

If we have an unfavourable Spring in Canada, thousands of dollars' worth of damage ensues to the farming community by the heaving out of the Fall wheat plant. I consider that this "heaving out" is chiefly due to a neglect of deep ploughing.

A few inches forms the arable superstratum of the ordinary wheat field; the tap root of the wheat plant meets with such resistance from this hard pan beneath that it is unable to push through and take a fair anchorage, and in consequence the heaving effect of the frost "coming out" in the spring throws the plant bodily out of that soil in which it possesses such a slight hold.

The deeper the staple the more manageable it is upon all occasions; it receives all rains into itself, and not merely on its surface; the water sinks gradually through it, and even when unable to penetrate, the undisturbed pan is yet so far below the surface of the field that it will gradually ooze over the pan to the lower part of the lands, before it has lain so long as to render the seed-bed cold and sour.

Another means by which to improve clay is to incorporate with it any kind of friable earth, such as sand marl, lime, and manures of all kinds.

Many soils are made clays by bad cultivation, and may be converted into a loam by turning up with deep ploughing that sub-soil which is not naturally a clay, and which has not been made one by a constant system of half ploughed cultivation. It would indeed be a great undertaking to incorporate sand with a clay soil by drawing and ploughing in, though I doubt not it would amply repay the expense to a man of large capital, who could afford to await some years for the accruing benefit.

Every farmer in this country has a wood yard near the house, in which yearly large accumulations of chips are formed. Indeed, I have seen heaps of chips that have been accumulating for many years. Such, hauled out, spread upon, and ploughed in with clay, have the mechanical effect of disintegrating the soil and rendering it more friable.

We often have heaps of rough straw, for which we can find no ordinary use. Plough that in; or, better, spread it on your fall wheat in winter, and let it work in with the soil; it will thus do double duty—protecting the wheat in the spring, and loosening the soil when afterwards ploughed in.

Green clover, rye and buckwheat, ploughed in, are of great value to clays.

Plough heavy lands *roughly* in the fall, thus exposing the greatest amount of surface to the disintegrating action of the frost. Put on the teams in the fall; plough then all you want to sow with spring grain.

The general character of clay lands is that the crops are very abundant, but are cultivated at a great annual expense, more cultivation required, heavier teams, stronger implements, and more wear and tear to man,

beast and tools. Moreover, as we cannot get on this land as early in spring, nor as often during the season, the clay farmer's teams stand idle more often.

Summer fallowing I look upon as a method of cultivation to be carefully avoided if possible, but upon clay lands it often becomes unavoidable. The soil is so retentive that when it becomes foul, a thorough fallowing becomes the only method of cleaning.

I have seen no land in Canada, which if properly worked, with the aid of our cold winter and hot summer, cannot be kept in good order by winter fallows. When we get such land as the blue clays of Gloucestershire, England, through which a plough cannot be drawn by less than four heavy horses, we may begin to think of summer fallowing; but if in Canada we take care not to let our land get foul, we shall find that fall ploughing will keep our soil friable and clean, and give us a good seed-bed.

C. E. W.

### Best Root and Best Root Sugar.

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Each month that passes, and each practical experiment that is made, clears away some mist or exposes some fallacy, which has hitherto assisted in enveloping this subject in darkness or obscurity, and which has had the effect of confining the manufacture to France and Germany, and the countries bordering on those nations. The English farmer, with all his push and dogged resolution, has been prevented from raising the sugar beet as a general crop, and even our energetic cousins across the lakes have by these mists and fallacies been prevented from adding to their failing agriculture the crop which, above all others, would restore prosperity to the farmer and fertility to the land.

The fallacy last exposed is with respect to the keeping of beets during the winter season. On this subject we were met by the positive assertion that the least degree of frost destroyed entirely the sugar producing qualities of the root, and the consequence has been the housing and storing of the roots in such warm and drying warehouses that the root, if it has not fermented more or less, has grown, and if not grown has shrivelled up to two-thirds of its weight. Now, the frost business has been a complete bugbear to all Canadians, and any person proposing the manufacture has been met by the statement that the expense of housing the roots in winter, and the space necessary, would be destructive to the enterprise. One fact will rather destroy this assertion.

A week or two since, just at the breaking up of the winter, the writer met with an old countryman who had pitted a lot of beets in his garden; he did not know the power of the frost, and had only put about 6 or 8 inches of earth over the heap, covering the

heap in the first place over with the leaves of the beets and some old pieces of wood. When he came to find that Canadian frost penetrated the ground two feet at least, he considered his beets as lost. The writer saw the man open the pit and throw out his beets. They must have all been more or less frozen, and thawed again under the ground, but they were quite sound, and the writer got a quantity of them for trial. He rasped them down, expressed the juice, defecated it, and evaporated it down into syrup in the usual way. *It was not injured at all.* It was of the full strength by the instrument for ascertaining the specific gravity. The beets were perfectly sound and juicy, quite as much so as if they had been just removed from the ground in which they grew. They grated down well and easily, and had lost neither colour nor flavor. They had been more exposed to frost than any prudent man or good farmer would have allowed his crop to be, and yet they were uninjured. At the same time the writer obtained some roots for experiments from a gentleman who had imported some of the best seed that can be obtained from the continent, and who had grown beets experimentally in various parts of the province, to test the quality of the land of different locations for the production of sugar, and who had the roots most carefully pitted and preserved in the German fashion. These roots were in good order as to preservation (except in one point, which will be mentioned hereafter), but they did not grate down so well as the roots first spoken of.

Another fallacy is the supposed necessity of cutting off the crown of the root when harvested, to prevent growth. The roots first spoken of had the leaves *twisted* off without injury to the crown; they were all perfectly sound, and not a rotten spot about them. The roots preserved in the usual way had the crown all cut off, and almost every root had a decayed spot, extending down to an inch or two in depth to the heart. Besides this, every spot of these latter roots which had been wounded by the fork in digging was more or less decayed; whilst the roots preserved out of doors, as first mentioned, were not in the least rotten where the fork touched them; the latter roots were well ripened.

This experiment (so far as it goes) is conclusive as to the exaggeration which has been made use of in statements of the injury done by frost.

But this fact is of far greater significance than would first appear: The roots in question were grown in the season of 1870, and harvested and pitted late in that year, having been well ripened. It was a mixed sample of seed, and we counted at least five distinct sorts, besides some nondescripts, so that there could never be a fairer experiment; and notwithstanding the variety of sort and colour, none were rotten or injured except two or three at the very top of the heap. If