

The mere soaking of seeds in strong solutions of common sal-ammoniac and saltpetre of the shops, enables plants to increase largely their weight. Now, the question is—do they derive this additional nourishment, which, as in the case of the horn shavings, adds 45 bushels of grain to the acre, and stalks in proportion, from the soil or the atmosphere?

From the known sterility of the soil, I think at least 90 per cent. of the grain comes from the air. In a mellow, deep soil, where the roots can easily expand, and be accessible to atmospheric influence, no matter how destitute it may be of organic substances, plants gain the most by the aid of concentrated fertilizers.

M. Boussingault heated a fair clayey soil to a high temperature for some time till he had burned out all the organic matter. In this earth he planted a few peas, and watered them with pure distilled water. Some of them blossomed and bore perfect seeds, drawing all their carbon and nitrogen, as well as oxygen and hydrogen, from air and water. Had these peas had the benefit of common rain-water, there can be no doubt that the carbonic acid and ammonia which it contains would have been of essential service in promoting their growth.

An acre of land wholly destitute of vegetable matter, and containing all the minerals required for the plant, might produce a small crop of peas. The same is probably true of corn, clover, and artichokes. Mons. B. tried a similar experiment on wheat, but it would not grow to maturity without the aid of some organic matter. To prepare a field to produce a good crop of this grain, other plants, which draw nearly all their nourishment from the air, should be first cultivated and "ploughed in" to enrich the earth. There is good reason to believe, however, that nearly all lands in Western New York lack, not so much vegetable mould, or organic matter, as some of the mineral or purely earthy ingredients necessary to produce large crops of wheat. This opinion is not lightly formed. It will take up too much of your time, however, to go into details to explain the facts and reasons on which it is founded.—

Thorough draining, deep ploughing, and a perfect pulverization of the soil, I regard as of great importance, and calculated to improve our present system of farming. On the subject of draining we have much to learn, and more to practice.

Deep ploughing has the double advantage of letting off, to some extent, any surplus water, and of bringing to the surface those saline substances without which no plant can flourish. When any of these are wholly wanting, there is no remedy but to apply to them. Fortunately, only a very small per-centage of most plants is mineral matter.

One hundred pounds of wheat straw give only 3½ pounds of ash; and 81 per cent. of that is called *silica*—the basis of common sand. Before this sand can enter into the circulation of plants to form the base of their stems, to keep them upright, and many a field of wheat has fallen down, and been lost from a lack of this vegetable bone,) it

must combine with potash or soda, to render it soluble in water. Loose, sandy soils are usually barren, because all the alkalies are dissolved and leached out. Without these, pure sand cannot enter the roots of plants, and they die from the lack of their natural ailment. The application of wood ashes to such soils increases largely their fertility, although they contain very little organic matter.

In clayey soils, the potash, soda, and magnesia are not washed out. After they have been partially exhausted by injudicious cropping, the application of lime sets the balance free to unite with silica, and form silicate of potash or soda, or double salts, which are soluble in water, and thus enter the roots of plants. These salts are decomposed in the chemical laboratory of vegetables. Silica is deposited in their tissues, and becomes again insoluble. But a small part of wood ashes, when put up in a leach, will dissolve, although every particle of them was dissolved before it entered into the organic structure of trees or smaller plants. On the decomposition of the compounds of silica, potash and soda return to the earth, combine with and render soluble, more sand. This is carried, with its circulating fluids, into every part of the vegetable, and deposited where needed. It is doubtless in this way that a small quantity of alkali will serve to convey into the stems of corn, grass, and grain, the large percentage of silica, flint, or sand, which they are known to contain.

Thus, if a soil had a moderate supply of organic matter, and only lacked one or two simple minerals, you can readily see how a farmer might pay, as do some in Virginia at the rate of \$60 a ton for ingredients to be transformed into plants, and sold, perhaps, at \$10 a ton. It is, however, bad economy to waste the raw materials of cultivated plants—the very constituents of our daily bread and meat—and then trust luck to purchase, at a dear rate, something nearly as good brought from Africa, or the Pacific Ocean.

A large portion of the elements found in guano, and the salts or minerals necessary to the growth of plants, escape from the bodies of animals, whether man or brute, by their kidneys. You need not be told that the liquid excretions of all animals are salt, and that this saline matter must come from their food. Small as this mineral substance really is, when compared with the gross amount of matter taken into the animal system, it is quite indispensable in the composition of the vegetables that furnish it.

There are two and a half millions of people in this State, and they may consume an average of five bushels of wheat each per annum. This would use up 12,500,000 bushels a year, or 100,000,000 bushels in eight years. Now, bear in mind the important fact, that it will take just as much and precisely similar ingredients to form the second 100,000,000 bushels that were consumed to make the first. Owing to the great abundance—say 80 per cent.—of these ingredients, according to my estimate, being provided by Infinite Benevolence every where at our hands, their loss to the wheat-grower is not important.