

raised in Europe we may mention the process resorted to, to insure the best quality of root. As in cattle and all other natural productions, so it is with seeds, "like produces like." The best and richest roots produce the seeds which produce the greatest amount of sugar in the future crop; but as every root is a perfect plant, so every root must be tried, and its quality ascertained before it is planted for seed. To do this the seed grower (who values his character for the production of the best seed,) takes each root, punches out a piece of it, and reduces the piece so punched out to pulp and juice; by the use of extremely delicate instruments, the specific gravity and consequent sweetness of the juice of each root, is ascertained; those which are found deficient are rejected, and the best are planted for seed. The rootlets of each beet-root grow on opposite sides in two longitudinal rows; the trial piece of the root is punched out from between these longitudinal rows of rootlets; the hole so made heals sufficiently to prevent the decay and destruction of the root when planted for seed, and the future growth of it for seed is not materially injured. By this means a sort of seed is secured, which produces the greatest possible amount of sugar, and this is how the average yield of sugar has been increased from five or six per cent. to as much as fifteen per cent., and even more in the future crop. This was the plan adopted by "Vilmorin," of Paris, and his seed has now, as well as Carter's, attained a European reputation.

We mention this to show that everything depends on the quality of seed to be obtained, and neither pains nor expense ought to be spared to procure the best. The best German seed growers also produce a seed of equal quality, but they are not within our reach. Carter & Sons, Sutton & Co'y and others of the same class and respectability in London, England, will always obtain for their customers the best seed.

In Germany the excise duties are collected on the amount and weight of the roots manufactured. In France the duty is collected on the amount of sugar actually produced. Consequently the Germans grow the richest and sweetest roots, (irrespective of the amount of roots produced per acre,) whilst in France they grow the kind of root which will produce the most sugar per acre. The Germans cut off and reject all those parts of the root which are poor in sugar, whilst in France the whole root is worked up except the crown.

Having procured the best seed, the next thing to do is to grow it in the best manner, and in this the European and English farmers spare no expense. From 16 to 20 tons of the best farm yard manure per acre are put on the land in the fall, and well and deeply ploughed under, the spring following the land is lightly ploughed, about sixteen hundred pounds of rape cake having been first sown on the land. Land manured in this manner will not only give the richest quality of beet-root, but will the year following without any other kind of manure produce the finest possible crop of wheat. Where the leaves and tops of the beet-root are left on the land and ploughed under, a less quantity of rape cake is used.

The roots are dug and stored in the same manner as mangolds or turnips. The sugar beet is not readily affected by frost, and continues green in the field long after every other summer plant is cut down by the frost.

The sugar beet may be sown the very first thing in the spring; indeed, the earlier the crop is sown, the sooner will the roots be ready for the mill, and early manufacture saves all the expense of pitting and storing, and gives the quickest returns to the farmer.

Summer frosts do not injure the sugar beet. The year before last, they had a very bad summer frost in Wellealey, which even cut down the weeds; but the sugar beets though in full leaf, were neither destroyed nor even checked in their growth. The roots, too, when pitted, will stand much more frost than has been

supposed possible; the roots will suffer far more from growth and heating than from frost during winter storage.

With respect to the manipulation of the juice, we refer our readers to Mr. Cull's recent pamphlet on the subject, and to Crook's work, published in 1870, with plates, in which work all the processes are fully and exhaustively treated on. Some most valuable information is also to be had from the numbers of the *American Chemist*, for July and August, 1872, where the subject is admirably treated by Professor Goessman, Ph. D., of the Amherst (Massachusetts) Agricultural College; these two papers are the more valuable, as they treat of the sugar beet as grown on this continent, and in a climate very similar to that of Canada.

Sugar refining has always been a most profitable business, and is one in which very few failures occur. The utensils however, are expensive, and the capital necessarily invested in bone-black, or animal charcoal, is always large; but the profits are large and certain, and in well conducted establishments no waste occurs, the whole of the substances contained in the rough sugar, being convertible, and converted into good merchantable matter.

If sugar is obstinate and won't crystallize, or even if it is so injured as to be rendered uncrystallizable, a certain and good value is always obtained in the shape of syrups and molasses, and other sweets. The Glasgow (Scotland) refiners have brought their business to such perfection, that no syrups whatever, are made; everything is reduced into crystallized sugar in one shape or another. It is too much however to expect such success as this in Canada yet awhile; but there is with us a regular and constant demand for syrups and molasses, far more than there is in the old countries.

Beets do not produce their full equivalent of sugar on peaty land, or on new soils. They want a rich deep clay and sand-loam, or any rich old soil well manured the previous year, but by no means manured with rank manure in the same spring in which the seed is sown.

Twenty years ago the manufacture of beet-root sugar was confined to France and a part of Germany,—for home consumption. Now, the various European countries produce more beet-root sugar, than the tropics produce cane sugar,—and more beet-root sugar is now refined in Glasgow and London, than used to be grown in all France twenty-years since.

It is simply absurd to be sending our money out of the country to purchase sugar which we can produce here at a cheaper rate, and at an excellent profit to all concerned in the business, from the farmer who grows the roots to the refiner who turns the rough produce into the loaf and other refined sugar, which we daily make use of to so great an extent.

Saving and Application of Barn-yard Manure.

In reply to a correspondent, our able cotemporary of the *Albany Country Gentleman*, thus gives his opinions on these highly important points:—

Manure taken fresh from the stable, with but little admixture of litter, should be placed under shelter; if exposed to rains, a portion would be washed away and wasted. If there is danger of the heap fermenting too strongly, so as to waste and injure the manure, of which every owner can judge best on the spot, it may be prevented by composting it, or alternating it with layers of turf, loam, muck or peat, &c.; turf being preferable if accessible. The thinner the alternating layers of manure and absorbent, the better. Fermentation is also retarded or prevented by spreading it broad and flat under cattle sheds, where it will be trodden hard by the animals. But if the manure contains a large portion of straw litter, as usually happens on grain farms, it will be likely to become too dry to ferment sufficiently to break the fibre, if heaped under shelter, and exposure would be better. After the straw heap has fermented several weeks, the sides should be cut down with a hay knife and thrown into the middle, so as to give all a chance to ferment. The degree of exposure to rains, and the desired amount of fermentation to reduce the manure, without injuring it, must be judged by every farmer by personal examination. Hence the impossibility of giving any rule, either for exposure or shelter, that can be blindly followed.

The great object in applying manure, is to diffuse it as intimately as possible through the particles of the soil, where it can be reached by all the thread-like roots of the plants. Experiment has shown that when manure is finely broken up by the harrow or clod-crusher, and well mixed with the soil, its effects are doubled or tripled, as compared with the common way of spreading it in lumps, and simply plowing

under or half covering. Now, the most perfect diffusion through the soil is effected by using liquid manure, which soaks down and goes among the finest particles. The easiest way to use and apply liquid manure, is to spread solid manure over the surface of the ground, and allow the rains of late autumn, winter and early spring, to wash the soluble and richest portions down into the soil. If evenly and thinly spread, at this time of the year, it will not ferment and waste; but it will, if left in heaps. More than twenty years' experience has shown us that manure may be applied to the surface, under proper circumstances, with great advantage. It succeeds better on heavy than on light soil. Our practice has been to plow it under in spring, after it has been thoroughly washed by the rains of the previous months, and thus secure all its value. The most successful application of this method of top-dressing has always been to the corn crop. The results of a large number of experiments go to show that, on an average, manure is worth twice as much applied in autumn to soil intended for corn, as when applied the following spring just before turning over the sod. The process of the intimate diffusion of the manure has been going on for months whenever the surface was not actually frozen; but when the manure is applied just before plowing under, there can be but very little intermixture with the soil. It should be distinctly and well understood that the top-dressing here recommended must not be in large lumps scattered irregularly over the grass, but the whole should be finely and evenly spread, for which purpose we have found the slanting-tooth smoothing harrow, the best implement, doing the work perfectly and more rapidly than ten men.

There may be instances when the manure may be washed away if applied on snow. If the whole surface were covered with snow converted to ice, a heavy rain on this ice might easily wash much away, but we have not met with any instance of this kind. We have often spread manure on snow, and in every case when there was enough water on the surface from rain or melting snow to wash any of the liquid portions, there has been at the same time enough of the surface thawed to absorb the whole—a tenth of an inch being enough to absorb all that will commonly wash at first over the surface. It must be borne in mind that heavy or clayey soils absorb more readily and copiously than light or sandy soils, and are more benefited by the surface manuring. In order to test the truth of the opinion that the manure would be washed down hill-sides, a number of manure heaps were placed in such a position, and allowed to remain there for some months, including the most rainy season of the year. The grass below the heaps, and in close proximity to them, was rank and green; but five feet distant not the slightest effect could be perceived.

Indian Corn—New Plan.

The universally accepted mode of planting Indian corn, has heretofore been in hills 3 feet, 3½ feet, or 4 feet apart, with 3 or 4 stalks to each hill—or in drills from 2 to 3 feet apart. Mr. Samuel R. Hough, of Manchester, Ill., however, suggests a new plan which he has tried for two years and found most successful. In a letter to the *Iowa Journal*, he says:—

"In one corner of my garden which had been newly taken in and had not yet received any more manure than the surrounding land, I prepared a small spot of ground. It received no more attention, and was in no wise in any better condition, than the adjoining field. The corn in the field was planted about the 10th of May, with a corn-planter which dropped from three to five grains to the hill. It received five ploughings. The summer was an almost rainless one in this part of the State and we were visited with clouds of 'chinch bugs.' The corn in the field yielded about thirty bushels per acre. After I had finished planting my fields I remembered my garden spot was not yet planted. About the first of June, I marked it off and dropped the corn, making the hills two feet apart each way. As soon as the corn made its appearance, it was thinned to one stalk in each hill. It was never plowed but received two hoeings. I measured the ground and the corn and it yielded 90 bushels to the acre. I am satisfied that, if farmers would take the time to plant their corn with exactly the same number of grains in each hill, and let that number be very small, that they would not only increase the yield of their fields in quantity but improve in quality."