

their experiences and sights were disheartening, but this only shows the amount of unrest; people are continually changing. Some were Canadians, but by far the largest number were from the Western States and Territories. Many, had they known of the advantages to be had of markets, health, fertility and opportunities of acquiring comfortable homes in this progressive locality, would not be expending so much in travel. The advantages of a wooden country are not to be despised, and we deem it proper to call the attention of capitalists and others to the fact that there is ample room for thousands of good farmers to procure good lands, that must rapidly increase in value, in the whole of Ontario west of this city. We think the over-booming of some of this continent has mitigated against the progress of some of our country, and European emigrants with means would often do better in partially improved localities than enduring the uncertainties and trials of a pioneer's life. The winter wheat was looking remarkably well on both lines of railroad.

#### The Value of Roots.

A short time ago, while in conversation with a prominent farmer, he objected to raising roots on the ground that they contained little else than water, asserting that he could not afford to raise substances which nature supplied free. That roots contain about 90 per cent. of water has been ascertained by analysis, but the objection against their cultivation on this ground proves what a dangerous thing a superficial knowledge of science is. This is a very important question, inasmuch as farmers recognize the necessity of manuring heavily for this crop; and if roots require so much manure which produces so much water, there is apparent evidence of waste.

The percentage of water in roots varies with the soil and mode of cultivation; the richer the soil or the more the manure applied, the greater the percentage of water. By way of parenthesis let us here observe the enormity of the humbug in the present system of awarding prizes to vegetables,—the more the water the surer the prize. In other words the less nutriment vegetables contain, the greater are the chances for a prize. An average crop will often contain more nutritive value per acre than one raised under the high pressure system. The same principle is illustrated by cattle prepared for our fat-stock shows. The average percentage of water in all our root crops is about 85 per cent., but for the purpose of giving our opponent the benefit of any doubt, and in order to make round numbers of the figures, let us take 89 per cent. as the average, making the comparison with the yield of an acre of wheat. Take wheat at 20 bushels per acre and roots at 500. Now wheat contains about 14 per cent. of moisture, and in order to reduce the water in the roots to the same percentage as that contained in the wheat, let us imagine that 75 per cent. of the water is squeezed out of the roots; then 75 per cent. of water from 500 bushels leaves 125 bushels. Now we have 125 bushels of roots placed against 20 bushels of wheat, and the next question to be decided is, which of these two products contains the more nutritive value? Mangels would have nearly the same

nutritive value, but turnips and other roots somewhat less. On an average, 12 per cent. allowed off would be reasonable, reducing the 125 bushels to 110.

Now let us compare these figures with the market prices. Twenty bushels of wheat at \$1.25 will bring \$25; and 500 bushels of roots at 10 cts. will bring \$50. It will now be seen that while the root crop only brings twice as much money per acre as the wheat, yet it brings 5½ times more nutritive value.

With regard to the difference in the cost of cultivation, every farmer must make his own calculation, not omitting the benefits of roots as a mode of cleaning the land, and their many other advantages in the system of rotation, besides being a succulent food which is necessary to stock during the winter season. No farmer should be guided by the market price of roots. Being too bulky for extensive shipment, they will always command a lower price, compared with their nutritive value, than more concentrated foods, but this is no reason why they should not be raised more extensively for home consumption. These figures harmonize with the practice that roots require liberal manuring; for they require much more food than other crops. We think every effort made to discourage root-growing will be a failure—at least until ensilagists bring their art into a higher state of practical utility.

#### Application of Manure.

The old process of applying manure requires changing as much as the old style of treating the heap. It is still the practice of many farmers, regardless of conditions, to haul their manure to the field and throw it into small heaps, waiting for the season in which they spread it and plow it under. It sometimes remains on the field in this shape during the whole winter, and in other instances it so lies during many of the more temperate months. If there were any appreciable substance left in the manure when it reaches the field, the farmer would soon experience the error of his ways; for the large quantity of soluble fertilizing material which would be washed into the small area of soil covered by the heaps would, under many conditions, rather retard than assist the growth of the crop, the strength of the soluble salts being greater than the tender plants could bear.

The present tendency of the times is towards top-dressing in place of plowing under. Every method, however, depends upon a great variety of circumstances, so your best plan is to study the principles involved and then use your judgment. It was formerly supposed that a large quantity of manurial substances was lost by top-dressing or spreading for any considerable length of time before plowing the manure under; but experimenters have put this question to rest. At any rate, under the usual method of treating the manure, there is very little substance to lose in the field, no matter what the system of application is. If the manure is turned over or hauled out while fermentation of the heap is going on, a considerable quantity of ammonia escapes into the air; but fresh, or even well-rotted manure, contains very little free ammonia, so that it can be applied in these forms without fear of loss by volatilization. But there is also the character of the soil to be

taken into consideration, there being a liability to loss by drainage as well as by the evolution of gas into the air, under certain conditions. Clayey soils, or those containing an appreciable proportion of clay, have the power of absorbing and retaining the drainings from the manure spread on the surface or plowed under. The nature of the soil therefore decides when and how the manure should be applied; for if the subsoil is sandy or gravelly, and the application made some time before the crop begins to grow, the liquid fertility will be carried down by the rain beyond the reach of the roots, which calamity could not happen in a retentive soil. So far as loss is concerned, it will now be seen that on clay soils you may haul and spread at any time, and you may safely leave the manure spread on the land any length of time before plowing it under.

But the texture of the soil is another important consideration, as is also the kind of crop to be grown. An undrained clay soil is apt to be too stiff, so that plowing the manure under will improve its texture; but if it is already in the right mechanical condition—that is, neither too loose nor too firm—top-dressing is the preferable mode of application, especially if the crop is a shallow rooted one. In top-dressing the drainings uniformly saturate the surface soil, making it rich for early growths and shallow roots; whereas plowing under has a tendency to enrich the subsoil for deeper rooted crops. Of course the quantity of rain also plays an important part in this particular. A heavy dressing of coarse manure is mechanically injurious under any system of application; for as a top-dressing it checks evaporation too effectually, favoring mould, fungus growths, slugs, and tender plants, and when plowed under, the manure hinders the free upward movement of moisture from the subsoil in dry weather. Coarse manures can only be applied advantageously in the fall, when it will exercise a beneficial influence on stiff clays, keeping them open for the free admission of frost, which pulverizes the soil, and the manure will be sufficiently decomposed for the ensuing crop.

Under ordinary circumstances, all experiments have proved the economy of using dry earth as absorbents in the stables, and of spreading the manure on the fields in winter. It has been objected that the spring rains will wash away the soluble portions by surface drainage. Although this may take place on steep portions of the field under heavy showers, yet it has been observed that the rain which thaws the manure will also thaw sufficient soil to absorb and retain the fertilizing portion of the drainings under all ordinary circumstances.

The latest remedy for the cabbage worm consists simply of ice-cold water, or water but a few degrees warmer than ice-water, sprinkled upon the worms during the heat of the day. An application in the hot sun is said to cause them to quickly let go their hold upon the leaves, curl up, roll to the ground, and die, while the cabbages suffer nothing, but look all the fresher for the application.

The rain and the atmosphere are the poor-farmer's fertilizers.

Only a rich man can afford to buy or work a poor farm.