

Book Review of and Excerpts from:

# SECRETS OF THE SOIL

NEW AGE SOLUTIONS FOR RESTORING OUR PLANET

© 1989 by **PETER TOMPKINS & CHRISTOPHER BIRD**

**AUTHORS OF THE SECRET LIFE OF PLANTS**

Harper & Row Publishers, NY

ISBN 0-06-015817-4

Lib. Congr. S591.T64

This is a great book! The Boston Herald was quoted writing, A worthy sequel to Rachel Carsons Silent Spring

## *Introduction (p. xi)*

No creature, not even swine, befouls its nest with such abandon as does *Homo sapiens*, poisoning his habitat with fiendish concocted chemicals and their deadly toxic waste. That the earth is ailing almost beyond repair was clear enough as early as 1912 to Nobel Prize winner Dr. Alexis Carrel. Today soils are tired, overworked, depleted, sick, poisoned by synthetic chemicals. Hence the quality of food has suffered, and so has health.

These sensational, introductory words arouse passions of great concern for the next generation as well as our own. Malnutrition begins with the soil. Ever wonder why so many obese people inhabit the planet and yet are undernourished? Carrel stated, Chemical fertilizers cannot restore soil fertility. Only organic humus makes for life.

According to the book (p. xiii), doctors in general know very little about food. Their average training (at least at the time of its publication) during four years of medical school is 2.5 hours per physician. The emergence of industrialization, with its massive toxic wastes coincided with the appearance of many of the new diseases.

*Chapters I-III* (pp.1-25) discuss a novel way to create organic humus (refer to HYPERLINK "[http://www.montmorillonite.info/page%203\\_humus\\_art.htm](http://www.montmorillonite.info/page%203_humus_art.htm)" [http://www.montmorillonite.info/page%203\\_humus\\_art.htm](http://www.montmorillonite.info/page%203_humus_art.htm)) which includes some detailed practical application of astrology observed and recorded for thousands of years by the ancients. The introduction of biodynamic compost, credibly stimulated by long-forgotten (or poo-pooed by 20<sup>th</sup> century soil scientists) cosmic forces, releases the potential of the soil in correlation with certain seasonal patterns of the constellations. Speaking of a hard-to-find volume on agriculture written by Rudolph Steiner, its author (p.3) avoids chemicals, concentrating instead on natural composts inoculated with the products of certain processed and revivifying herbs. These are selected to help microorganisms quickly decompose the raw organic matter of the compost heap into simple compounds, reassembling them into the ingredients of a long-lasting, earth-smelling, dark-brown, light-textured, friable humus, a substance which, because of its colloidal state, holds its structure, resists leaching, helps fix nitrogen directly from the air, and increases the availability of minerals to plants the staff of life.

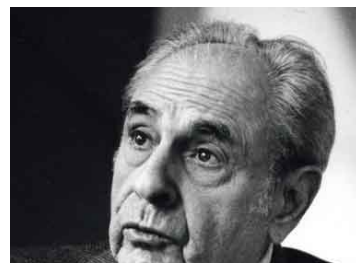
*Chapters IV and V* (pp. 26-48) delve into unlocking the potential of microbes to perform all sorts of use decomposition purposes. Mind you the ravings of these green-conscious people are the same scientists who brought us *Streptomycin* for the treatment of tuberculosis and many other wonder drugs derived from their understanding of microbiology first observed in the soil. A tantalizing series of facts reproduced from page 37 reads, A single microbe reaching maturity and dividing within less than half an hour, can, in the course of a single day, grow into 300 million more, and in another day to more than the number of human beings who have ever lived. As computed by Lynn Margulis and her son Dorion Sagan in their brilliant *Microcosmos*, bacteria, in four days of unlimited growth, could outnumber all the protons and even all the quarks estimated by physicists to exist within the entire universe. On this sort of scale the usefulness of bacteria could be almost limitless in its ability to decontaminate the earth. Pages 40-49 explain the equally fascinating and invaluable contribution of earthworms to the creation of fertile soil.

*Chapter VI* continues to explain the interplay amongst bacteria, gravitational pull, celestial light, and natural compost to enrich agricultural harvests with an intriguing expose on Alex Podlinskys experiments and discoveries in Australia. *Chapter VII* heralds Dr. Kirchenmanns valuable work in North Dakota mirroring some of those same organic farming principles.

The influence of water, vortices when stirred--and dont forget minerals, are all related in *Chapters VIII and IX* (pp. 90-115). At the convergence of the Middle East and Asia lies a fascinating region known as Hunza with wonderful stories and documented longevity records flowing from the abundance of mineral waters for which the area is famed. The Hunza minerals (p.96) go into the soil in a **colloidal** state, which is described as the state of a solute when its molecules are not present as separate entities, as in a true solution, but are grouped together to form solute particles. These particles, approximately one hundred thousandth to one ten-millionth of a centimeter across, only detectable by means of an ultra-microscope, carry a resultant electric charge, generally of the same sign for all the particles, usually negative, and it is their colloidal state that enables the human body membranes directly to absorb essential mineral elements without their having first to be processed organically by plant and animal. Every cell of the human body is made of **colloids** arranged to perform specific functions. Colloidal particles are so small, and therefore have such a large surface area a teaspoon of particles has a surface greater than a football field that, according to Gustave Lebon in *Evolution of Energy*, they generate surface energies that have powerful effects on physical chemical reactions.

***Claws of Chelation*** (*Chapter X*, pp. 116-127) pays tribute to Dr. Albert Schatz ( [HYPERLINK "http://www.healingandlaw.com/Bios/bios.html#AS-BIO"](http://www.healingandlaw.com/Bios/bios.html#AS-BIO) <http://www.healingandlaw.com/Bios/bios.html#AS-BIO>), and his expertise in the field of *pedology* (meaning, soil science from which we derive the word peds from the Greek. For additional detail on soil structure, please consult: [HYPERLINK "http://www.montmorillonite.info/What%20is%20soil%20parts%20AB.pdf"](http://www.montmorillonite.info/What%20is%20soil%20parts%20AB.pdf) <http://www.montmorillonite.info/What%20is%20soil%20parts%20AB.pdf> )

In 1966, Schatz was invited to write an article for *Compost Science*, published by the Rodale Press in Emmaus,



Pennsylvania to explain why soil research, subsidized almost completely by the U.S. fertilizer industry, was leading to a decreasing interest in humus and soil organic matter in the United States to the point of near extinction.

The central problem, to Schatz, was that the grants to colleges of agriculture provide continual financial support to an army of graduate students while at the same time their professors are raking off thousands of dollars as consultants to the same fertilizer moguls who are supporting the students research.

The research problems pursued are predominantly those from which the fertilizer companies can make more profit, while the indoctrinated graduate students go on to work along the same lines after receiving their degrees, and those receiving teaching appointments train new student in the same chemically-oriented philosophy.

Thus, wrote Schatz, with each passing generation, humus and soil organic matter become more and more abstract textbook topics which gradually lose their identity as real objects of vital interest. This decreasing attention dramatically illustrates how private and selfish economic interest can distortedly influence the direction of scientific research in a major discipline.

This neglect has resulted in a corresponding decline in *soil microbiology*. Graduates originally trained in the discipline were herd-mindedly rushing to accept lucrative appointments in pharmaceutical, fermentation, and fertilizer industries, where financial remuneration was steeply higher than in university faculties.

Dr. Schatz, however, apart from his disgust with the prevalent NPK mentality, is perhaps best appreciated for his understanding of **chelation** and the **colloidal properties** of humus. His initial curiosity with the ability of lichens to apparently weather rock led him to the following observations explained in Secrets of The Soil.

Taken from the Greek word *chela*, meaning claw or pincer it is the property that allows the formation of a ring-shaped chemical structure, based on six carbon atoms, that enables lichens to clamp onto free floating metal ions. The ensuing more-complex compounds can then be absorbed by the lichen; **once within their bodies, the metals are released to serve whatever function is required**. The chemical explanation for this canny phenomenon is that in chelation one or more electrons can be shared between two elements, dragging the metals along to be released as the compound is soluble in water.

Chelating substances, present in up to 36 percent of the dry weight of lichens, give them the power to dissolve iron and other metallic minerals, grab them, and such them up, enabling them to feast directly on the hard bare rock.

In 1954, Schatz published in the Proceedings of the *Pennsylvania Academy of Sciences* the first of a series of papers: **Chelation as a Biological Weathering Factor in Pedogenesis**. As he continued to work on the problem, it came to him that if the chelating process could explain the predisposition of lichens to dine on no more appetizing a menu than a rock surface, it could also be importantly involved in the

creation of soil fertility. Were the plants not creating soil just as the soil created plants? And was soil formation not an ongoing process that *maintained fertility*?

It was when I found out how lichens were chelating rock to extract minerals, said Schatz, that I said to myself that something in the soil had to be working in the same way to keep on forming it from solid rock. It was then that I concluded that there had to be a chelating agent in humus.

The clue or law with which to unravel the mysterious mechanism of chelation came to Schatz when he ran across an article published 160 years ago in a Boston newspaper, *The New England Farmer*.

Curiously, this same clue may be able to explain how the ancient Incas were able to so precisely cut angles into monolithic stone to form their giant fortress structures (the book goes on to explain (pp. 122-125)).

At the University of California's College of Agriculture, Schatz gave a lecture on The Importance of Metal-Binding Phenomena in the Chemistry and Microbiology of the Soil, in which he presented all his experimental results. No one in the United States seemed to care about the subject, said Schatz, (p. 126) though it is vitally connected with health, not only that of plants, but our own.

**Chelation** goes on not only in the soil and in microbes but in the cells of plants and in the bodies of animal and humans. How closely plants and humans are related can be explained by the extraordinary fact that both depend on a chelating chemical compound basic to their physiology. In man it is the deep red *heme* that transports in the blood the oxygen liberated by plants, which themselves have a compound, green-colored *chlorophyll*, that is so similar to *heme* that, to depict its chemical formula, it is necessary only to substitute an iron atom for one of magnesium. It is one of nature's miracles, says Schatz, that it could so simply modify a key life-compound, one way for animals, and another way for plants.

Asked why the feeder roots of plants prefer the humus packed in a below-ground open jar to the soil around it, as demonstrated in Podolinskys experiment, Schatz replied: First, because the trace minerals prized by plants are more readily available in humus since it has already acted as a chelating agent to solubilize them. Secondly, the far greater microbial activity in the jar breaks down the humus itself so that the roots can absorb the organic products coming out of it.

With respect to the **colloidal nature of humus and compost** (p. 127), Schatz pointed out that the whole of humus is not made of colloid substances but only that part which is chemically constituted to act as a **chelate**. The reason colloids remain in a liquid suspension, he added, is that their surface-to-mass ratio is enormous. To illustrate his point, Schatz put a large wad of ordinary steel wool in a tinned coffee can and applied a match to it. The wool exploded into a white-hot flame. If you try to ignite an iron nail with a match, he said, nothing happens. But if you convert the iron in it to very fine steel wool, the surface to mass ratio, as in **colloids**, becomes very large. If you weigh the wool

before and after burning youll find the weight has increased because the final product is no longer just the iron, but iron plus oxygen, or iron oxide (rust). The same thing happens with an iron nail if you allow it to rust in water, the difference being that in the burning of steel wool the oxidation effects are far more rapid.

To relate this to the chelating and colloidal properties of humus means that their combination brings about a faster and greater chemical effect than if they were both not acting in conjunction. Nutritionally speaking, whereas a pig, or human being, cant eat a nail, it can easily ingest chelated iron.

To be continued

