COVER CROPS: FERTILIZERS AS WELL AS PRESERVERS OF EXISTING FERTILITY: BY H. B. FULLERTON

The use of legumes and other plants as aids to agriculture is by no means a new thing. It is not, as many suppose, the discovery or "creation" of twentieth-century "book farmers" or agricultural chemists of high degree. Mago, the first farmer who left a record of his agricultural observations, experiences and discoveries, knew the value of cover crops seven hundred years before the dawn of the Christian era, and his findings were commented upon and added to by Columella, who about fifty-five A. D. wrote an agricultural library covering practically every ramification of this very complex profession. This has been preserved by reprints and shows very plainly that many of the practices today called "new-fangled notions" by some were the very foundation of the successful agriculturists of twenty-seven hundred years ago, just as they are the pillars which uphold the temple of success erected by twentieth-century agriculturists. "Dry farming," called by its proper name, frequent and thorough cultivation, the great value of barnyard waste and the conserving and vivifying effect of leguminous plants all receive marked attention, and other authorities are quoted and given full credit.

Early American agriculturists rediscovered,—or stumbled over, observed and applied the very valuable lesson constantly presented by crops following such plants as clovers, beans and peas.

For example, in the dawn of the year eighteen hundred a French boy and his Spanish wife wandered out to Ohio, and began to farm upon the spot where the great city of Cincinnati was afterward built. One year, on an acreage of field corn, a very darkly colored strip was in plain evidence. All the corn hills upon this strip showed a very high and vigorous growth. The color of the blades was very dark, and the ears were large and very plentiful. The husky American farmer, who was the French boy of a few years before, had first his attention attracted by this marked peculiarity. Then his curiosity was aroused and later his desire for knowledge whetted. Finding no solution of the problem he had given himself to solve, he did what many another wise man has done, called into consultation his life partner, the young Spanish girl who had grown up into an American woman and in the western wilds mothered sixteen frontier American children. She had not grown weary considering the enigma, so, tackling the problem from a fresh point of view, she got her bearings by trees and stumps and asked if that strip of ground where the fine
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corn was growing had not been the "hay lot." Her husband said it was, and, moreover, it was the particular field that had given him such a heavy yield of red clover. This quick-thinking American woman at once decided that the clover had something to do with it, and suggested that a trial be made to see whether or no this was the solution of the problem. The experiment was tried, and a "high hook" farmer at the beginning of the nineteenth century followed in the footsteps of high hook farmers in the beginning of the first century, who were following in the footsteps of those high hook farmers who achieved agricultural successes before history was written. And this early nineteenth century observer, who put into practice the lessons learned by following the suggestions aroused by his observation, was simply one of the many successful agriculturists who flourished in the East, and every other section of the United States for that matter, likewise everywhere else upon the globe.

I have never seen any word that is just suited to what we generally speak of as cover crops. Briefly and simply a cover crop means a crop of some hardy plant which, by covering the ground throughout the fall and winter and early spring prevents the washing away of the top soil which contains the humus, or the decaying vegetable matter left by the forest trees and the soluble mineral matter; through late fall and winter it prevents damage from persistent downpours, cloudbursts, heavy showers and torrents; through the winter, when the tight freezes of the night are in part or wholly broken up by the noonday warmth, the cover crop prevents particles of all descriptions of plant food from being lifted by strong winds and gales and thus carried along till checked by forest trees, by waste growth or fall into ocean, stream or lake, where they are lost to the present-day man at least. Almost any growth will check this annual needless waste, so we rightly look upon bare fields as proof positive of wasteful methods.

Rye is the usual crop selected for the cover crop because it can be planted after corn is gathered and will make growth at every chance given it by a rise of temperature. At the first approach of spring it rushes upward and holds the fort, likewise the fertility, against the assaults of spring's ever-present floods and gales; when plowed under for early crops it acts as a mattress or sponge, holding the moisture of early spring and summer and furnishing a reservoir throughout a season of drought. Even if cut for straw, and the stubble alone left to be turned under, it helps to retain the moisture from below by keeping it from escaping into the air through the earth's capillary tubes. Furthermore, it holds the moisture that sinks
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rapidly in well-cultivated fields when nature provides a summer rain. Left lying in the ground for a year, it rots, ferments and in fermenting releases a gas formed in nature's laboratory. This gas attacks the immense mass of mineral elements that exist in all soils, but in many cases are unavailable for plant growth, because they are insoluble either by the earth's moisture or by the liquids that are said to exude from the plant's feeding rootlets for the purpose of making available, or putting into digestible condition, the many mineral substances found by analysis in all plants. But the great disadvantage of rye (which is so immensely valuable for replenishing the depleted store of decaying vegetable matter found in the soil of lands once covered by forests, with their falling leaves and dying plants, or of the great prairies where the annual grass growth is cast down by nature upon the approach of winter) is that it has no nitrogen reservoirs.

THERE is another class of plants which, besides providing this water-retaining mat and breaker down of insoluble mineral plant food, furnishes a wonderful store of nitrogen, which has long been known to be a plant stimulant of immense value. This nitrogen is breathed in or absorbed by the portions of the plant above ground and in some way is passed into the soil, where it is found in little lumps, sometimes perfectly round, homeopathic-pill-like lumps upon the fibrous roots, sometimes in larger balls the size of a pea, at times in gross, misshapen wads larger than marbles. These nitrogen-filled lumps are called nodules, and scientific men have discovered that they contain besides the nitrogen a minute low form of animal life,—or a high form of vegetable life,—which is called bacteria. As yet no one has been able to prove exactly how or why this wonderful storage of gas by plant life is conducted, nor has anyone been able to state definitely why some plants are fitted by nature to select from the atmosphere nitrogen gas and store it away in these curious little excrescences upon its rootlets. Neither is it known whether the bacteria are friends or foes; that is, whether these minute creatures force the plants to gather or aid them in so doing. Of course, there are many opinions, strongly expressed by deeply learned authorities, regarding this matter, but, like most of nature's secrets, proof positive has not yet been discovered that man's investigations and deductions have solved this very remarkable nature riddle. Mankind merely knows that where legumes have grown the soil produces better and bigger crops. For this reason the legume is the best of all cover crops; and some of them, like the sand or hairy vetch, can be planted late and supply soil protection, decaying vegetable matter and nitrogen

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in its most valuable form for plant growth. There are a great number of legumes, and many of them are used annually by agriculturists—all, the clover family, the red, crimson and white; the plant called lucerne by botanists, and blue clover or alfalfa by just folks; sweet clover, generally considered a weed; all the bean family, particularly the soy or soja; all the peas, especially the Canadian field pea and the cow pea; the lucernes and the vetches. Each particular variety has its champions who have reasons for their favoritism, some of them valid and some of them lacking conclusive proof.

On Long Island, years of experience have proven crimson clover to be absolutely hardy, hence as it is a remarkable gatherer of nitrogen, and a very strong grower with an immense number of leaves, it is particularly valuable as a fodder crop. To some it would not appeal because it should be planted fairly early. As a matter of fact, in this region it may be planted any time between June and the middle of September. Rye and vetch form a good combination, and this combination crop can be planted even in November. Such things as cow peas, Canadian field peas, soy beans, etc., are summer growers. They are killed by frosts, and, while they grow very strongly and even when dead form a protecting mat, they are not as valuable for a winter cover as the hardy crops, which include alfalfa. This latter is just coming into use as a cover crop and nitrogen gatherer. It has in the past been grown as an immensely valuable fodder crop alone. So, in summing up, we find the cover crop’s value lies in the fact that it keeps the soil just where it belongs, that vegetable matter is being continually supplied and that nitrogen is being automatically and cheaply added to one’s acres.

THE PIPE OF THOUGHT

THE Pipe of Thought,—a slender pipe,
    A single mystic reed;
Whose fragile throat flutes out a song
    That Time alone has freed.

EUGENE BLAISDELL BAKER.