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A Climax Human Crop

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Because of a visit to "The Land of the Hunzas," or "The Fabulous Health and Youth Wonderland of the World," Dr. Allen E. Banik of Kearney, Nebraska, reported[1] the significant facts which help us to understand *WHY* the people of Hunza Land live to such ripe old age and and how they maintain themselves in good health. Certainly the latter, namely, their excellent health, is not the work of dentists and doctors. It results in almost complete absence of those professional groups.

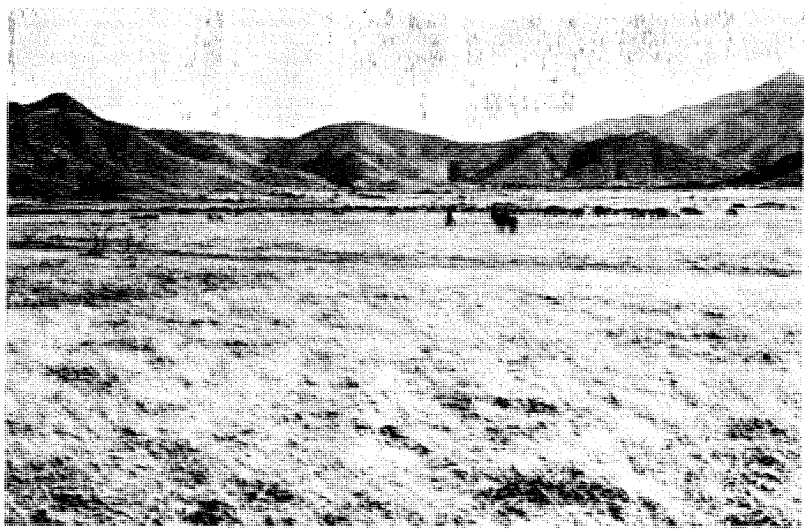
Dr. Banik's report leads us to believe that the Hunzas are what might be called *A CLIMAX HUMAN CROP* because they conform to the laws of Nature with reference to their management of the soils for the most nearly complete conservation of them. Thereby, their healthy soils seem to be good reasons for those healthy people.

When we find a climax crop of healthy plants, like the pure stand of trees in a forest, or of a grass on the prairies, or of animals like the bison was on the plains, we are reminded that any crop reaches its natural climax of development and survival because: (a) the same species grows there persistently; and (b) it is nourished well enough to protect itself from pests and diseases, and to reproduce regularly with healthy off-spring in goodly numbers. Those climax aspects result in the single area without additions to the soil, save for the dust-blown minerals dropped from the atmosphere or such brought possibly by inwash from nearby higher elevations. Much of the climax effect results from the complete annual return to the soil of all the organic matter it has grown. That serves to put energy and "life" into the soil. Apparently those are the same factors operating in the case of the healthy, long-lived Hunzas, and are those by which that climax crop of humans has resulted in the Himalaya Mountains for persistence during a score or more of centuries.

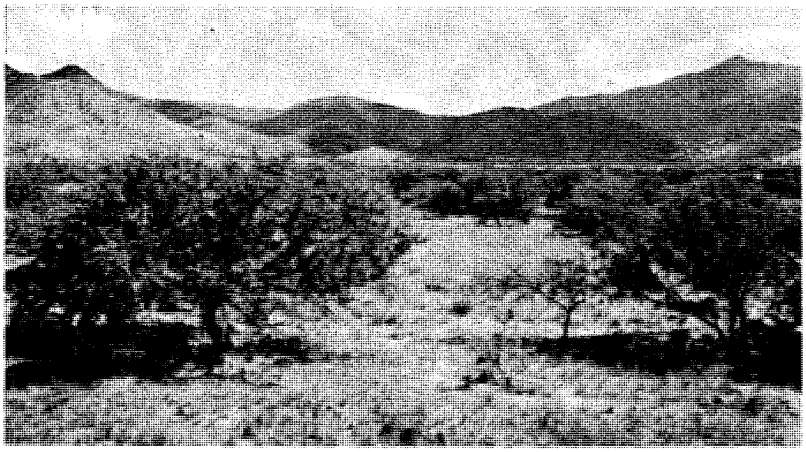
SOIL MANAGEMENT, AU NATUREL

Their soil management for its successful maintenance of productivity consists of two kinds of fertilization, each applied semi-annually: (1) the application of the silt-size, or powdered, natural rock particles in the "glacial milk" which they use as the irrigation water to flood the terraces; and (2) the regular applications of the organic manures made from the carefully collected and composted materials which those same soils have grown.

As for the powdered, natural-rock fertilizer, "The Hunza fields (generally one-half to five acres in area) must be irrigated constantly, especially since two crops are grown each year", Dr. Banik reports. "The water comes from melting snows high in the mountains. The mountain water is rich in minerals, and carries



Climax crops are not so apt to be long lasting under man's presence and disregard of the natural laws maintaining the soils under such crops. (Upper Photo 1903. Lower Photo 1943. Santa Rita Mts. Courtesy U.S. Forestry Service.)



to the fields a plant-nourishing silt which is invaluable in replenishing the growing properties of the soil—. Early in the spring, and again before the second crops are planted, canal gates are opened and all the terraces are flooded. When the water has been absorbed by the soil, leaving the silt deposit, the terraces are plowed and fertilized."

In the Hunza's plan of soil and water management, their irrigation is inadvertently also a fertility treatment with natural minerals. By applying semi-annually the natural rock which was freshly pulverized and mixed by the glaciers in the high mountains, they are maintaining (and building up) the soils in all of Mother Nature's fertility elements. Those folks are not concerned about ratios of plant-nutrients, their degree of availability, their possible dangerous salt-effects demanding placement in relation to the planted seed, or any of the other details of soil and fertilizer chemistry about which we have been so concerned in the late years. But they are concerned about their duplication of nature's processes regularly making more new soil by their help in weathering natural mixtures of rock dust in the surface soil. There the decay of organic matter speeds up those weathering processes and combines the inorganic and the organic essentials in ways that are coming more recently to be considered, though only partially comprehended.

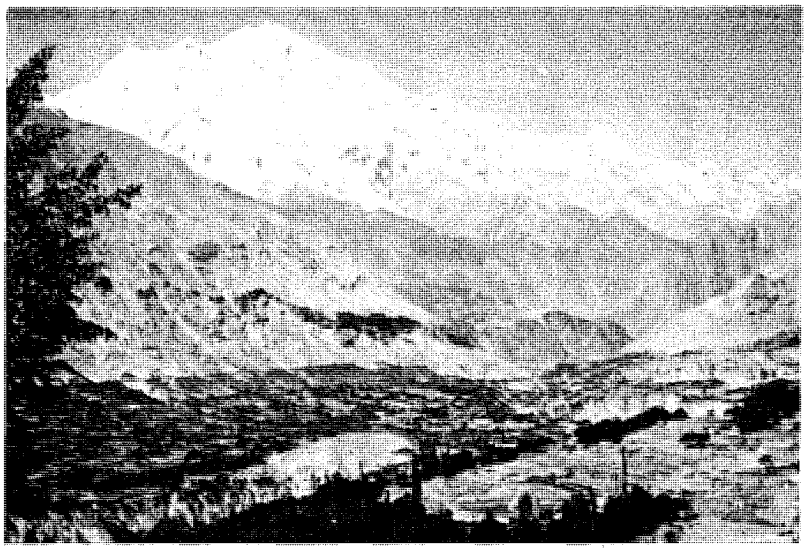
Then when the Hunzas fertilize their plowed fields with organic manures, they again duplicate nature's build-up of nourishment of her climax crops of plants by the return to the soil of whatever it has grown. It is reported that "Every solitary thing that can serve as food for vegetables, field crops, and fruit trees, is diligently collected, stored, and distributed in rationed equality over every square foot of the hundreds of terraces. Sunken compost pits are conveniently located, and into them go the ashes from cooking and heating fires, inedible parts of vegetables, pulverized animal bones, dead leaves, rotten wood and collected manure from animals".[1]

This organic manuring is the simple return to the soil of what it has grown. It is the provision there of the many organic compounds—still unknown in their chemical composition—which serve in plant nourishment, but of which, unfortunately, the function is information we still lack and are thereby lead to believe, erroneously, that only the inorganic fertilizers are needed—and the more soluble in water the better. Thus, instead of encouraging the microbes to burn out the soil's natural supply of organic matter by treatments with highly soluble salt fertilizers, the Hunzas maintain, and even increase, the soil's organic matter supply and its services, not only as organic nutrition of the crops, but also for its values in hastening the weathering of the soil's inorganic reserves of silt minerals for their release of plant nutrient contents through the help of the decaying organic matter via its temporarily active organic acids. The Hunzas have been practicing soil chemistry *au natural* rather than *au science.*

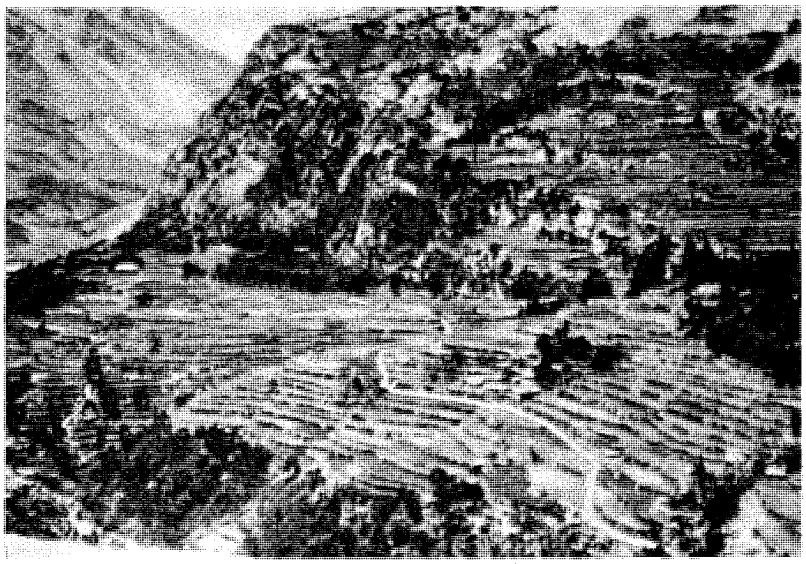
A LITTLE SCIENCE STIFLED OUR CURIOSITY ABOUT NATURE

For academic purposes and educational conveniences, we have made two major divisions of our chemistry, namely, the inorganic and organic. But in

1. Hunza Land. Dr. Allen E. Banik and Renee Taylor. 1960. Whitehorn Pub. Co., Long Beach, Calif. $4.95.



By means of terraces, the Hunzas converted the rugged and inhospitable terrain into level topography on which they developed fertile soils that nourished an unusually healthy people as the climax crop on soils so managed. Upper photo shows the source of the "glacial milk" used for irrigation and fertilizer in form of the pulverized rock left on the soil after flood irrigation. Lower photo shows the terraces wherever soil can be made and the "glacial milk" can be delivered. (Photo by Dr. A. E. Banik, Kearney, Nebraska).



natural phenomena, like plant growth, those are not separated kinds of chemistries. In fact, plant growth is such an intimate union of the two that they cannot be separated. Even though we, in our own bodies, are considered organic and are composed of highly combustible organic substances, we still contain about five percent of ash as inorganic and non-combustible matter. That is intimately combined with the organic, even in the bones and the teeth which we emphasize as "mineral" in composition.

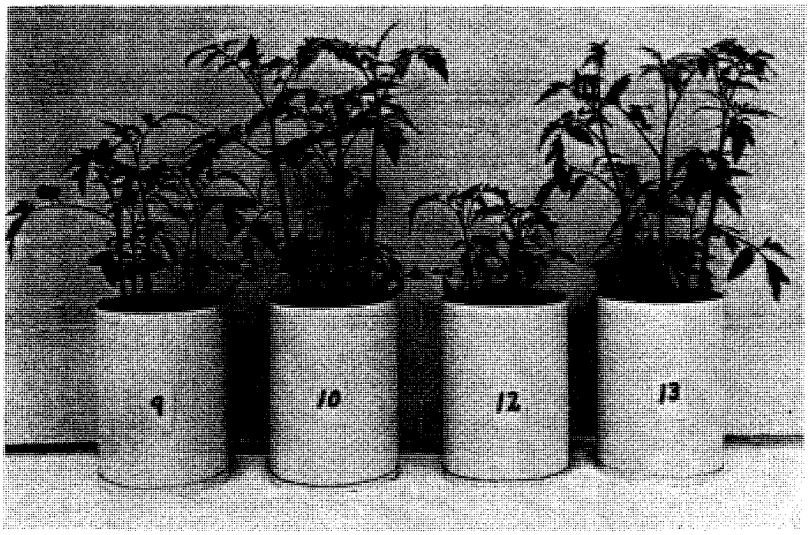
Because the inorganic chemistry has been the easier to learn, the simpler to demonstrate, and the more ready to comprehend, we start learning about chemical facts concerned with inorganic matters first. Then, all too often, we do not arrive at learning much about the organic matters of nature. As a consequence, we have studied plant growth—in relation to the soil that brings that about—mainly in terms of matching the quantities of ash elements in the plants against the quantities of those many inorganic elements in the mineral supplies in the soil. By ignition first to get the ash sample which we analyze, we have destroyed the many organi-inorganic combinations in which the elements initially occurred.

Liebig, the foremost early agricultural chemist, started our thinking about plant nourishment from the soil when he began with that analytical, or inventory-taking, kind of study of the ignited residues. Only very slowly have we come to appreciate the simple fact that our most rapidly growing food crop of commerce, the mushroom, is nourished almost wholly by its feeding on the organic compounds which it takes from its bed of barnyard manure brought beforehand to a certain degree of its natural decomposition. This crop grows so rapidly that the grower speaks about its mycelia "*running* through the bed". The mushroom takes inorganic nourishment in very small amounts from the thin layer of "casing" soil on top of the manure, into which tiny root-like growths are extended only just before the mushroom matures enough to develop its spores, or before the reproductive process is completed and the crop has fully matured. This most-speedily growing crop is produced, in the main, from salvaged organic compounds that were parts of preceding crops. It is not a crop synthesized from the elements coming directly from air, water, and soil. It is rather, a synthesis of a new crop from organic compounds left over from the old and dead crops.

With so much concern about sales of inorganic salts as fertilizers, we have given little thought to the nutritional role played by the decaying organic matter of the soil as it moves into the plant in the form of organic complexities, making up a significant part of the plant's diet, and as it mobilizes the inorganic elements in their intimate combinations within them to serve more efficiently thereby. It is in this latter role that Nature has Her inorganic and organic chemistries working together in what would seem unique, at least in our delayed recognition of it.

"CHELATION", A NEW TERM FOR AN OLD NATURAL PHENOMENON

Before the organic fertility compounds of the soil can carry any inorganic element into the plant, the latter must be combined with the former in ways by which the inorganic is not ionized or is not acting on its own. This activity, or



A case of Nature's chelation by manure. Mixing phosphate and dried manure, each separately into the upper three inches of the soil, gave the tomato crop in pot No. 9 on phosphorus-deficient soil. When phosphate was mixed with the manure first, then back with the soil, the crop growth was that of pot No. 10. Pots 12 and 13 are duplicates using six inches of soil. (Courtesy A. R. Midgeley. Vt. Agr. Expt. Station).

situation, in which the two, namely, the organic and inorganic behave as a unit or molecule, is now included under the term "Chelation". It is a case in which the organic part takes over the command of the situation. In addition, a protein-like part of the organic complex seems to be involved often, or at least the nitrogen (the common indicator of protein) is a means of linking the inorganic element so firmly into the organic complex.

In our "ash", or inorganic, chemistry of agricutural crops we have been emphasizing the natural separation (in solution) of the elements of compounds and of molecules, or their ionization by which they become the chemically active parts of them. Nature works in the very reverse with those elements as we are now interpreting them in chelation. Many soil and plant interactions consist of the biochemistry of large molecular compounds holding the ionization to a minimum by the union of the inorganic with the organic, and thereby allowing literally no ionization by mainly gigantic molecules, so well illustrated by the growth of the mushroom.

Some of our pioneer agronomists, as able chemists, may have had a vision of this unique natural phenomenon of the mineral fertility and the chelation of it by

2. A. W. Blair. The Agricultural Value of Greensand Marl. Cir. 61, p. 3, New Jersey Exp. Sta., May 15, 1916.
3. O. Flieg. "Uber den Einfluss von Humaten auf die Beweglichkeit der Phosphorsaure im Boden. Zeitschr. Pflanzenernahrung, Dungung und Bodenkunde. 38: No. 4, 1935.

the soil organic matter, when, as an example, about forty-five years ago Prof. A. W. Blair[2] of New Jersey said: "It is well known, for example, that by judicious use of lime and vegetable matter on the soil, reserve or locked-up mineral plant food may be made available." Similarly, one of the scientists of Germany, O. Flieg[3], touched on this idea when he considered "Braun Kohl" (brown coal) an effective agent, in some unknown manner, for mobilizing the inorganic fertility from rock to crop. As far back as 1905, the Russian chemist Tschugaeff[4] discovered that the inorganic salts of some of the trace elements combined with the organic compound known as dimethylglyoxime ($C_4H_8N_2O_2$) do what we would now call chelation. Since 1916, and the research at the University of Illinois[5] that organic compound has been an important analytical reagent for several inorganic elements by a single organic molecular structure. In this case the nitrogen part is the portion active in chelation, much as during the past ages Nature has used magnesium as the inorganic central—but not ionized—element of the chlorophyl molecule for service in photo-synthesis by plants. Now that the commercial markets offer chelating compounds, like ethylenediamine tetraacetic acid (EDTA), we are looking into Nature's processes using similar ones as parts of Her organic compounds occurring naturally in the soils and within the plants.

That such natural processes of chelation are common has been confirmed in a report from the Macaulay Institute of Soils Research, Aberdeen, Scotland, in which P. C. deKock[6] tells us that, "we showed that the growth-promoting effect of lignite was the result not of its trace element content, but of humic substances that made iron in the nutrient solution readily available even in the presence of high phosphate. Iron chlorotic plants were found to have high concentrations of iron in the roots, probably immobilized as complex ferric phosphates. This indicated that the effect of the humic acids was not merely an ion exchange at the root surface, but that the translocation of iron to the leaves was being promoted. This could be demonstrated by the split-root technique—."

"We have been able to confirm that EDTA, absorbed by the root in one compartment, caused translocation to the leaves of iron supplied in the presence of high phosphates from the roots of the other compartment. Within one month about two-thirds of the EDTA supplied had disappeared."

"If a water extract of peat was used instead of EDTA, the plants grew equally as healthily. Humus-like substances from 'A R' sucrose were equally effective in preventing iron chlorosis. The plants became chlorotic if the humic water was withdrawn."

Here, then we learn that by feeding on these organic compounds which are serving as chelators (including protein-like substances) the plants increase their power of feeding themselves, both internally and externally, on the inorganic elements. *It suggests that if plants are nourished by the organic matter first, they will feed on the inorganic elements, second, rather than vice versa as we have commonly blieved.*

The Hunzas, in adhering to their ancient practice of using only organic manures, have been practicing the natural principle of chelating their inorganic

Hunza men up to 105 years of age. The beards are dyed a flaming red (photograph dark), after age of 100. They do not purchase old age security. They grow it as good health via natural foods. (Photo by courtesy of Dr. A. E. Banik, Kearney, Nebraska).

fertility—applied as pulverized granitic dust—for its more efficient service in nourishing their crops, long before we even caught the idea or principle involved. They have been practicing the art of natural chelation without waiting for the technology of it to urge them to adopt it for practice under sales pressure of artificials for that purpose.

HUMAN ECOLOGY TOO, ACCORDING TO SOIL FERTILITY

The Hunzas are a good illustration of human kind located with varied health and success in survival according as the varying soils feed them for such. They are an example of the unappreciated fact that the geography of mankind, like the biotic geography of other forms, reflects the fertility pattern of the soil in its production of protein foods according as the climatic forces develop the soil to feed, or to fail, in that respect.

The twenty-five thousand, or more Hunzas are apt to be considered as a very limited case in point, but it happens to be a very positive case. It is the exception —possibly the proof—to the prevailing rule of bad health, or its serious degeneration. The Hunza case has been cited numerous times in literature on health, but

4. L. Tschugaeff, Z. Anorg, Chem. 46: 144. 1905.
5. Harvey Diehl. The Applications of Dioximes to Analytical Chemistry. G. Frederick Smith Chem. Co., Columbus, Ohio.
6. P. C. de Kock. Influence of Humic Acids on Plant Growth. Science 121:474. 1955.

it is to the late report by Dr. Banik, telling of the soil, that we owe the knowledge about Hunza practices of their management of the soil which is the foundation supporting them as a climax crop of humans, just as it has been the soil which has determined any other natural growth like the plants and animals to a climax.

It is the positive nature of the Hunzas as a natural evolution that makes their case so worthy of public notice. The Hunzas illustrate survival of the fit humans under adherence to the natural laws of biology—supported on a soil maintained by pulverized rock and organic fertilizers—rather than under a following of the dictates of human ingenuity in technologies or economics. That simple fact is especially pertinent now that we are beginning to substitute the word "degeneration" for the time-worn professional term "disease". More careful note of a case like the Hunzas can do much to shift bad health, or the prevailing negative, to good health, as the positive, by educational emphasis, and otherwise, as the consequence of the individual's more careful study of it. Man's survival too—in no wise different in biological principles than survival of other life forms—reflects the forces of Nature growing nutrition as the soil's creation of foods for such.

We may well study the Hunzas more critically because they are a people who have been healthy by natural evolution and individual efforts, rather than one so maintained through professional design and business by any portion or group amongst them. As we learn more about the fertility of the soils which have been giving us the natural climax crops of plants and animals, we may well learn what treatments we need to give to our soils to bring human health, in general, more nearly to its climax when such can come via proper soil management for the Hunzas as a climax human crop, isolated as they have been so long in the Himalaya Mountains.

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