In reply to Mr. Foster who asked about a detail of the equipment, Dr. Doss replied that the sample was contained in a tube having a bore of 3 mm. The whole sample container was very small and would come to temperature equilibrium with the containing bath in about 10 minutes.

Dr. Doss pointed out that the accuracy of the conductivity method was limited by the fact that the curves for the conditions above and below the saturation temperature intersected at a small angle. He went on to mention that useful supplementary information could be derived from studies of the conductivity curves for isothermal conditions over the period necessary for equilibrium to be established between the solid and liquid phases.

In the absence of the author, Dr. J. L. Clayton presented the following paper.

Paper

INTRODUCTION OF THE TRIPLE SEED SYSTEM TO A SUGAR FACTORY - FOR THE PRODUCTION OF RAW SUGAR FOR REFINING PURPOSES

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Ingenio del Mante, S. G. L., C. Mante, Tams

The manufacture of a good quality raw sugar at the least possible cost is, undoubtedly, a fundamental matter for a refined sugar factory producing its own raw sugar. The possibility of obtaining a raw sugar formed by large, low coloured crystals, that drain well and may be washed with little water, circumstances that may reduce the costs of refining and all the problems brought by low quality raws, made the Ingenio del Mante adopt the system which we have called of “Triple Seed”, in the operation of its boiling house.

This system is basically the same one called “double einwurf” mentioned in paragraph 296 of the 2nd edition of Oliver Lyle’s “Technology for Sugar Refinery Workers”. It was found logical and easy to be applied and thought it might solve the old problem existent of lack of the equipment necessary to effect the double purging of the raw that passes to the refinery, which problem had become acute because of the official requirements for an improvement of the quality of the sugar produced in the country.

The system, in brief, is the following: Unwashed sugar coming from “C” strike or Third, is used, conveniently prepared as seed grain to form “B” strike or Second, and, at its time, the unwashed sugar from “B” strike is used as grain seed to form “A” strike or First. The sugar from this last strike, well washed, is the raw sugar passing to the refinery.

This system has been applied at the Ingenio del Mante (El Mante Sugar Factory) in the following way:

“C” strike is made, following Gillett’s method for the preparation of strike footings using extra fine sugar powder as seed grain. This is introduced to the vacuum pan as magma, mingled with a saturated sugar solution.
In our case the quantity of sugar powder introduced is approximately seven kilograms and with these we form a grain strike of 75 to 78 apparent purity, using "A" washes and syrup. This strike gives footings for three "C" massecuites totalling about 3800 cu. ft. The part not used immediately from this grain strike, is passed to a grain container where it remains until needed. "C" strike is followed on each of these footings exclusively with "B" molasses. When finishing this strike it is discharged into an open crystallizer provided with stirring blades and water cooling-heating stationary coils.

Because of its relation to this matter, the form of controlling the centrifugal work for "C" strikes run into the crystallizers is herein mentioned. Former to the present arrangement the only factor taken into consideration for passing "C" strike to the centrifugals, was the time of permanence in the crystallizers. In other words, the crystallizers were rigorously centrifuged in the order they had been filled. Taking into account that curing time is not the only important factor in the exhaustion of a "C" strike in the crystallizer and that instead it is of the maximum importance to centrifuge the strike producing in a given moment, the lowest purity final molasses among all the available strikes, the following way of control has been used.

We take from eight to ten samples from a relative number of crystallizers and send them to the laboratory every eight hours. There, by means of a small centrifugal, the molasses of each crystallizer is separated, analyzing by purity. The analysis determines which is the crystallizer whose strike, must be centrifuged because of having the lowest purity in the whole lot. A record of these analyses and the exhaustion history of each "C" strike are registered in a note book. Most of the times the strikes with more time in the crystallizers are the ones that logically appear with molasses of lower purities, however, the influence of viscosity, temperature, density, size and number of crystals is big in the exhaustion velocity and only in the way mentioned can these factors be taken into consideration, the arrangement allows the strikes more curing time for the strikes of lower exhaustion velocity in benefit of the factory's efficiency.

Continuing with the Triple Seed System, the unwashed "C" sugar is mingled with "A" washes and the resultant magma is deposited in a storage crystallizer provided with an agitator, from which the footings to make "B" strikes are taken. This, at its time, is made with the mentioned footing and finished with "A" molasses. It is passed from the vacuum pan to the crystallizer where it stays a little time before passing to the centrifugals.

The unwashed "B" sugar is mingled with syrup and the magma is passed to a storage crystallizer also provided with an agitator from where the footings to make "A" strikes are taken. These strikes are almost exclusively made with syrup and occasionally also carry "A" washes. The sugar from this "A" strike, well washed, passes to the refinery and is characterized because of its being formed by large crystals.
The attached drawing shows schematically the use of the mentioned system at the Ingenio del Mante.

The proven results in four consecutive crops show that this arrangement is superior to the one formerly used, consisting in crystallizing syrup and "A"
washes to obtain the footings, both for “C” and “B” strikes. These results may be simply resumed as follows:

1. No recirculation of molasses. This improves the factory efficiency and saves calories.

2. Graining is avoided, all strikes are made on seed grain. Consequently there is a better control in the operation of vacuum pans and an increase in the equipment’s capacity.

3. The raw sugar passing to the refinery is well purged and washed, as the crystals are always of a good size. Among other advantages, we achieve mainly savings in active carbon and filter-aid, obtaining a sensible increase in the refinery’s filtering capacity and an improvement in the quality of the product.

DISCUSSION

The Chairman commented that the triple seed system was an unusual one as far as the Indian Industry was concerned. As regards the suggestions that “C” strikes be not centrifuged in the order in which they were produced, but rather having regard to which had the lower purity, the Chairman said it would be better to obtain consistent results from each strike for exercising care during the boiling process.

Session II—Wednesday, 1st February, 11-15 A.M.

Dr. H.W. Kerr, Chairman