

## PRIZE ESSAY.

## Improving the Soil by Green Manuring.

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My own personal experience with green manuring has been such as to induce me to resort to it whenever practicable, believing it to be a most valuable auxiliary in keeping up the fertility of our farms. My first experience in this line was with a crop of buckwheat on a loamy soil about twenty years ago, believing then, as I do now, the theory that buckwheat, when in blossom, gives off continually more or less nitrogen, thus draining the soil of one of the most valuable substances on which growing crops feed. I determined to plow it under while still in bud, but the weather being dry, the plowing could not be done in a manner to cover the crop properly, and the result was that much of it ripened its seed and gave me such a foul field for grain the following year, that, though the land was otherwise visibly benefited, I have never since used buckwheat as a green manuring crop.

My next attempt was with a one-year-old red clover sod plowed down in August, six weeks after the crop had been cut for hay, and the land, a strong loam, was at once well harrowed, till not a vestige of green was to be seen. In the following spring the piece was cross plowed, and I had one of the cleanest and most mellow cabbage gardens I ever worked; hardly a weed showed itself, and the land was in perfect condition for any root or grain crop. The clover, owing to its having been so thoroughly covered, seemed to be entirely decayed, and so satisfactory in every way was the result that I have depended entirely on red clover for green manuring ever since. Soon after this I had a large market garden, which had been worked on shares, thrown on my hands in so foul a condition with weed seeds that all my neighbors said that bare summer fallow was the only practical way of ridding the land of the weeds. Never having had much faith in bare fallows, I determined to rely mainly upon red clover as a cleaning crop, and in September, after gathering the vegetables from amongst the weeds, I mowed and burnt the latter, and at once harrowed the ground thoroughly; then when the weed seeds were just germinating, I plowed the land with a broad and shallow furrow, and left the frosts of winter to kill those that started into life on the unharrowed surface. In the spring I cross plowed deeply as soon as the land was dry enough, and in a week harrowed it; then, on a fine, warm day a week later, I harrowed in barley and red clover seed, 15 lbs. of the latter to the acre. The barley was a splendid crop, and the clover growing well from the start, kept ahead of any weeds that might have been left. The next year I cut two magnificent crops of clover and one the year following, plowing the aftermath under. I then returned the land to root crops and vegetables, practically free from weeds, and in every way improved by the operation. Since then I have never lost sight of clover as a means of assisting to keep up and even increase the fertility of the soil, and one reason why I prefer clover to any other green crop for this purpose is that you can vary the practice in so many ways, according to what you find the conditions of the soil, season and demand for food to be.

Wishing to try the plan of green manuring, pure and simple, I sowed clover by itself at the

rate of 15 lbs. to the acre, on land of ordinary fertility and cleanliness, but, the weeds getting ahead of the clover, I had, in June, to mow the weeds high enough up not to cut the young clover plants, and in the end only obtained a moderate crop of clover hay, having to wait till the following season before I could, with advantage, plow it down. So, from experience, I have settled upon the plan of seeding down with grain, and in cases where I consider the land not strong enough to stand a crop of grain, and also yield sufficient clover for plowing down, I give it a dressing of wood ashes or some other easily applied fertilizer at the time of sowing the seed, and on land that is benefited by plaster (for some soils are not), I add 150 lbs. of it to the acre, after the grain and clover are well up.

The principal objections that we hear urged against green manuring are that it increases the richness of those parts of the field that are already rich, and gives very little to those that are poor. To this I would say, give to the poor portions some easily applied fertilizer at the time of sowing the clover seed, and so bring them up to the same conditions as the rest. Others say that clover is often worth more to feed out than to use as manure. In this case I would cut the first crop for hay and plow under the aftermath, or cut both for hay and depend upon the clover roots to benefit the land, always remembering that a heavy aftermath of clover left to rot upon the surface often smothers itself out. Again, we hear that on farms where a regular rotation is not practiced, it brings the meadows too often under the plow. In this case I always sow 8 qts. of timothy seed and 15 lbs. of clover to the acre, and find that practically the first year I get a clover crop with an aftermath also to cut or pasture, and that after this the timothy begins to assert itself, and thus I get a valuable sod for hay without a second breaking up, and am satisfied to know that the dead clover roots are in the soil fertilizing it as they decay, and leaving numerous drain pipes, as it were, to carry down any excess of surface water to the subsoil, while, at the same time, the vegetable matter of the clover roots acts as a filter, retaining much of the liquid portions of the manure and vegetable matter that otherwise might be carried down below the reach of shallow-rooted plants.

The soils which seem to be most benefited chemically by green manuring are such as are of a sandy nature, while clays and clayey loams are mechanically improved by being rendered more open and pliable, and peaty soils would probably show the least good results of any, being already of an open nature and well supplied with organic vegetable matter.

On many farms we find steep hill-sides and high table-lands, as well as distant fields, on all of which it may be difficult and expensive to haul manure even if we have it, and where that most useful implement, the manure spreader, will not work. On such places green manuring can often be most advantageously practiced in conjunction with some concentrated and easily spread fertilizer; for, be it distinctly understood, that green manuring *by itself* is not calculated to keep up the fertility of the soil for an indefinite period, and it is also an important fact to bear in mind that soils require and are benefited quite as much by a change of fertilizers as by a rotation or change of crops.

In plowing under all green crops, particularly on light soils, I would advise a broad shallow furrow, not over four or five inches deep, so as not to get the vegetable matter down below the decaying influences of the sun, air and rain, and if a second and deeper plowing is then thought best, the vegetable matter will still remain near the surface where its effects will always be most beneficial.

In the case of hill-sides, where a side-hill plow is not available and you cannot plow round and round, I always start the plow diagonally up the hill, bearing away to the right hand; this gives the horses the advantage of

turning the sod down hill as they ascend, and the extra power while descending for turning the sod up, finishing the two gore pieces that would remain by plowing round them, and where the ground is free from stones, a sharp, circular revolving cutter on the plow beam, and a looped chain from the careener to the plow, to tuck the clover down in advance of the mould board, make clean and easy work. Lastly, if the crop which is to follow green manuring is to be fall wheat, plow for it in August or earlier, or the sod would not be sufficiently decayed to give the best results, and the same rule holds good for all root crops other than potatoes.

To those who have never tried it, I would say do so by all means, and as soon as possible; not on too large a scale at first, nor with the expectation that by this means *alone* you can make your land rich while taking other crops from it, but employed in connection with other fertilizers. I believe we have no cheaper or more beneficial way of improving our farms and our finances than by the judicious practice of green manuring.

To care for and apply the different kinds of manure produced on any ordinary farm to the best advantage is no simple matter. French farmers have a proverb: "It is not he that sows, but he that manures well, that gets the crop." Not merely to manure largely, but "well," is the problem. The products of the stable, cow-house, pig-pen and sheep-fold differ in manurial value and in composition, and are, therefore, adapted to different uses. Agriculturists of experience have laid down the general rule that horse manure is most valuable on stiff, clayey soils; that of cows and oxen most suitable to soils that are very light and dry, while the contents of the pig-sty and sheep-fold are very improving to meadow lands, but should be avoided in the cultivation of vegetables for cooking purposes, to which they often impart a rank odor. The general sensible practice on an ordinary farm of mixing the various kinds of manure in one heap, is due to the fact that what is lacking in one kind is supplemented by the qualities of another sort, making a good fertilizer for an average arable soil in which neither stiff clay nor dry sand predominates. It will pay any farmer, however, to study the special uses of each kind of farm manure. Then he will know where to put manures to get their greatest value out of them, as well as how best to fertilize particular lands and crops.

Joseph Harris in the *American Garden*, says:—Many false ideas prevail about asparagus. It is just as easy to plant and raise this crop as to plant and raise potatoes. The old directions in regard to trenching and manuring are obsolete. True, it will do no harm to work a lot of good manure into the soil and sub-soil, provided you do not turn up all the poor sub-soil on top. The best asparagus bed we have was neither trenched nor manured. We top-dress it with nitrate of soda every spring and occasionally with manure late in the fall.

Prof. Wallace (Professor of Agriculture, University of Edinburgh), in a lecture on "Cattle Feeding," says: "As to early maturity, I am not one of those who believe that all cattle should be finished and killed before they are two years old. In a bad or awkward climate, and where inferior forage is produced, I think it would pay to keep cattle longer, not only the climate and the nature of the forage being against the fattening powers of the animal, but the tendency to early maturity is not compatible with that hardness of constitution which has been induced by adversity in the conditions of life."