

its work to about twelve or fourteen inches deep, and the teeth, sometimes eight in number, are about one foot apart. When the work is completed one way, the land is grubbed again the other, leaving it broken up into lumps and left as rough as possible. Experience has shown that land thus broken up is more perfectly freed from weeds by germination, and more exposed to the action of the atmosphere, than by any other method. By the action of the grubber, the largest surface possible is exposed to the air, and the soil is certainly thus more calculated to receive by absorption all that the air is capable of giving, than by simply turning over, with an ordinary plough, the furrow slice, which, according to agricultural ploughing matches, constitutes the *ne plus ultra* of good ploughing, especially if the furrow slice is quite unbroken, and laid smoothly one against the other, so as, in truth, to expose as little as possible of the surface to the action of the air and the elements. Such ploughing is advantageous in sod land, where, of course, it is absolutely necessary. But farmers do not generally consider what other courses of husbandry may be open to them. Almost all fallow land, except sod, would be far more benefited by the action of the roughest ploughing, provided it was repeated often, than by the smoothest furrow slice ever laid at a ploughing match, and a deep scarifying with a grubber like that described would be an admirable assistant towards working our fallow lands in summer. To do this effectually we require a more powerful propeller than the muscular force of horses. Steam is and must be the only alternative during our generation at least. Afterwards, some new motive power may be found to supersede steam, but at present there is none. Our enterprising fellow-townsmen and machinists, Wm. Hamilton & Son, have turned their attention and machinery to perfect a light rotatory engine, capable of doing the work required, and yet not to exceed in weight and size one quarter that of the ordinary engine in use. If their efforts are crowned with perfect success, on a scale sufficiently large for agricultural purposes, there is little doubt that before three years we shall see the iron horse superseding that of flesh and blood on the farm as well as the railway, and we say most heartily, "So mote it be."

There can be no reasonable practical difficulty in Canada against the use of steam ploughing and cultivating by steam machinery generally. We have all to gain and little to lose by its advent. Our seasons are so short that the one month in the spring is generally altogether insufficient for our wants, and we rarely have more than from the middle of April to the middle of May to complete our farm work, if we wish to be early. How much, therefore, would it tend to the benefit of Canada if, by steam power, as much could be done in one day as is now done in four or five.

Pasturage.

We think farmers, in general, are in too great a hurry to turn their stock into the pasture fields in spring. The grass should have a chance to get well grown before being depastured by stock, otherwise it will never attain anything like the productiveness it is capable of, and much of it will be either killed out, or cease growing as soon as the summer heats come on. Besides, the poaching of the ground by stock that are turned on early in spring, is very destructive to grass, and the little food they can then obtain when the grass is just sprouting, serves scarcely any other purpose than to scour them, and they soon fall off in flesh, while had they been kept in the yard for a few weeks longer, a smaller amount of hay or other dry food, than what they need in cold weather, would suffice to keep them in condition, till the grass had become well grown. The middle of May is quite early enough, in favourable seasons, to turn stock into the pastures, and care should be taken to give them the driest pastures first, even though the grass should be shorter in them than in those on a moister soil. Sheep can pick up a good deal of food around the fences of fields that are being prepared for spring crops, and in the lanes or by-ways, where they would perhaps do little injury in poaching the soil in comparison with larger stock, and be less apt to wander about. Cattle are difficult to restrain within bounds, when once they get out of the yards in spring, unless they have an abundance of grass, and will watch every opportunity to break through a weak spot in the fence, into the fall wheat or early sown spring grain. If one or two animals amongst them are inclined to be breachy, they soon set a bad example to the others, and then the farmer and his men are kept on the jump all the time to drive them out of the crops, and fix up broken fences, which may give them work all the summer in endeavouring to save the crops they have been at so much labour and expense to get in. It is remarkable how determined a breachy animal is to break through at the very same spot every time it gets a chance, no matter how well the breach may have been repaired.

Horses should be the last stock allowed in the pasture fields. If they are working on the farm, they are better able to stand the strain on them if kept stabled and fed on dry provender, while young colts are not only easily scoured, but become so restless on gaining their liberty in the fields, that they seem to delight in driving all the other stock from one corner to another, much to their injury as well as that of the pasture.

There is no excuse, this year at least, for turning stock early to grass, as the hay crop of last season was a tolerably abundant one, and the mildness of the past winter has en-

abled stock to keep in condition with a less amount of it than is usually required.

The best plan is to have four or five pasture fields at least on a farm, give the cattle the first feeding of each field in succession for a week or two, beginning with the driest; let the sheep and horses follow, and when the grass is eaten down tolerably clean, shut up each field in succession, so that by the time the cattle are through with the last one, the field first fed off will have the grass in it recuperated and ready to be again pastured. Horses not only bite closer than cattle, but will eat some grasses they reject; sheep bite still closer than horses, and eat up nearly all weeds, and many plants that are rejected by either cattle or horses. Hogs should never be allowed in a pasture that is intended to be eaten by any other stock; they will utterly defile the grass, and if kept on clover or other grasses, should have a field or paddock entirely to themselves, and be well ringed in their noses to prevent them from rooting up and destroying their pasture. If the orchard has been seeded to grass, which it ought to be if in full bearing, it would be the place to keep the hogs in until after harvest, when they can get the range of the stubbles, if desired. In about two or three weeks after haying is over, the aftermath will have grown sufficiently to enable the stock to be turned into the hay fields, and afterwards on the stubbles, where they can remain long enough to enable the pasture proper to get on a good growth of grass for fall feeding till the snow comes. Where clover is most abundant in the hay crop, it will give good pasture till the first hard frost comes, after which all stock should be taken off, and in no case should the grass intended for hay be cropped close, if it is intended to cut another crop the next season. It is a most slovenly and unsightly practice to have the droppings of cattle and horses in solid masses on the pastures, to grow up into hassocks of coarse grass. As soon as the stock is removed from one field to another, the droppings left by them had better be broken to pieces and scattered finely over the surface.

Relative Cost of Root Crops.

A subscriber asks, "Having all necessary implements on hand, which can I raise at the least expense—potatoes, mangolds, carrots, or turnips?"—

He does not seem to desire to know which crop will prove most profitable, but only which is least expensive as regards actual cost of preparation and cultivation of the soil.

Undoubtedly, potatoes would require the least amount of outlay for work and manure, if grown as most farmers grow them. Carrots would come next, as they ought to have the benefit of manure that has been applied to the previous crop. Mangolds would re-