

**ART. II.—***Process of Manufacturing and Clarifying Sugar from weak or immature Juice, and of obtaining Sugar from Molasses; by Z. KINGSLEY.*

White Oak, St. Mary's, 15th July, 1830.

Sir,—Having read in some liberal systems of economy, that individual knowledge ought to be common stock to which every member of society has an equal right, and believing in this creed, my sentiments are at variance with all secrets and privileges; moreover, being one of your subscribers, and residing in a part of the country where the making of Sugar has now become an object of attention, I am surprised not to have found in any of the numbers of your very useful “*Southern Agriculturist*,” any practical directions

how to proceed in converting the juice of the cane into Sugar, in cases where its want of maturity, or other opposing causes, render its clarification by the ordinary process of lime, inadequate to that object. This local want of practical information in converting weak and unripe juice into Sugar, by defecation, I consider as owing entirely to the shortness of time since the cultivation of that article, and its granulation into Sugar, were looked to as objects of profit in some of our Southern States; for it is now more than twenty-five years since the European chemists, in their experiments upon beet-root juice, discovered that a modification of that process could be applied to cane juice with great advantage. My attention was first drawn to the subject by a conversation I had with the Marquis Lafougere, in St. Augustine, about twelve years ago, from whom I learnt that each process was then practiced in Martinique, and since that time all the subsequent improvements in Sugar-making have been generally diffused through the American Sugar colonies, where they are now in common use, and with which improvements it will be our interest to keep pace.

The present state of my information upon that subject, amounts to what I now communicate to you for publication.

Your most obed't serv't, &c.

Z. KINGSLEY.

*Clarifying and Sugar-boiling processes, from modern Recipes in France, England, and the West-India Colonies, &c.*

After putting the cane juice in the boilers to clarify, pour in for every 100 gallons, the following composition.

1 lb. 4 oz. sulphuric acid, at 66° Beaume, mixed or stirred round in 4 lb. 4 oz. of cold water, then agitate strongly the cane juice in the clarifying boiler. This mixture being well done, there must be added 2 lbs. lime, weighed when quick before it is slacked, but afterwards slacked and converted into a *soup* (Boullie.) After having again agitated the liquor in the boiler, light the fire in the furnace; the liquid having arrived 75° Reaumur, put in half a gallon skimmed milk, or, what is far better, half a gallon of bullock's blood, free from smell, mixed up with an equal quantity of cold water, well beat up together; then strongly stir or agitate on purpose to mix all well up together. Operating thus in the cla-

rifier, it comes to pass that the two deposits (occasioned, the one by the action of the sulphuric acid, the other by the lime,) form only one; the operation is now simplified, and in the evaporating boiler you have only to concentrate sufficiently the cane juice.

The skimmings obtained in this operation of clarifying, are thrown upon a pretty thick filtering cloth; afterwards closed up in bags also of strong cloth, and are passed under a press for this purpose, to press out the sweetened water which they might still retain.

It is well proved that an excess of lime causes the Sugar to undergo considerable alterations, and to be secure from the losses which its presence occasions; it is found that the surest means is to neutralize it by sulphuric acid, with which it forms an insoluble compound, but you must be careful never to use acid in excess, for that would be much more hurtful to the sugar than an excess of lime, for instead of favouring the crystalization, it would destroy it. So that one can only employ the exact quantity, and always ascertain if the saturation is complete, by a very simple method, which is to dip in the saturated juice a small piece of blue paper; which if there is an excess of acid will immediately become red; if on the contrary, there is an excess of lime, it will be as easily detected by dipping a piece of yellow paper in it, which the alkali causes to become red, even with some drops of syrup of violets the excess of lime is equally proved, when it becomes of a green colour.

One essential observation with regard to syrup taken out of the evaporating boiler, is, that it ought to weigh 23 to 29° of Beaume's hydrometer.

The sugar-boiler being filled to within four or five inches, and coming to boil, produces a white scum which must be taken off by a skimmer, afterwards push the fire briskly until Reaumer's thermometer indicates 87°, then it becomes prudent to be more careful with the fire, for the nearer the Sugar approaches to its boiling point, the more it is exposed to the risk of burning or sticking to the bottom of the boiler. If during the operation of boiling, the syrup rises too near the top, throw in a lump of butter about the size of an almond, which will have the immediate effect of reducing it.

The Sugar is boiled to perfection when the liquor reaches 90° Reaumur. It should then be taken off immediately.

*How to derive great benefit from the Molasses drained from Brown Sugar.*—As soon as the Molasses is mostly drained from the Sugar, put it into the clarifying-boiler, filling it about one third full, then fill up with water, which being well mixed up, and heated to 60°, it ought to weigh 28 or 29° Ariometrique Beaumé, then add to every hundred gallons 2 oz. sulphate of magnesia,  $\frac{1}{4}$  gallon of bullock's blood dissolved in cold water, or if you cannot get blood put in the same quantity of skimmed milk; a good quantity of milk of lime also well dissolved; afterwards stir all together with a wooden mover purposely to effect a complete mixture: as soon as this liquid in the boiler marks 70° Reaumur, add 4 lb. of animal charcoal in fine powder, or should that be wanting take 5lb. of vegetable charcoal (the first is by far the best) taking great care to agitate it with the wooden mover, for fear it should fix itself or form a deposit on the bottom of the boiler—immediately after the liquor or molasses mounts in the boiler, throw in  $\frac{1}{8}$  gallon of bullock's blood, or as much milk dissolved in water and got ready before hand; then the boiling lowers itself, taking care not to urge the fire; some minutes afterwards the boiling recommences, and mounts up, then the clarification is finished.

Then there is a large wooden case in which a cloth pocket is fixed, into which pour the clarified liquor contained in the clariner, taking care to draw off clear until the animal or vegetable charcoal is fixed to the bottom of the pouch, when no more runs through. The syrup or clarified liquor having passed through the linen or cloth pouch, it is conveyed into the boiler; then proceed the same as in boiling Sugar, except that it must be carried to 91 $\frac{1}{2}$  Reaumur, and done or boiled with a more moderate fire towards the last, and when the Sugar is at proof, always open the door of the furnace. By this process one is always sure of obtaining from 40 to 45 lbs. of good Brown Sugar for every 100 lbs. of Molasses.

Molasses mixed with one sixth part pure water, may be boiled without being clarified, as is explained before, but in this case the Sugar produced from it is red, with poorer crystals, and in smaller quantity, that is to say instead of 40 to 45 lbs. it will only yield from 30 to 35 lbs. Sugar.

*Recipes translated from the French.*—Put a double handfull of clay of the consistence of paste, with an equal quan-

tity of sifted charcoal dust, to make a paste of; then fill up the pail with strong clear lime-water, so as to make it about the full thickness of cream, and put it into the boiler at  $81^{\circ}$  to  $83^{\circ}$  Reaumur, in proportion to the quantity of 1000 lbs. sugar, and let it boil five minutes; the Sugar will become quite clear, and when the Molasses is drained off will be very white,

*Recipe*— $\frac{1}{2}$  oz. sal amoniac dissolved in the proportion to 200 lbs. Sugar, put into the cooler, will prevent froth and promote granulation.

The above two Recipes are from memoranda of the Manufacturers at Paris, of an old date.