility. Many modern farms exporting hay, silage or sugar cane would not fulfil this requirement, while a dairy farm which composts and recycles its manures and only exports only milk is ideal for building self-sufficiency and engaging nitrogen.
7 This refers to rhythmic shaking (aka succussion) or stirring (potentization) where the creation of a series of alternating left and right vortexes are involved. (see Biodynamic Soil Activator)
8 Caution: When using this formula in foliar applications, it may be appropriate to dilute the boron tenfold. Used sparingly in foliar and fertigation programs this combination considerably strengthens the silica containment and transport features of everything in the market garden, orchard, vineyard or nursery.
9 (Casuarina equisetifolia, C. cunninghamiana, etc.).

10 (Allocasuarina luehmannii, A. torulosa, etc.).
11 (Equisetum arvense, E. hyemale etc.).
12 Be careful about overusing this formula. Even on high organic matter soils, which greatly buffer the effects, eight or ten times in a growing season should be ample. A rule of thumb in agriculture is that if a little bit is good a little bit less more frequently is better.
13 In Australia these are available from Biodynamic Agriculture Australia, P. O. Box 54, Bellingen, NSW 2454, (02) 6655 0566.
14 Epigenetics is the study of the influences of the surroundings on how each cell's genes are expressed.
15 Syntropy is what occurs where available energy accumulates rather than dispersing as with entropy. Since the mid nineteenth century physicists embraced the Second Law of Thermodynamics (Rudolf Clausius, 1822 - 1888) which proposed that all heat driven systems invariably run down in a process called 'entropy'. However, biophysics acknowledges that living organisms both accumulate and release energy. From birth on to maturity they concentrate a stream of order on themselves and grow, even while expending energy. Thus within every organism's life span syntropy runs up while entropy runs down at the organism's boundaries. These boundaries are temporal as well as physical, as at some point senescence and death release the built up energy and the organism dies.
16This biochemical sequence of sulphur, boron, silicon, calcium, nitrogen, magnesium, phosphorous, carbon and potassium is the basis of plant growth.
17 As determined by the Morgan test, which uses a mix of acetic acid and sodium acetate as an extracting agent.
18 At 90% evaporation most of the sodium chloride precipitates and the remaining pot liquor contains all the other elements in solution in the sea. Many of the functions of these elements are unknown, even though such elements as fluorine and caesium, which are abundant in sea water, are promising subjects for research. This pot liquor is referred to as sea minerals.
19 A large amount of information on this subject can be found by googling ORMEs and Barry Carter. _____
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