

business. Root culture.—chiefly that of the turnip, —has wrought just such a change in British agriculture, and is capable of effecting a similar improvement in this country.

To induce farmers to grow root crops, it should be sufficient to show the important place they occupy in a well-managed rotation. The lessons of a stern experience have taught our agricultural population that over-cropping with wheat is, in the long run, a most suicidal business. It is consuming the capital instead of living on the interest. But by alternating root and grass with grain crops, and manuring at proper intervals, this evil is avoided. No two plants of different kinds require the same substances in the same proportion for their nourishment, and by a succession of crops one description of plants will take what another leaves. It is thus that both labour and manure may be economized, for it is easier work to till a farm on the rotation plan, and as manure only requires to be put in once or twice during the course, it is made to go as far as possible. One of the greatest practical difficulties encountered in farming is that of obtaining a sufficient supply of good manure. This is partly surmounted by a well-arranged succession of crops, and partly by the increased production of manure, and that of a better quality, which results from growing root crops. For by the help of these more stock can be kept, and while the animals are being fattened they produce the best description of manure, and so help to maintain the fertility of the farm.

We earnestly counsel all our farming readers to pay more attention to the growth of roots. Whether your farm be new or old, large or small, you will find root culture profitable. Do not be deterred by the idea that it requires an enormous amount of labor to raise roots. This is a great bugbear with many. They suppose that sowing and hoeing turnips, &c., entails a vast deal of work. But this is a mistake. If the land be properly prepared, and suitable implements are used, the labour is not extraordinary by any means. The plough and horse or hand-roller, will put the soil in order for the seed. A drill costing from two to six dollars, will make sowing speedy and easy. Even a simple contrivance in the shape of an old tin dipper or long-necked bottle, will greatly help to lessen the trouble of sowing. Thinning the plants is the most tedious part of the work, but this is quickly performed by a man expert with the hoe. A one-horse cultivator, or even a plough driven between the rows, will leave but little to be done with the hand-hoe. If the work requisite be promptly done at the proper time, it will not be found so very arduous as many people imagine. A good crop of roots is well worth all the trouble it costs, even if it were much more than it is.

Many people who know the value of turnips, both as a renovating crop and an article of food for stock, are not so well acquainted with carrots, mangolds, and parsnips. All these are excellent plants to raise for feeding purposes, and they leave the land in equally good condition with the turnip. But the turnip has the great advantage of coming at a time when there is comparative leisure and freedom from the hurry of other crops, while carrots, &c., must be put in among the earlier spring seedings. Still, to all who can possibly squeeze them in, we earnestly recommend these roots. The carrot is a valuable food for horses, cattle and sheep. Horses are especially fond of it. It keeps up their condition, gives them a fine glossy coat, and helps greatly to supply the want of the juicy food so much relished in the summer time. Fed to cows it improves the quality of the milk, and is thought to give a richer colour to the butter, while it has the advantage of not imparting an unpleasant taste to the milk and butter. It is also a valuable food for sheep and lambs. The mangold is a desirable article for stock feeding, and cattle of all kinds are very fond of it. Toward spring it is considered especially beneficial for milch cows. The

parsnip is more nutritive than the carrot, and is even better than that root for milch cows. The farmers in the islands of Jersey and Guernsey are noted for the excellent winter butter they make, and it is said to be owing to their extensive use of the parsnip. This root endures the severest cold, and may be left in the ground all winter, so as to be dug up fresh in the spring and used for feeding stock.

The modes of culture suited to these various roots cannot be described in this brief talk, and we content ourselves at present with earnestly advising our readers to grow these important crops for the reasons above stated.

### Fermentation in Barnyard Manure.

To the Editor of THE CANADA FARMER :

SIR,—An article appears in your issue of Feb. 1st on the subject of manures, of very great interest to the practical farmer, and in which you dissent, at least in the most material part, from the views of Prof. Voelcker, the lecturer, whose address you were reviewing. I have not had the pleasure of reading Prof. Voelcker's paper, and can, therefore, gather his views only from the very slight sketch with which you have favoured your readers; but conclude that he recommends the application of barnyard manure to the soil in an unfermented state, thereby preserving the azotised or nitrogenous principles, in the same form as when they were voided from the animal, and as contained in the fæces and urine; and I presume it will not be denied that almost the whole fertilizing principles in barnyard manure are due to these substances. It is quite true that a plant will absorb from the atmosphere alone sufficient nitrogen to perfect seeds enough to prevent the species from becoming extinct; but that which the soil contains is undoubtedly the great source of supply. There are no two principles better understood in animal and vegetable physiology than that azotised substances in the form of the perfected stems and seeds of plants are exactly fitted for the support of animal life, and are adapted in that state to enter into the animal economy; and also that the nitrogenous compounds contained in the droppings of animals, and in their bodies, are in a fit state to enter again into the composition of plants, the conversion being hastened and facilitated by putrefaction, while the compounds in question will be entirely changed and measurably lost by fermentation. We come now directly to the point at issue between you. You assume that the manure should be turned over, and put in large masses, so as to induce this very heat and fermentation, which, so far as relates to the fertilizing principles, makes them volatile, by transforming them into gases, whereas they existed previously as salts. Even in putrefaction alone, urea is converted into carbonate of ammonia, which, if the water is allowed to evaporate, escapes, except it be fixed by some substance such as chloride of lime, gypsum, or charcoal; and if such disastrous effects follow mere putrefaction, what must be the effect when complete fermentation takes place and a temperature of 100 degrees is evolved? A large share of the fertilizing principles is certain to be transformed into gas, which eludes the grasp of the farmer and wastes itself on the "desert air." There is very little plant food in the stems of plants, except carbon; and there is a large supply of this ingredient in the carbonic acid of the atmosphere, and this gas enters into the construction of plants, through the leaves, in connection with oxygen by the agency of the life principle. Straw is valuable as an absorbent of liquid manure in which the nitrogenized compounds are held in solution, and it operates on certain soils, particularly stiff clays, mechanically, where it slowly decays, the escaping gases being fixed by the soil. Where is the necessity, then, for the chemical changes induced by heating the manure in the barnyard, so far as the action of the manure itself on the growth of plants is concerned? On the contrary, are we not doing our best, in conjunction with the leaching process, to destroy it altogether? There is another point in your article to which I think

too much prominence is given, namely, the destruction of the vitality of the seeds of weeds by heating. It is known that the seeds of a great variety of plants will pass through animals uninjured. In doing this they are subjected to a heat of at least 98 degrees, which is seldom exceeded in a heap of fermenting manure, and which is quite sufficient to liberate all the gases contained in it. I think, therefore, that the advantages supposed to accrue from this source may be "counted out."

A PRACTICAL FARMER.

Sophiasburgh, February, 1867.

NOTE BY ED. CANADA FARMER.—We are very glad to find "practical farmers" taking up the subjects brought forward from time to time in this journal, and frankly discussing them from their own point of view, and with the advantage of their own experience. We have another letter from another practical farmer on the same subject, very strongly condemning Professor Voelcker's recommendations of fresh manure. When practical men as well as men of science are so diametrically opposed in opinion, we will not presume to dogmatize, and are willing to wait for the slow but sure disclosures of time and intelligent experience. In one point, our correspondent has mistaken the gist of the article in our former issue to which he refers. Great stress was laid on the necessity of destroying the vitality of the numerous seeds brought together in the manure heap; and this, it was contended, was effected, not by the mere heat to which the seeds were exposed, but by their germination and subsequent destruction.

### Manure-Saving.

To the Editor of THE CANADA FARMER :

SIR,—Much has been said about manure, the merits of different kinds, how and when it should be used, and the best method of preparing barnyard manure; but I have not met with anything on this subject that could be accepted as of universal application. Professor Voelcker's lecture before the London Farmers' Club may in some points apply to agriculture in England, though I doubt very much his theory of spreading the manure on the fields in a green state. I will say this much, that if scattering the manure over the fields as it comes from the stables proves best in England, there must be as wide a difference between England and Canada, as there is between chalk and cheese; for a farmer might better save his labour here than to cart his manure out in winter. In my opinion, the best method of manufacturing manure in the Canadian barnyard is this, first I approve of sheds, but they should not be entirely close roofed over like a barn, but closed round the sides, with only half roof. Better manure can be made here than in a close air-tight cellar, because I consider air is very requisite in the process of rotting; and as I consider barnyard manure fit for nothing unless rotted, I will give my method of doing that, and the best time of applying it. I first prepare a tight shed that will hold from 100 to 150 wagon loads of any kind of dry mould, which any farmer can get during the months of July and August, by ploughing up a piece of high endlands, work it to a mould, and cart it into the shed, then shut the door for winter use, and in winter, once a week, give the barn-yard a coating of this, with some long manure or straw over it, to keep it from getting into a paste or becoming mud; this will prevent much of the leaching that takes place in spring. Another advantage from this earth is, that the frost will be much sooner out than otherwise, that is if the yard has been open. If it be a close one, this plan will prevent the manure from getting fire-fanged. As soon as frost is out in the spring, commence at one side, and turn it over, trenching it clean to the bottom, getting it well mixed; and as it is after this turning over that the greatest loss from leaching takes place, either drain this leaching into a cistern, or surround the pile with the rest of the dry mould, which will lick it up like a sponge. If the manure thus prepared is used as top-dressing, it will speak for itself more than I can write in its favour. If the leaching is drained into a cistern, keep pumping it on to the pile until it