EXPERIMENTS IN THE MANUFACTURE OF CORN-STALK SUGAR.

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Our readers have been already informed, that a premium of $100 was awarded by the State Agricultural Society to Marcus Adams, of this County, for experiments in the manufacture of sugar from corn-stalks. This subject is of so much general interest, that we copy from the recent vol. of Transactions, with slight abridgement, Mr. Adams' full report of his experiments, with the important suggestions and inferences deduced therefrom :-

RAISING THE CORN.—One acre of ground was selected of a sandy loam, cultivated last year to ruta-baga; this was manured with thirty loads of the best stable manure, well mixed in the soil by ploughing and harrowing. Corn planted the 13th of May, with eight-rowed northern corn; the rows three feet apart one way, and hills eighteen inches the other, with from six to eight kernals in a hill. Corn came up fine and was plastered the 31st May; hoed the first time the 9th and 10th of June, the second time 24th June. Cultivator run through it three times. The corn began to tassel the 18th of July, and was in full tassel the first of August.

Up to this time the crop had looked uncommonly well, but from the first of August a severe drought commenced, and continued until the crop was very materially injured. Some spots where the corn had grown more luxuriantly, withered and dried up; other parts of the field suffered less, so that on the whole there was something more than half of a good crop, or what there would have been if the season had continued favorable.

CUTTING, GRINDING AND BOILING.—Cut the first stalks, and made the first experiment at grinding and boiling, the 25th of August. The stalks at this time were quite green, but the produce was quite satisfactory, and appeared quite favorable for crystalising. The juice was very abundant, of a greenish colour, very rich thick and heavy, yet retaining all the flavor of the corn stalk, until after cleansing and boiling.

August 30th, made the second batch. This was boiled in a shallow sheet-iron pan, clarified and strained according to the directions given in Mr. Ellsworth's report. From this batch was taken the specimen of sugar exhibited to the Committee at the State Fair in Rochester.

Other experiments were made the 4th and 7th of September.

The object of these successive experiments was mainly to determine at what time the saccharine matter was sufficiently matured to make crystalized sugar.

On the 11th September the stalks appeared in the right stage, and cutting, grinding and boiling commenced, and continued with little intermission untill the whole was completed. The method pursued in this operation, was to keep a sufficient number of hands in the field to strip the leaves or blades, and cut off the tops as fast as the stocks were wanted for use; this labor was generally performed by boys. The corn-field being at a little distance from the mill, the horse used for grinding was put before a light waggon, driven to the field, the stalks were then cut and placed upon the waggon, (taking care to keep them straight and in order,) driven to the mill and ground without delay. A load of this kind in a light waggon, with lumber box, will make a batch of from fifteen to twenty gallons; this would be ground in about thirty minutes. Lime water was mixed with the juice while it was running from the mill. The juice is then strained through a flannel cloth into a pan, and heated, rather moderately, to the boiling point. when the scum is removed with skimmer, then boiled rapidly for a few minutes. The syrup is then removed from the fire, and again passed through the flannel strainer, when the boiling is finished as rapidly as possible.

This process from the cutting of the stalk to taking the sugar from the fire, could not possibly be performed in less than two hours; and if the batch was larger, would often exceed three. Five batches were made in one day, from which one hundred pounds of sugar were produced.

THE BOILER.—The boiler or pan, I made of a sheet of Russian Iron, turned up at the sides and ends, lapped and rivetted at the corners, would hold about twenty-five gallons, five and a half inches deep, but from fifteen to twenty gallons is as much as would boil to advantage. This pan is placed upon an arch of brick, so that the fire comes in contact with only the bottom.

MILL.—To construct this was a matter of much more difficulty. Some drawings and descriptions are given by Mr. Ellsworth, but little more could be known from them than that there must be three rollers, so placed and put in motion that the stalks in passing between them should receive two crushings.

To plan and construct a mill with the proper dimensions and with the strength required, so that the work of crushing the stalks should be performed with certainty and despatch, was no easy task. I flatter myself that I have in this been tolerably successful. The rollers and iron work, patterns, &c., for my mill, were made by A. J. Langworthy, of Rochester, at a cost of $65. The whole weight of iron is about nine hundred pounds.

About one half of the mill is in the horse power. The iron rollers being placed horizontal, it was necessary to have a horse power wheel and gearing in order to give them motion. If the more simple, and it would seem at first view, less expensive forms, given in Mr. Ellsworth's report had been adopted, placing the rollers perpendicular the horse passing around them, the rollers must have been of large diameter in order to take through the length of a corn stalk at one revolution of the horse. These large rollers, when made of iron, would have been very expensive, and probably not work as fast as the small ones I use, giving them a quicker motion by gearing. In my mill the circumference of the rollers has such a proportion to their motion that their velocity is equal to about one-sixth the velocity of the horse; or in other words, a corn stalk six feet long, will pass through between the rollers in the same time that the horse will walk thirty-six feet. The grinding is a beautiful operation, the amount of juice contained in the stalk is surprising to every one. The stalks in passing through the mill are crushed very fine, and the juice entirely separated from them by the pressure of the rollers.

CLARIFYING.—This has been to me a difficult and to some extent an unsuccessful operation. All the various methods recommended by different persons who have made some experiments on corn-stalks sugar, and all that my own experience in clarifying maple sugar could suggest, failed of producing fully the desired effect. In all the failures which have been experienced to produce crystalized sugar, the cause should be sought here. Unless the juice of corn-stalks can be clarified, it is vain to expect a pure article of crystalized sugar. All the obstacles to the complete success of this enterprise are met at this point; but that they will