

SUBSOILING—SUBSOIL PLOUGHS.

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Hitherto the farmers of this country have cultivated a soil enriched for ages by the yearly addition of a fresh stratum of mould. From the first existence of vegetation upon the dry land, decayed plants, leaves, &c., have continually furnished a supply of manure, which the winds and rains have liberally spread abroad. As the supply was annually greater than the consumption, the earth, unexhausted by its productions, increased in fertility. The thick layers of vegetable mould which covered the face of the earth, was a warehouse of food for plants, and this quality increased by the conversion of wood into ashes by clearing. It is not wonderful, then, that for some years, newly cleared settlements should abound in produce and require little more labour than that of ploughing and reaping, for, during this period, the provision is wasting which for centuries had been accumulating. But the time will come, and indeed has already come in some sections, where the soil has been exhausted, and is too weak of itself to make plants grow with their former luxuriance. The grand question now presents itself, "how shall this soil be renovated and brought back to its former richness and fertility?" My answer would be by breaking the under crust, opening and stirring the subsoil, by which means it so alters and disposes the earth in which plants are rooted, that the radicals shoot more easily and more extensively through it, or in other words, it becomes a better filterer for straining and applying nourishment to their inhaling or absorbing vessels.

It is a well established fact or axiom in agriculture, that the deeper the soil is, the more favourable will it be for the purposes of cultivation. To produce this desideratum, several plans have been adopted, either by thoroughly trenching with the spade, or by the use of the subsoil plough. Air and water are chief instruments which nature makes use of to enrich the earth.

It is by close attention to passing events that any desired object can ever be obtained. As far as experiments have been made, we find the earth liberally affording its produce in ten-fold quantity, and the land that now supports an hundred inhabitants, may give equal enjoyment to a thousand. But in this state a well managed farm must be carried on with more labour, more expense, and more exact skill. The most profitable system of culture is that which pays the greatest per cent on the money laid out in cultivation, while the land is yearly increasing in its productive powers, is a truth which no one will attempt to deny.

I have, for the last four or five years, had my attention directed, by reading in the agricultural journals, to the great benefits derived from subsoil ploughing in England and Scotland, and have felt very anxious to obtain an implement for the purpose. For the last three or four years, I have been making some experiments with mere an apology for a subsoil plough, as it only penetrated about five inches below the bottom of the furrow of the common plough, and the share was thin, flat, and only three inches wide at the broadest part; still, with this simple, and I might say, inefficient machine, I could see a very perceptible difference in the appearance of the crop, especially in a drouth. In 1841, I made an experiment in a field of corn, a part of which I subsoiled with my skeleton or apology for a subsoil plough, stirring the under soil only to a depth of five inches; in that part of the field where the under crust had been broken, the corn manifested a healthy, dark colour, while that adjoining, which had not been stirred with the

skeleton plough, turned yellow, leaves curled and looked sickly. In fact, the difference was so great that it was noticed by those passing, although some distance from the road. I also tried it for my carrots and beets, with the same decided effect. I have tried it on stiff loam, and on soil inclining to sand, with equal success. This I was not prepared for, as I supposed such soils would not be benefitted by the operation; but on examination, I found the subsoil, which had not been reached by the common plough, very compact, and nearly as hard as a beaten track on the surface.

As for myself, and from my own experience, I am certain not a doubt of the utility of deep ploughing; not, however, by turning up the under soil, but by following in the furrow made by the first plough, with a real subsoil plough, which, if properly constructed, pulverizes and stirs the earth from twelve to fourteen inches. Indian corn, and all tap-rooted plants, in such a mass of loosened earth, would not, I am confident, suffer much by an ordinary drouth. Like a sponge, it would absorb a vast quantity of rain water, and become a reservoir to supply the wants of the plants. Nothing is more common in a dry summer, than the rolling of the leaves of corn, and the circumstance is often mentioned as an evidence of the severity of the drouth.

There is another advantage in subsoiling. If the season is wet, it has the effect of partially draining the land, and causes the water to settle and carry with it any vitriolic or other obnoxious matters.

I am not aware that subsoil ploughing has as yet, in this country, received much attention; but from my own experience, and several experiments made by different persons in different sections, and with very indifferent implements, the results have been such that I am led to believe that it will prove of very great advantage on old soils, that have been long under cultivation.

E. Phinney, Esq., a very spirited and successful farmer, in Lexington, Mass., in a letter published in the *New England Farmer*, in speaking of an experiment made with a substitute for a subsoil plough, in a field of carrots, says, "A part of my crop of carrots was sown upon the same land appropriated to that crop last year, no more manure was applied than in the previous year, and notwithstanding the severe drouth, which greatly injured most of our root crops, my crop on this piece of land was nearly double that of last year. There is no known cause to which I can attribute this great increase of the produce, but the use of my new constructed substitute for a subsoil plough. The soil was stirred to the depth of fourteen inches; by this means the roots of the carrots were enabled to strike deep, and thereby not only to find more nourishment, but to overcome, in a great measure, the effects of a very pinching drouth."

It is stated in the *New England Farmer*, "that B. V. French, Esq., of Braintree, Mass., raised the past season, over 22 tons per acre of white carrots, on ground not particularly well prepared for roots. He attributes this great crop principally to the use of the subsoil plough on the land the previous season."

The subsoil plough has been tried in Pennsylvania and Delaware, but I have not as yet seen any account of its effect on the crops. For deep rooted plants, no one, I think, will pretend to gainsay. Why do our gardens produce so much more to the acre than our fields? Is it not, in a great measure, owing to the deep tillage and mixing the under with the upper soil?

Mr Smith, of Deanstons, to whom is awarded the credit of first successfully introducing the

subsoil plough, in a lecture delivered before the Royal Agricultural Society of England, in July last, says, "When I first began to cultivate my own farm, although I had put in the drains, I found they were not so efficacious as I at first expected; and I then began to think of stirring up the subsoil, which gave rise to the idea of a subsoil plough. I thought I must construct an instrument which would execute the work with the least possible power. I made my plough very strong, and of that form to which the least resistance would be opposed, at the same time taking care to have sufficient power fairly to stir up the soil.

"I will here explain the principle of the subsoil plough, because I have found that many persons, although seemingly acquainted with it, have not a proper notion of the principle on which it is based. The great principle is, that there are many subsoils, which, though capable of being converted into good soil, yet if brought up and mixed with the active soil, will so far deteriorate it as to make it for some time sterile. It therefore occurred to me, that the great point would be to stir up the subsoil, still retaining the good soil on the surface. Stirring up the subsoil would, in the first place, very much facilitate the escape of the water into the drains; and secondly, in consequence of the passage of the water through the stirred up subsoil, and the attendant admission of air, it would be so acted upon as to be converted into good soil, while, at the same time, I was having all the advantages of working the active soil as before."

Having treated of the process, and noticed some of the advantages derived from subsoil ploughing, I will now endeavour to give a description of some of the implements made use of for that purpose, three of which are of European, and one of American manufacture. In proof of the estimation in which subsoiling is held in England, I would state that no less than eight subsoil ploughs were entered for competition and exhibition at the Fair of the Royal Agricultural Society, held in Bristol in July last.

The subsoil plough is not a new invention, but was in use in England, more than fifty years ago, and recently brought into prominent notice by Mr. Smith, of Deanstons, Scotland. In Dickson's Report of Lancashire, is the following notice of the "Miter or deep-stirring plough."

"There is another tool of the plough kind, somewhat similar in construction, which was introduced into the country about the same period as the 'Trench plough.' It simply consists of a ploughshare firmly fixed to a strong beam by means of a strong sheath and handle, without any mold board. It is usually drawn by four or more horses, being made to follow in the furrow of the common plough, so as to penetrate into, loosen, and stir up the under soil, without turning it up, to the depth of from eight to fourteen inches below the track in which that plough had gone."

The following description of it is taken from Mr. Morton's prize essay, published in the "*Farmer's Magazine*," (London), of July last. Mr. Morton says, "Smith's subsoil plough consists of the ordinary frame-work of a plough without the mold board, made strong enough to stand the shock and the strain to which an implement requiring the force of four or six horses to work it, must be subjected. The frame-work is of iron, and about 15 feet long. A sole plate, on which a feather shaped or pointed sock slips, is attached to it by means of two uprights or curved coulters. The height of the plough, when held in a working position, from the sole-plate to the beam, is about 22 inches. From the furrow side of the