Agricultural Emplements.

The "Ditcher."

Perhaps there is no branch of tillage so much neglected in this country as drainage, and certainly there is none of greater importance where it is needed. Water should be allowed neither to remain too long on the surface of the soil, nor to run too swiftly off it. In the first case it becomes stagnant, doing positive injury, whilst in the second, the reaction from a mere surface-wetting tends only still further to dry the soil. Water should, on the contrary, percolate through the ground, giving it a thorough moistening to a proper depth, and then be removed, it would thus impart to vegetable life the valuable properties it contains. This is the function of successful drainage, to appropriate to the soil all the fertilizing elements of air and cloud, heat, carbonic acid, oxygen and ammonia, by opening the pores of the earth to receive these disintegrators and fertilizers, and to yield its latent nutriment. And not only so, but also to remove from the soil everything that is deleterious to the growth of plants. The means for accomplishing these important ends, have not hitherto been within reach of the ordinary farmer in this country; and, this being the case, the neglect is not much to be wondered at, for drainage, solely by pick and spade, is, of all operations on the farm, the one most abhorent to civilized humanity In England drainage has worked a revolution in farming, and in Holland large tracts of land have, by the same means, been reclaimed from the sea, and made the richest in the world.

Such might also prove the case with thousands of acres throughout Canada, which constitute otherwise a mass of marsh land. One of the first inquiries connected with this subject is "what kinds of land require draining?" and the answer, in general terms, might be stated as follows, viz: "All lands which, at some seasons of the year become covered with water which has no natural outlet, but remains on or near the surface until removed by evaporation." And again, when a ploughed field shows on its surface a constant appearance of dampness, indicating that water is being forced up from below, so that after a rain-fall it is much longer than other lands in assuming the appearance of dry earth, that field, undoubtedly, needs draining.

Soils, too, which, in dry weather, present fissures, or cracks all over the surface, caused by the drying of clays, which, by previous soaking, have become pasted together, come under the same category, and when corn is seen to curl, showing that in its early growth that it has been prevented by a wet subsoil from sending down its roots below the reach of solar heat, it is a sure indication that draining would prove of service there.

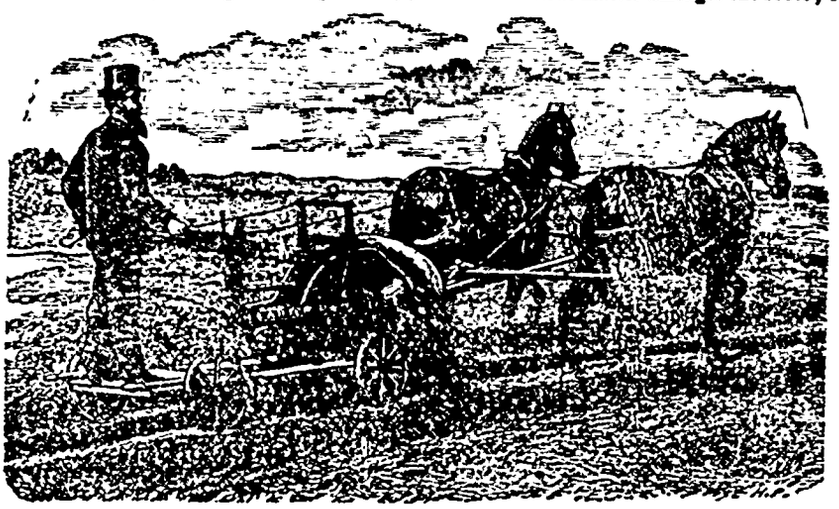
Now, what is the object of drainage? It is to accelerate filtration in such soils as we have been describing, and to impart to them the mellowness and dark color of self-drained land, conditions which are the most favorable for the growth of plants.

In a saturated or soaking, wet soil, every space between the particles is filled with water to the entire exclusion of the atmosphere, and hence only aquatic plants will grow on it.

In a soil which is too dry, again, where the earth seems baked, almost as in an oven, nothing will thrive except those plants which ask of it simply an anchoring place, and seek their sustenance from the atmosphere, in other words, air plants.

But agriculture is directed to the production of a class of plants very different from either of these, and requiring, to some extent, the conditions of both. Whilst they must have heat, they cannot dispense with moisture; and whilst they require moisture they cannot abide the exclusion of air.

Plants receive a large portion of their nutriment through their roots, from the soil. The raw materials, from which it is derived, are minerals, manures (artificial), water, and certain substances taken from the air by the absorptive action of the soil, or taken from rain, or from water flowing over the soil from other lands. Of manures, those of a mineral nature are affected by drainage in the same manner as mineral is native to the soil, whilst those of an organic character absolutely require fresh supplies of air to continue the decomposition, which alone prepares them for their proper effect on vegetation. Soil, of itself, has no chemical action in the process of germination; it is simply the vehicle by means of which air, moisture, and heat can be kept up. It absorbs moisture from the atmosphere, heat from the sun, and it admits air to circulate freely amongst the roots to supply them with their proper food. Now, the secret to be learned is, how to adapt the soil to the furtherance of these conditions. Under drainage will do this in the hardest, most obstinate, and most retentive of clayey soils. It decomposes the mineral matters contained in them, disintegrates the particles,



and renders them porous. This can be easily illustrated. Take a common box, with holes in the bottom; fill it with earth of the most tenacious character, and pour water upon it. It will be found in a short time that the water has soaked down through it, and is pouring out at the bottom. Continue the process, and each successive time the percolation takes place more readily, rendering the contents quite mellow and porous, and so long as there is a free outlet at the bottom, the earth will thus receive all the water that falls upon it, extract its fertilizing properties, and run no danger of being over-drenched.

Now, observe the high importance of having these conditions present in the soil for the utilization of rain. Rain water is the rightful property of the soil on which it falls, and it constitutes the chief source, not only of moisture, but also of fertility, it being calculated that a rain fall of 24 inches per annum has a fertilizing influence equal to the quantity of ammonia contained in 200 cwts. of Peruvian guano, with 150 lbs. of nitrogenous matter besides.

Rain water contains in solution air, carbonic acid and ammonia, the first two the most powerful disintegrators of the soil, and the last an equally powerful manure. The chemical action of these ingredients is such as to enable the soil to give up its hidden treasures; but before these latter can become effective for the nourishment of plants they must be rendered soluble, and this is only effected by the free and renewed access of water. The soil is in its most profitable condition when it is mellow, porous, moist, and moderately warm, and all these conditions are attained by drainage.

1st. Under drainage raises the temperature of the soil by the admission of heated air, and by diminishing evaporation. There can be no such thing as a vacuum in the soil; for, as soon as the water runs off from between the particles, its place is at once supplied by air primed with solar heat; and again, evaporation, which is a terrible soil-cooler, cannot take place because there can be no accumulation to evaporate.

2nd. Under drainage prevents land from becoming either too wet, or too dry to produce good crops. It prevents wetness, because where it is present there can be no accumulation, and too much dryness, because of the much larger quantity of dew which it is enabled to absorb from its mellow condition. In fact, drained land, generally speaking, contains enough moisture in its pores to effectually prevent drought. At a meeting held in Albany, N. Y., in 1855, to discuss the great drought of the preceding year, a Mr. Harris, present, who had tested the matter practically, said that "a drained soil will be found damper than an undrained one, and the thermometer shows a drained soil to be warmer in cold weather, and cooler in hot weather than one which is undrained."

3rd. Under drainage causes a more even distribution of nutritious matter amongst the roots; renders soil available earlier in spring, thereby lengthening the season, and assuring the maturity of the crop.

4th. It enables the farmer to work his land sooner after rains; prevents the soil from baking and cracking, and renders it easier to work, and most undoubtedly pays well.

We indicated, near the beginning of this article, that drainage is perhaps the last job any farmer would care about undertaking manually, however important it might prove. We do not wonder at this, but the "Ditcher," an implement of but recent date, and one quite available all over Canada, obviates altogether the necessity of hand labor. The accompanying cut illustrates it probably much better than we could describe its structure. It is simple, strong, and not very liable to get out of order, and its price is not beyond the ability of most of our farmers.

With proper management, a team of four horses and two men, should cut a ditch with it from 1,000 to 1,500 yards long, 3 feet deep, 14 inches at the top, and 10 at the bottom, in ten hours, according to the character of the soil

Its principal parts are an iron wheel four feet in diameter, eight inches wide, with two flanges of five inches in width projecting from its edges. Between the flanges, on the periphery of the wheel, are cogs, corresponding in length to the width of the flanges, and arranged in couplets, at distances twelve inches apart, around the wheel. In the rear, and close to the bottom of the wheel, is a spade or cutter, set in such a manner as to cut the earth, and hold it within the flanges. As the wheel revolves, the earth is caught by the cogs and carried to the top, where the cogs pass through a comb, which entirely removes the earth, and discharges it through a polished steel spout, which deposits it at a convenient distance from the trench, to be replaced when required.

The whole is connected with a car, upon which