

Sub-soiling—A Prize Essay.

BY W. DUMBLE.

Written for the Farmer's Advocate.

As the agricultural interests in Canada supercede all others, any subject that is calculated to promote that interest, deserves our closest attention. Several great revolutionary principles are now engaging the minds of all scientific agriculturists, as the conviction is forcing itself upon them; that a better system of farming must be pursued, if the greatest public interest of the Dominion is to prosper.

Among these may be mentioned stall feeding, implying more abundant manure, and the abolition of all inside fences, under-draining, and the question now before us, viz., Sub-soiling—a question of the greatest importance to all farmers who would prosecute their ennobling profession with the greatest success.

Naturally the most fertile portion of the soil is at the surface, where the clay, sand and lime have become mixed with the vegetable mould or humus. By constant cultivation, the plant food is extracted; and the mineral elements become deficient.

Mr. Mechi, an eminent English writer, says: That they have at home, what he calls, an "agricultural pie crust," which is on an average only from five to six inches deep. In this country, it is even thinner, not being more than four or five inches. This fact is a startling one, and tells its own story. The first layer of soil is worked out, robbed; and hence the necessity of the measure we are now advocating. We must dive into the treasures beneath.

This thin crust has, in the process of time, by constant cropping, become unfit for the growth of those grains that were once produced by it in such abundance.

Canadian farmers look back to the good old days, when their lands were just reclaimed from a state of nature, and call to mind the immense crops of grain and potatoes, they then raised. It was, in fact, as if it were only necessary to tickle the soil with the plow to produce abundant returns. How could it be otherwise, when the soil was in such a rich condition. It had been manured by nature for ages.

The want of manure, however, has changed all this; and to-day the fact stares us in the face, that we must either abandon our farms altogether, or we must pursue a different mode of working.

The fact is, we must leave the pie crust, and delve into the contents of the pie.

We will find, it no doubt, raw and uncooked; but nevertheless it contains stores of mineral and vegetable wealth; just what our famishing and sick crops need to thrive upon.

The sub-soil only requires to be exposed to the ameliorating and modifying action of the atmosphere to be brought into a condition to produce the crops that gladdened our hearts when our farms were new.

In fact, instead of having one farm, we have several; one beneath the other, in layers! We have more land to the acre than we ever suspected; and there is wealth beneath the sod, that will yield a rich return for working; richer it may safely be said, than that of all the gold and silver mines in the world combined.

There are three methods of sub-soiling that we may mention, that may be pursued according to means and character of soil.

1st. Very deep ploughing with ordinary plow.

2nd. Plow gradually deep at each succeeding plowing; thereby turning up gradually the cold subsoil to the surface.

3rd. Following the plow in the furrow, by a subsoil plow; (one of which was figured in a late FARMER'S ADVOCATE,) which simply breaks up and pulverizes the hard sub-soil, and does not turn a furrow. The two last are the methods that will yield the most immediate returns; and give the most satisfaction. Extra time and trouble will be required, but what "gains" are there without pains. To receive the full benefits of this treatment, lands ought to be at least moderately dry. If the deep soil is full of water, saturated in fact, little benefit will result, as the soil settles down again after a few rain showers into its old condition.

Sub-soiling, then, ought to be accompanied by draining, either off the surface, or by tiles, when the country is naturally level. On rolling lands,

surface-draining is sufficient; and sub-soiling may take the place of tile draining, with every prospect of an immense improvement in returns. A new set of changes are immediately brought about which cannot fail to bring large benefits to the cultivator.

1st. Light, heat, air and moisture are admitted; this is one immediate effect of breaking up the sub-soil; it is in a great measure a preventative of drouth, as the roots can penetrate deeply in search of the bottom moisture.

In our Canadian climate, we suffer very often from the absence of rain; in fact it is a chronic complaint with us, and any means that will enable our grasses and grains to thrive, independent of rain, ought to be hailed with the greatest delight. The air, even on the driest and hottest day, is more or less charged with moisture, as is proved every day on the dining table, by streams of water condensing and running down the sides of the water pitcher. The colder, lower strata of soil, act in the same way in condensing the watery vapor of the air that penetrates into the loosened sub-soil.

The air also is enabled to impart its heat, thus warming, as well as moisturing, the deep growing roots. The mineral elements will have their disintegration materially hastened, thus rendering them available as plant food.

2nd. The fertility of the soil is largely increased by the deep-rooted plants being enabled to push their way down deeply beneath the soil, and feed upon the deeper mineral and vegetable elements, but chiefly mineral, which are deposited again on the surface by the decay of the plant. A barren soil may, in this way, be greatly fertilized by the cultivation of clover and roots.

It is quite astonishing to know what a great depth most roots will penetrate. The clover plant, in a porous, well drained soil, will push its roots down to a depth of two to three feet.

Sub-soiling on hard clay soils opens the way for the adoption of the soiling system of feeding cattle, as this cannot be done properly unless carrots, mangolds and turnips are more or less cultivated, and these roots will not come to perfection unless the soil be deepened sufficiently, as they love a deep, loose sub-soil. On this question of soiling, we are assured, depends in a great degree, the future success of agriculture, in this as well as in all other countries. As soils are at present cultivated, it is impossible to get the full benefit of crops that are grown, and, in some localities, it is impossible to grow at all others that are essential to success. We feel confident that if subsoiling were to be adopted universally, as it should be, and followed up by the soiling system, in an incredibly short time an immense revolution would be effected in agricultural affairs. And not only would farmers themselves be benefited, but the community at large would feel the quickening influence.

The fertility of our upper crust is exhausted by an ill-advised system of robbery that has been going on for years. We have, in fact, been selling the cream of our lands by the bushel, ever since they were cleared; and now they have refused to yield a paying return.

What remains now to be done, is to go down to the sub-soil, and fall back on our reserve wealth that nature has so graciously hidden there, and render available, and learn a lesson by the past, taking care not to rob it as the upper soil has been. By a judicious system of manuring and rotation of crops, we may bring our properly cultivated lands to a high state of tilth, and have the satisfaction of seeing them year by year growing richer and richer. Let sub-soiling be a part of the new departure in agriculture which every wide-awake farmer will sooner or later adopt, and follow it up by under-draining of the soil. The removal of all inside fences, protecting the cattle from the crops, instead of the crops from the cattle, will follow the adoption of stall feeding; and then will be solved the question, which has so sorely tried the inventive faculties of all aspiring agriculturists, where to get manure.

Enough stock will be kept to manufacture the produce into beef, wool, cheese and butter, and our crops sold not by the bushel, but on the hoof. Our ideal of a farm, farmed up to its capacity, we hope soon to see realized everywhere around us as we drive through our beautiful country. Those unsightly, crooked inside fences will then not be seen; the line fences will be straight; large feeding sheds will be seen surrounded by small enclosures for driving blooded cattle; immense heaps of manure will be seen composting, and all the year round

loads of it will be seen on their way to the growing crops and to the fields. Corn and the various roots will monopolize the soil. The steam engine will be seen in the barn yard, cutting fodder, pulping and slicing roots, and furnishing steam for the large vats where will be found steaming and cooking the food for all the stock. On the face of the proprietor himself will be seen a genial, self-satisfied smile, a sermon without words—With me all is well!

WM. DUMBLE.

[We publish the above essay on sub-soiling from the pen of Mr. Dumble. It does not meet the requirements we proposed in offering the prize, nor do the others on the same subject, as they were to be based on the writer's own actual experience of sub-soiling by himself in Canada.—Ed.]

Prize Essay—For Effectually Destroying the Codling Moth.

[WRITTEN FOR THE FARMER'S ADVOCATE.]

Every grower of the apple knows how liable that fruit is to be worm-eaten. He finds basket-fuls of windfall in the calmest weather. The destroyer is a small grub which feeds upon the pulp of the fruit, but of how or when these grubs get there the grower has not the slightest notion. The grub in question is the larva of the Codling Moth. As before stated, it is upon the pulpy parts of the apple that the grub chiefly feeds; when, however, it has nearly attained its full size, it feeds upon the pips of the apple, which, when thus attacked in its most vital part, soon falls to the ground.

No sooner is the apple fallen than the grub quits it by the passage previously gnawed; the orifice by which they escape being open and not concealed by a little mass of brown grains, which is the case with those apples from which the larva has not made its escape. The grub is of a dirty white color, with brown head varied with darkish brown marks; the body is slightly hairy. The caterpillar wanders about on the ground till it finds the stem of a tree, up which it climbs and hides itself in some little crack in the bark; it wanders to this place of safety usually in the night time, gnaws a little of the bark away, and makes a smooth chamber; it spins a white case, and in a few weeks forms a chrysalis, and in this state it remains through the winter, until the following May or June.

I may state that I have had twenty-six years of troublesome experience with this pest, but have succeeded in finding the way of destroying it. In the first place have your trees thoroughly pruned and cleaned or scraped of all the loose bark that can be taken off without injury to the tree, and gather up and burn it; then make a wash with two pounds of potash in eight quarts of water; add half a pound of tobacco to the water and a large handful of unslaked lime and a small piece of bitter aloes; wash the trees with a brush on all parts that can be got at, where there is any likely place for the larva to be hidden. I have used the above mixture, and entirely destroyed them the first season; but the trees ought to be scraped of their loose bark every year in the winter or early spring, months before the larva moves from under the loose bark, where it secures its hiding place.—Gather up and burn this refuse bark, and in that way you will rid yourself of these troublesome pests and find your trees flourishing, and you will have a choice lot of fruit that will pay for all your trouble. A little time spent in this way is never lost.

Trusting, Mr. Editor, this will be worth inserting in your valuable paper,

I remain, &c.,

THOS. FARNHAM,
Late Gardener of Model Farm.

London Township, March, 1875.