

tions, possibly because that way of working has, as yet, hardly become of sufficient age to be public property, and also that, as the process is essentially French, it may not as yet have been well translated into English. Such as it is, we give it, and we have sent to Europe for further information, which shall in due time be laid before our readers.

In the Champonnois process the beetroot is grated down as fine as possible, the ground or grated stuff is then mixed with 30 per cent. of its weight of water, and pressed as in other processes; the resulting liquor is filtered or strained as fine as possible, and is then boiled with the addition of one per cent. of fine animal black—this is bone or ivory black, made from burned bones, and reduced as fine as possible. This is a purification which is considered equal to a filtration through coarse material in the ordinary manner by the old process (in which, after defecation with lime and boiling down into syrup, the syrup was strained and filtered through bone charcoal). The juice containing the fine animal black is finally concentrated by boiling down to 22° Baume (the thickness of thin molasses). This is then again filtered, and again boiled until the thermometer shows a heat of 115° centigrade, or 239° Fahrenheit. This will bring it to the thickness of thick treacle or molasses, or the thickness which maple sugar attains when you are about sugaring off. This mass is then left on a stove, or a warm place such as the top of a brick oven, or near the kitchen stovepipe for five or six days, during which the sugar crystallizes. It is then drained, and freed from the molasses by any of the ordinary means used for that purpose. The resulting sugar is very good, and crystallizes in large grains, so much so that the smallest particles of syrup adhering to the vessel crystallize completely and in large crystals.

The resulting molasses or drained syrup, which does not crystallize, is then diluted with about sixty per cent. of water—that is about twice as much water as was originally used with the pulp. This solution is heated on a water bath, or in such a way as that it will not burn, and is added to a fresh quantity of the pulped beet root. This mixture is then raised to the heat of from 158° to 177° Fahrenheit (70° to 80° centigrade) and maintained at that heat for from ten to fifteen minutes. It is then pressed, strained and boiled with fine animal black, exactly the same as in the first instance, then concentrated down to treacle, set aside to crystallize, and the resulting sugar and molasses divided as before, and the molasses again watered with 60 per cent. of water and applied to the obtaining extract from fresh pulped roots, as before.

This process is stated to leave all the mineral salts and other impurities in the pressed cake, which therefore pass at once to the

cattle feed and manure heap. It also does away with all the troublesome and expensive apparatus and machinery for the reduction of the molasses in the old method, and which form a business of themselves. The only objection to the process is the extra amount of water to be evaporated, and the larger size of the vessels. But that is far more than counterbalanced by the greater simplicity of the process, and the banishment of the machinery used in the after processes.

In the old processes two-thirds of the mineral matter of the roots pass into the molasses, the other third being in the pressed cake. In the Champonnois process, the whole of the mineral matters, from being worked over and over again into the newly ground root pulp, is absorbed by it, and thus is retained on the farm, and for manure.

Now, it will be observed that in this process lime, which is so extensively used in all others, appears to be omitted altogether, and that the operator trusts entirely to the fine animal black as the defecator, and for the purification of the juice. Skimming the juice is not mentioned, but common sense will tell any one that if scum is formed during the boiling and concentration of the juice, it ought to be removed, and that any deposits formed in the boiling ought to be removed also, so that the operator may only have to filter the clear syrup.

As we said before, the process is imperfectly described, and we hope for further information on it; but in the meantime we recommend to all who may be experimenting on the beetroot and sugar, to try the process as here described, and to use their previous experience with maple sugar and their own common sense, and no doubt the results will be satisfactory.

It is, however, remarkable that lime should have been dispensed with; but it is also possible that lime with this process is quite unnecessary, and that although it produces some benefits it may also produce difficulties, which have to be got over in other ways. People not connected with manufacturing have no idea how errors will be perpetrated and continued in the production of matters of everyday life, nor how what things which at some times have appeared to be necessary, and have afterwards been dispensed with, have subsequently re-appeared in another shape, and have been and are considered of vital importance. Thus, in the oldest printed systems of brewing beer from malt and hops, one of the great secrets of the trade consisted in putting into the water, before the mashing of the malt, a small portion of sulphate of iron, or green vitriol. The reasons for this were not understood, but one hundred years ago it was generally practised, and no doubt with good effect. Subsequently to that time it came to be considered an adulteration, and by special

enactment this substance was, with all others except malt, hops, and isinglass, banished from the brewery. The writer has brewed thousands of barrels of excellent beer without the use of sulphate of iron, or any other chemical matter, but nevertheless it was always observed that beer brewed with hard water kept better, and did not sour so much, as that brewed with soft water, and in time it came to be observed that beer brewed in certain localities, particularly at Burton, in England, could be made weaker and would keep better than beer brewed anywhere else. The chemists of the day analysed the Burton ale, and found a notable quantity of sulphuric acid in it, and so stated it in their publications. The Burton brewers, feeling perfectly innocent of the charge, were furious, and brought actions for damages against the chemists. The latter stuck to their first statements and analyses, and showed at the trial that sulphuric acid did exist. This finally led to the examination of the water, and it was found that all the water used at the Burton breweries contained in a natural state sulphate and sulphite of lime; that this was caused by the water filtering through strata containing those substances—so that the chemists were proved right, and at the same time the brewers were proved innocent, and the secret of the Burton ale became known. This caused a concentration of the brewing interest of England in and around Burton, and finally in and around other places possessing water of similar quality. Then, by chemical people, the old original system of the sulphate of iron became understood. The small quantity used was only sufficient to combine with the lime naturally in the water, and the malt. The required amount of sulphate and sulphite of lime for enabling the liquor to be kept from souring was made at the time of brewing, and the desired result produced without any one knowing why.

Now, the London and other great brewing establishments attain by chemical means the advantages which their Burton brethren attained by natural means, and as good beer is brewed in the old centres as in the new. We need not wonder, therefore, at any changes which may take place in so new a manufacture as that of beet root sugar.

VECTIS.

ADULTERATION OF SEEDS.—The unprincipled dealers in the seed trade in Europe are not to be baffled, it seems, by the British Act of Parliament framed to put a stop to their nefarious practices. Adulteration with old, killed, or dyed seed being interdicted, they have taken to mixing cleverly coloured sand with clover and other seeds. Farmers who buy imported seed should be on their guard. Shaking the sample in a vessel of water, when, of course, the heavier sand will sink to the bottom, or trying to chew a little of the seed, are ready means of detecting the new trick.