MAKING SUGAR FROM CHINESE CANE-JUICE

We find some very good information on this subject in the *Ohio Cultivator* for this month, some of which we condense for our columns, accompanied with other remarks, as we know it will be useful to many of our readers at this particular season of the year. It is a well-established fact that frost does not injure the cane-juice or the sugar, but aids the clarification, the juice working more perfectly after a frost than before, and making better sugar and sirup; but warm weather, after hard-freezing, reduces both quantity and quality. After hard-freezing, the saccharine matter separates more readily from the impurities in the juice, and therefore yields a larger per cent. of sugar than if worked before the freezing. Yet we would advise that the ripe cane should be worked up as rapidly as possible, and the operation of sirup-boiling to commence as soon as the cane is ripe, and continued without intermission until the cane is worked up. There is a culminating point in the development of the sugar in the cane, which is the best time for sugar-making. This point or season is when most, if not all the seeds, are ripe, and after several frosts, say when the temperature falls to 25° or 30° Fah. If the cane is cut and housed, or shocked in the field, when in its most favorable condition, it will probably keep unchanged for a long time.

To render the clarification of the juice as perfectly as possible, it should be supplied with some bi-sulphite of lime as it comes fresh from the mill. The most convenient and effectual mode of applying the bi-sulphite is to suspend a keg or bucket of it over the sluice or gutter which conveys the juice from the mill to the juice-box; then, with a gimblet, make a hole in the bottom of the bucket of such a size as to allow the proper quantity to gradually flow out and mix with the juice as it passes from the mill to the juice-box or tank. No time should be lost, it is important to observe, after the juice is expressed from the cane, before the bi-sulphite is mingled with it. The quantity to be used varies with both the character and condition of the cane from which the juice is expressed. The higher the gravity of the juice, the smaller the quantity of bi-sulphite required to make a good clarification; the lower or weaker the juice, the greater the proportion needed. Until experience teaches the operator to know exactly when enough has been used, it will be safe to apply in the proportion of say about one quart to 100 gallons of good sorgho juice. About one quart of good common milk of lime must also be added for every quart of bi-sulphite.

When the juice-tank is filled, stir it thoroughly with any convenient utensil, and after being allowed to stand a few moments, take out a small quantity in a tumbler or proof-glass. If, on examination, the green color of the juice has become changed to a dirty gray, with still a tinge of green, the proper quantity of bi-sulphite has been used; but should the tint still remain decidedly green, stir in some more, and allow the juice to settle. When the contents of the juice-box have well settled, either by means of a gate or siphon, carefully draw off the clear liquid, as you would a cask of wine, into the clarifier; then thoroughly cleanse the juice-box for another batch, and proceed as before. When operations are on a large scale, a number of juice-boxes will be found desirable.

The clear juice being received in the clarifier, raise the temperature to 60° or 65° Fah. (about milk-warm), and then add some milk of lime, and stir well. The clarification should be rendered as perfect as possible, after which the clear juice should be quickly concentrated, without scorching. The evaporation should be continued until the sirup has a thick, waxy consistence, and should then be set aside in wooden coolers in a warm room, to granulate. After the granulation, it should then be placed in barrels, deep boxes or draining-pots, with holes in their bottoms, and allowed to stand in a warm room to drain off the molasses.

If it is the intention of the farmer to make sugar only, the lower joints of the stalks should alone be used for this purpose. The tops of the stalks can be ground by themselves, and made into sirup. The juice in the lower or most matured portion of the cane contains the largest per cent. of crystallized sugar. If the cane has been cut up after a frost, and several days are permitted to pass before it is ground, this will not be necessary, as all parts of the stalks then become nearly alike.

If the weather is warm, all the vessels for containing the cane-juice should be washed once every 24 hours with a liquid containing one-third of bi-sulphite to two-thirds of water, or else with common lime-water. This is to prevent the juice becoming acidulous; and the reason why the lime should be applied to the juice as soon as it is expressed from the cane, is to prevent a like result, because saccharine fluid is liable to combine almost instantly with oxygen when it is forced out of the cells of the cane. The bi-sulphite of lime is an article manufactured in New Orleans, and used extensively in making sugar from the common cane. When it cannot be obtained, the common milk of lime is used as a substitute, and, although it is not by any means equal to it, still it answers a very good purpose. About a quart of good fresh lime, made into a milky condition with water, will answer for 200 gallons of juice, and it is applied in the manner described for the sulphite.

As the cane-juice is kept boiling during concentration, a dense scum arises to the surface, which must be skimmed off. Some white of eggs added to the juice assists in clarification. For making common sugar, any farmer can proceed with common lime, but he must mix it with the juice as it passes from the crushing-rollers. One reason why such different results are obtained by different persons from cane-juice, is owing to carelessness or a want of knowledge in treating the fresh juice with lime, to prevent fermentation.

BURNING WET TAN BARK.

This subject is treated at some length and quite intelligently by a correspondent of our cotemporary, the *Shoe and Leather Reporter*. It is a very important question to all tanners who employ ground bark; because if it can be burned when in a wet and spent condition, a great encumbrauce is thereby removed from the tan-yard, and converted into fuel. The correspondent referred to says:—

"It is within the recollection of the youngest of our trade, when the first steam-engine was employed to drive the machinery of our tanneries, and then only by a few, peculiarly situated, and by those only at a conceded disadvantage, as compared with water-power. The expense of fuel for running a steam-engine of 30 horse power for 12 hours, will vary according to the construction of the heaters, but from two to three cords of wood are usually consumed, which, at the mere cost of cutting and drawing, under the most favorable circumstances, will not be less than from four to six dollars per day. Not only is this entirely saved, by the present method of burning wet tan, but there are other respects in which a great saving results."

He then describes some apparatuses for burning wet bark in the furnace, which we pass over to reach more important topics, when he again says:—

"It will be remembered that for the first year or two, the tan was burnt under the boilers in the same way as wood or coal, and the only addition required was the new form of grates which were called 'cones.' These were only partially successful. But at this time was introduced 'the oven,' which, no doubt, is the important element of success. This was first introduced in Newark, N. J., to burn sawdust, green leather, shavings, &c., and was used in part to drive a steam-engine in a trunk factory. From seeing this, Mr. J. B. Hoyt and Mr. D. B. Crocket conceived the idea that it would answer their purpose for burning wet tan, and at once ordered one to be put up in connection with the boiler and engine then being put in the 'Woodstock Tannery,' situated at Woodstock, Ulster county, then carried on by Messrs. Hoyt, Bros. This was the first oven in which spent tan was burned, and the first perfectly successful effort to drive an engine by wet spent tan alone. Mr. D. B. Crocket afterwards experimented on this first idea, and very materially improved some of the details of construction, and in connection with Messrs. Hughes & Phillips, machinists, of Newark, N. J., stand to day the representatives of one class of burners known as 'Crocket's ovens,' of the merit and cost of which I shall hereafter have occasion to speak. After the introduction of these ovens, the plan of burning under the boilers was entirely given up in this section of the State; but in western New York, and particularly in and near Buffalo, they still retain the 'cone grate,' and burn as before, but I think to great disadvantage, and with only partial success.

"More recently, say within two or three years, still another form of wet tan-burning has been introduced, differing in some respects from Crocket's. I hear that a Mr. Thompson claims the particular merit of having suggested the improvements. They consist in using brick grates, and in feeding the ovens from the top instead of the front of the arches. The first attempt made with this improvement proved a failure; for the grate bars gave out very soon, and the confined heat otherwise reduced the whole mason-work to a complete ruin in a few weeks. But on further experiment and in other hands the brick grates are said to stand remarkably well, and the whole plan is revived, and is coming into quite general use.

"That by one or both of these systems (if indeed they may be considered different in principle) wet spent tan can be used as a motive power, tanners can no longer doubt."

NEW MANUFACTURE OF GUNPOWDER.

At the recent Cornwall Midsummer Sessions, an application was made on the part of Mr. Thomas Davey, one of the firm of Messrs. Bickford, Smith, & Davey, patent safety-fuse manufacturers, Tuckingmill, for a licence to erect a gunpowder mill and magazine at a place called West Towan, in the parish of Illogan. Mr, Davey, on being asked what were the advantages of the powder he proposed to manufacture, replied, "Perhaps I shall best do this by reading to you the provisional specification:—'The improvements in blasting powder consist—first, in the employment of flour, bran, starch, or other glutinous or starchy matter, to replace a part of the charcoal now employed in the manufacture of powder; second, in a new mode of graining the same. By the substitution of the above-named, the component parts are formed into a paste and are easily combined and grained without danger of explosion.' Gunpowder in present use is manufactured from certain proportions of nitrate of potash, sulphur and charcoal, which, by the dangerous process of trituration, are intimately combined; the mixture is afterwards pressed into cakes, dried and then broken into grains of different sizes, according to the use for which the powder is destined. In our process, instead of grinding the powder, the nitrate of soda or potash is dissolved in sufficient water to make a thick paste of the whole, and it is thus kneaded, to make it homogeneous. It is then rolled into cakes and cut into grains; or, while in a paste pressed through a perforated or wire sieve, with apertures or holes of the size of the grain to be produced. The matter falls on an endless canvas, which is put slowly in motion, and passes on through a drying-room, bearing with it a thin covering of the blasting composition divided in strings or long grains by the sieve, and after being dried, it is passed between two rollers, which break it into grains of a convenient size."

Mr. J. J. Rogers: "Then you consider there is no danger of explosion, the composition being wet?" Mr. Davey: "Not the slightest. We use 30 per cent. of water."

Mr. Rogers: "How do you prevent the coagulation of the wet particles after they have fallen down from the sieve?" Mr. Davey: "By keeping the canvas moving, but should there still be a slight connection between the particles, it is broken on being passed through the wooden rollers, after the composition is dried."

Mr. Reynolds: "What difference is there in the appearance of your powder and the powder manufactured by the old process?" Mr. Davey: "Ours is very like gunpowder-tea in appearance; it has no gloss."

Messrs. Freeman & Sons, the granite contractors, had tried the new powder, and found that it possessed qualities superior to other blasting powder, accomplishing all that was done by the latter at a saving of 37 per cent. in weight.

Captain N. Vivian, of Condurrow, said that he weighed the new powder before testing it, and found that the same quantity in bulk weighed 33 per cent. less. He had six holes bored in very hard granite and charged with powder, putting no more into them than he should have done of the old powder, and in every case it acted satisfactorily. It emitted much less smoke than the old powder, which in blasting a mine was a matter of very great importance. If it were sold at the same price in weight as the old powder, it would, of course, be much cheaper as it was much lighter.

In answer to Mr. Reynolds, Mr. Davey said that the