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THE MIRACLE OF THE SOIL

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Soil consists principally of rock particles that have become broken down into smaller and smaller particles through processes of continuous erosion and disintegration. The collection of these mineral-yielding rock particles, mixed with clay as a foundation, together with the decomposing remains of vegetable and animal life (humus), forms the basis of our productive life.

The purpose of soil is to provide a secure anchorage for plants and trees, and to provide all of the essential nutrient elements (plant food) necessary to promote and sustain plant life.

From the productive soil proceeds the only known form of chemically-created, self-accumulating, self-supporting energy in the form of the living green plants. Plant life alone has the ability to accumulate and store chemical energy, which becomes the basic food supply for all other forms of life to subsist upon.

By far the main food of plants consists of carbon dioxide, which plants breathe in through their leaves from the air,—and water which the plants draw in through their roots from the soil and circulate upward through their structure. The green coloring material of the leaves is a variety of chlorophyll, a very complex substance, each molecule of which is organized around one atom of magnesium.

This chlorophyll, which may properly be called "plant blood", has the remarkable ability of securing radiant energy from the sun and bringing about a chemical reaction between carbon dioxide and water to form a simple sugar called Glucose ($C_6H_{12}O_6$). This simple sugar is in turn converted by the plant—in whole or in part—into starch and cellulose which form the structure of the plant. It is a remarkable fact that we owe all of our food, fuel and clothing to this wonderful chemical reaction.

Besides carbon dioxide, water and magnesium, the living plant depends for its growth upon a number of inorganic (mineral) food elements, which must be present in the soil in such form that they can be absorbed through the roots of the plant and then circulated in the plant by the plant juices. Some of these elements are true plant foods which are built directly into the plant structure, while others are catalysts that play an essential part in the chemical processes which promote the growth and development of the plant.

Thus is seen the intricate pattern of life as it develops—first through a process of chemicalization whereby carbon dioxide from the air and mineral food particles from the soil, dissolved in water, are activated by energy from the sun and thereby converted and stored as food and energy in plants, then their subsequent conversion to a still higher form to become the tissue, blood, bone, sinew and the special adornments of animal and human life.

The principle of life, whether plant or animal, is an eternal force of perfect, self-expressing, self-creating, self-supporting energy. Each form of life is limited to its own peculiar life cycle involving germination or conception, growth, reproduction and maturity. Barring accident, the only factor that can limit or prevent any form of life from completing its life cycle is starvation. Starvation may be caused from lack of sunshine and water, or it may be due to the absence from an otherwise adequate food supply of a single one, or a combination, of the vital mineral elements essential to plant or animal life.

When the pioneers first settled on our virgin soil, they found it firmly sewed to the earth by roots of trees and grass. When they cut down the forests and tore up the sod, this soil started down hill and has been going down ever since. This is because many of the essential plant food elements are not present in our soils in sufficient quantities to support annual crops indefinitely. Each harvested crop removes large quantities of these vital elements from the soil and, unless these elements are properly restored, soil depletion is the inevitable result.

It is high time that we give consideration to conserving and restoring the vital elements to our soil. The mineral resources of our soil may be compared to a bank account which diminishes with each withdrawal until finally we will be faced by "overdraft".