Calcium: The King of Nutrients

By Charles Walters

A post- World War II book entitled *Doctors of Infamy* became a topic of discussion when I last visited that famous microbiologist and cancer specialist Andrew Ivy before he passed from the scene. During that conversation the fact was revealed that during the war I.G. Farben officials had ordered prisoners of Germany to be fed on 2,000 calories of totally synthetic meals - synthetic vitamins, synthetic fats, synthetic oils, et cetera. Prisoners promptly lost weight and soon were unable to work. Finally Heinrich Himmler took on the color of humanitarianism in order to save the prisoners from the knowledge of the scientists who were covering their errors with unspeakable medical tests.

This information, harvested from the Nuremberg Trials, reaffirmed a conclusion Andre Voisin stated in Soil, Grass and Cancer. Calcium, indeed, was not the prince, but the king of nutrients. Its absence as a nutrient among the numbered elements on the fertilizer bag calls into question many of the premises contained in the N, P and K mantra, and rejects the fondest absolutes of the entire rescue chemistry industry.

Here I would like to cite and quote from a 1943 paper by William A. Albrecht. It was first published in The Land in December 1943. The Land was the publication for Friends of the Land, a sophisticated group of far-seeing Americans whose laureate was Louis Bromfield. "Calcium sets the stage for an understanding of the element. Justus von Liebig all but ignored it, and Sir John Lawe - the founder of the world famous Rothamstad Experiment Station that gave the world superphosphate - did not fully understand that phosphate uptake depended on calcium for a pathway in plant growth.

That is why William Albrecht's lines bless our subject with insight still challenged by much of academia.

Calcium is at the head of the list of the strictly soil-borne elements required inl the nourishment of life. It is demanded by animal and human bodies in larger percentages of total diet than any other element. Its own properties, as for example its relative solubility in some forms, its pronounced insolubility in others, its ease of displacement less essential, and the multitudinous compounds it forms, all make it the mobile one of the earth's nutrient ions.

These properties are responsible for its threatening absence from our surface soils that are bathed in the pure water of rainfall, and for its presence in the water at greater soil depths in distressing amounts that make it appear as stone in the tea kettle or as post-bathing rings in the bathtub.

These same properties that seemingly impose shortages and hardships have given cubic miles upon cubic miles of limestone in geologic sea deposits to be later uplifted as land areas widely distributed in close proximity to the soils now suffering shortages of calcium needed for plant and animal nutrition.

Soil science did not stand still for Lawe, or even for Albrecht. One of his associates, C.E. Marshall of the University of Missouri, is credited with the leap-forward soil studies of the chemical activities of the potassium and calcium on clay in various ratios, these to dismiss single-factor analysis. He wanted to know the ionic activity of calcium and potassium in the same way hydrogen activity is measured via pH.

He used terms such as pK, pCa. He revealed that the ionic activities of a mixture of elements could not be independent of each other as is true of a mixture of gases.

In fact, the former are complementary in certain combinations, opposing in others. The tables illustrating this point are fare for a research paper. Here it is enough to set aside the idea that elements can be isolated, or that validity depends on ratification by some approving authority.

So we say calcium is the stuff for bones and teeth, and some physicians suggest consumption of the blackboard chalk called calcium carbonate, all without examining the rest of the story.

Nature Smiles

The great Design now glows afar; but yet its changing scenes reveal not what the pieces are nor what the puzzle means.

And nature smiles - still un-confessed the secret thought she thinks - Inscrutable she guards un-guessed the riddle of the Sphinx.

The anonymous poet did not give us details, but research has.

Agriculture is full to the brim with imponderables. A chick at birth has a skeleton of bones, and those bones are composed of calcium. Yet there is not enough calcium in the egg to account for bones. In fact a chick at birth has four times more calcium than can be found in both the yolk and the white of am egg. Research had demonstrated that the calcium does not come from the egg shell.

Take the dairy cow. This animal secretes more calcium than it ingests. In fact, the cow has a negative balance for both phosphorus and calcium than it ingests. Weights of these elements are both inferior to the quantities that leave the animal's body with lactation. Obviously the cow has other uses for elements, such as maintenance of her own body. These uses together with the milk excreted exceed the intake of those same elements in food. There has to be an endogenous production of phosphorus, but the rules of chemistry say this is not possible.

Take the terrestrial and marine iguana. Some species secrete a liquid containing 190 times more potassium than there is in blood plasma.

Nature is chock full of phenomena for which there are no questions, and questions for which there are no answers.

Why is it that when limestone is missing in leaves, daisies spring up as if by magic? Experienced folk gardeners know that daisies mean limestone deficiency. And yet when investigator Ehrenfried E. Pfeiffer (a student of Rudolf Steiner) analyzed the ashes of daisies, he found them to be rich in lime! When told that the oak tree, indigenous to regions aware limestone is missing, contained limestone in the wood and bark - up to 60 percent high-calcium lime - being found in the ash test - the orthodox turned and walked away.

Hold onto these thoughts as the calcium story unfolds, first detailing the metabolic role for atomic number 20, and its role in agriculture.

King Calcium

Sir Humphry Davy, the British scientist who identified calcium in 1808, described it as a soft silver-white and metallic element with useful compounds. The element itself accounts for 3.6 percent of the earth's crust tem miles

deep. The Romans used high-calcium lime over 2,000 years ago, industrially in construction of course, but also in fields, according to Pliny the Elder. They seemed to have an in-depth knowledge of calcium carbonate, calcium sulfate, calcium phosphate, and even calcium fluoride. It would take an encyclopedia to flesh out the industrial biography of calcium, and probably twice that much space to fully trace the path of this king of nutrients from soil to plant to human health, and still leave unsettled what many believe to be settled-science.

Marine organisms build their shells with calcium, and diatomaceous sad has a peculiar affiliation with animal husbandry, especially in parasite removal. Mines diatoms are now used in soil management, water treatment, pest management and various forms of human therapy. Oceans are a veritable factory for calcium-based reefs, the Great Barrier Reef off Australia for instance, and other calcium carbonate repositories of note include the Florida Keys and reefs off of the Bahamas.

Calcium, much like sodium, is much too active to be found in a pure state. The reaction is basic when water enters the picture, hence calcium hydroxide. Calcium ion is another name for calcium atom with a resultant positive charge and robust activity with other chemical groups. The calcium ion is a hardness ion, and its legacy is hard water.

Calcium is number 20 on the periodic table of elements. The Latin word calx means lime, and lime it is to most people, atomic weight 40.08, fifth most abundant mineral on planet Earth.

Calcium is number 46 on the Standard Genetic Chart, codon CUA, and it affiliates with the amino acid leucine. Its oxidation state is +2. This much stated Pandora's Box closes. It can only be opened to its lost content, hope, when codon CCU of the human-farm connection have been filled in, and the riddle of that calcium flush in egg shells, bones and human metabolism has been explained.

Human Metabolism

In Minerals for the Genetic Code, chiropractic physician Richard Olree associates the three-letter codon CUA with "calcium and regenerates a 3 a.m. out of a sound sleep have a bad calcium-magnesium ratio.

Calcium is also home base for TV medical mythology. Women are given bone density tests, than loaded with 1,200 milligrams of calcium, often mere calcium carbonate, all the above without a single reference to "the rest of the story" about other minerals that catalyze or piggyback or otherwise shade the single-factor equation.

In genetic sequencing, calcium always shows up at the bottom of the chart. The key is magnesium, which always mobilizes calcium. Taking high calcium supplements is much like making hard candy. This process calls for heated water, sugar added for super-saturation. As the syrup cools, sugar precipitates as crystals. The crystallization will form around any introduced foreign object such as a string. Kidneys supersaturated with calcium and not enough magnesium to keep it in solution quickly go into the stone-manufacturing business.

Almost all of the calcium that arrives in the human diet is stored in teeth and bones, possibly 99, that is. There is a delicate balance maintained with phosphorus. The

errant 1 percent finds its way into the extra cellular matrix and the cell itself. The element has its marching orders. It services membranes and holds a record as the prime cation in the human body. Medical reference books list the many functions of calcium beyond bone and health maintenance, including digestion of fats and protein, nerve functioning, muscle control and digestion in general. Its affiliation with enzyme activation is cited as standard textbook fare. Calcium figures in blood clotting and hormone secretion, to mention a few of the functions prescribed by nature.

Small wonder that physician knee jerk a response that may be wrong absolutely. They prescribe inorganic compounds with or without the knowledge that microbial workers must first make the nutrient organic in order to achieve absorption. The last two decades of investigation seem to suggest that calcium supplementation may be worthless in cases of osteoporosis, and that an overload may inhibit iron absorption. Here again we leave our air-tight calcium compartment to point out the tardy reference to stable strontium in bone problems, and renew an appeal for attention to organic sources of calcium.

Urban lawn growers curse the presence of the dandelion as an offense to the psyche of mankind. Calcium seems to obey the law of gravity. It migrates down under, usually quite deep. The dandelion sends its roots down to capture calcium and returns it to the surface and to supply a salad leaf rich in calcium.

Minerals for the Genetic Code (page 192) lists hundreds of plants that deliver organic calcium to the dinner plate, if consumers have the wit to make use of this information.

Age-related osteoporosis - degeneration of the bone - has achieved near pandemic production in developed countries. At issue is organic calcium in the diet. Women are the most frequent victims, especially after menopause. And heavy consumption of blackboard chalk calcium - calcium carbonate - is not being validated as a treatment. Bone construction is believed to be based on calcium, but research has now revealed that stable strontium better treats osteoporosis in post-menopausal women. New bone depends on stable strontium, but the element does not make its way into old bone. When new bone construction fails to match deterioration, usually caused by a drop in estrogen - fractures and general osteoporosis stand in the wings.

Strontium, magnesium and silica (not calcium) lay down a matrix that is replaced by calcium - transmuted calcium, according to French scientist Louis Kervran. The implications contained in the words set down require us to revisit agriculture, to learn why nature can be conquered only by obeying.

Agriculture

Calcium has also picked up a folklore tradition for canceling out soil acidity, the perceived nemesis of the row crop farmer. “Lime to the neutral point” became the advice of Extension, the republics of learning and the United States Department of Agriculture during the dust bowl 1930s and beyond.

“No,” said microbiologist William Albrecht of the University of Missouri. “Don’t lime to fight soil acidity. Use lime to feed the plant.” It was the first premise in a syllogism of premises the professor repeated

tirelessly. Why? Because, insects and diseases are the symptoms of a failing crop. The use of toxic sprays is an act of desperation in a dying agriculture. It is not the overpowering invader we must fear, but the weakened condition of the victim.

In interviews I taped with the old professor he iterated and reiterated the basic premises on which the cation capacity soil test has been based, and he excoriated the use of chemicals of organic synthesis as well as excessive use of chemical salts in fertilizers while ignoring calcium, a practice that, he charged, was upsetting plant nutrition. Even before the 1920s and 1930s, it was accepted science among progressive schoolmen, if not Extension, that plants in touch with exchangeable soil nutrients needed to develop proper fertility loads, structure, and stabilized internal hormone and enzyme potentials, and could provide their own protection against insect, bacterial, viral and fungal attack.

Adjusting pH, then, has to do with loading nutrients back into the soil system, and not removing acidity, in fact, its bad business to remove all the acidity. In fact, it is bad business to remove all the acidity. Since time began, soil acidity had been breaking potassium out of potash feldspars. It has been taking magnesium from dolomitic limestone much the same as it has taken calcium. Acid soil uses the same mechanism to make phosphate rock available for plant uptake as factories do to convert mineral rocks into soluble fertilizer.

In other words, acidic soil is beneficial. It is also a free source of virgin plant nutrients. The pH measure is of great value - if we pause to understand what it means - yet it should stand to reason that adjusting pH with one nutrient alone has to result in shortages or marked imbalances of some fertility elements. As a matter of fact, it would be well to consider pCa, pMg, pNa, and pK in addition to pH.

On the facing page is a chart illustrating the calcium, magnesium, sulfur or potassium contents.

The country is full of lime pits. Some of this lime is dolomite. Some is high calcium lime. Since calcium should represent from 65 to 75 percent of the saturation of the exchange capacity, and magnesium only 10 to 15 percent, it is not possible to reach balance for the cation bases with the wrong type of limestone.

Calcium, magnesium, potassium, sodium - these are the cations on which balance is built. Blessed with microbial activity, these nutrients ask not for factory - created solubility, but for availability, leaving it to nature's microbial workers to do their thing. These few points considered, we stand ready to grapple with calcium's absence in the fertilizer bag, and nature's mix provides a chemistry that holds all the answers.

Biological Transmutation

Earlier, I commented that the orthodox walked away when confronted with that calcium-rich chick, iguana and oak tree and the mystery of how calcium appeared where there was no calcium. Corentin Louis Keveran was noted French before he passed from the scene without gaining the attention his scientific accomplishments may have deserved. Kervran made the point that the agriculture of centuries 19 and 20 was dying, whereas biological agriculture was taking hold.

The fallout from his work was the realization that the exact sciences are a

great deal less than exact, that nature in effect smashes atoms to create new elements. Nature has many ways of mitigating or preventing deficiencies, but nature cannot operate properly when microorganisms are driven from soil systems with salt fertilizers, plant killers and toxic rescue chemistry.

Kervran does not use the term atom smasher, probably because smash is had terminology for the delicate work microorganisms perform. He uses his own term, biological transmutation. It holds that fertilizations are more complicated than returning to the soil what has been subtracted by cropping. Fertilization's task is to build life into the soil, a job our friends the dung beetles perform with alacrity - thus our belated enchantment with calcium, humates, bacteria are vital contributions to soil management. The dung beetle's work of saving the economic value of nitrogen and phosphorus contained in manure has been overlooked for too long.

Even before Kervran, Albrecht held that simplistic N, P and K fertilization means malnutrition. Now we must conclude that simplistic nutrient supplementation - giving calcium for calcium deficiency, Fe-iron for iron deficiency - is equally an error. Transmutation of one element into another was proved when uranium was trans-mutated into lead in experiments attending the birth of the atomic bomb. Now Kervran tells us that bacterial action in the soil or animal life can change manganese into iron, silica into calcium, similar activity deals with sodium, potassium, nitrogen, sulfur, chromium, selenium, and perhaps others.

Chemists today hold that it is impossible to create a new element via chemical reaction. They hold that reactions in living matter are solely chemical, ergo chemistry must explain life. But is chemistry physics?

"Why is it that chemically pure reactions, such as the one in which an atom of nitrogen and an atom of oxygen, combine, can be realized only in vitro at ambient air temperature?" asked Kervran. Living organisms do it at room temperature. Enzymes are no doubt responsible.

And so poultry starved of calcium to a point of listlessness and death, their eggs hardly "shelled," come back to life and exhibit tough shells when fed mica for its silica content. Experiments with bovines confirm and validate the transmutation thesis.

However, biological transmutation puts to pasture the idea that balanced crops can be grown in simple salts hydroponics, sterilized soil or chemical systems that remove themselves from nature's disciplines. Most transmutations observed so far have been noted in the first 20 elements. Calcium is number 20.

20

Ca

40.08