

# Report of Committee on Training of Sugar House Apprentices

The following Committee was appointed by the General Committee to investigate and report upon the training of Apprentices for Sugar House work :—

- B. M. Narbeth (Principal, Natal Technical College.)  
 B. J. W. Pearce (General Manager, Gledhow Sugar Estates.)  
 G. S. Moberly (Supervising Technologist, S.A.C.G.A.)  
 H. H. Dodds (Director, S.A.S.A. Experiment Station),  
*Convenor.*

Five meetings were held, usually with a full attendance.

In attempting to define the term 'Sugar House Apprentices,' it became apparent that this term was a misnomer, as a large number of youths were engaged as learners in various departments of the industry, but except in the case of learners in the mechanical shops, there was usually no legal term of apprenticeship. It was felt that there was a very urgent need for a properly organised scheme of training for all these youths to fit them to occupy eventually, the higher positions in the industry, and to prevent the employment ending in a blind alley. The problem was further complicated by the employment of a large number of youths as cane testers and weigh-bridge checkers by the S.A. Cane Growers' Association, and the necessity of finding openings for these youths after they had served in these subordinate positions.

With a view of finding out the prospects of absorbing these men into the industry, a questionnaire was addressed to all millers asking for their views. From the replies received, the prospects of absorbing all these men does not appear at present to be very hopeful, but there seems to be a general opinion that there might be considerable scope for openings in field work for young men with experience of farm work and the handling of native labour. It is hoped that it will be possible to induce millers, when making new appointments, to draw on the reserve of young men who have already entered the industry, rather than to bring in new and inexperienced men from elsewhere.

In the past, courses were provided by the Technical College for sugar employees during the non-crushing season, but during later years, attendance had dwindled and these courses had been discontinued. Since then, the S. A. Cane Growers' Association had arranged to provide a course of instruction for its employees, and it was felt that this provided an opportunity to start such a course open to all employees in the industry. It was decided that this course should be made to cover a number of years progressively, and that it should lead eventually to the granting of scholarships tenable abroad to picked students. It was realised, however, that at present, no funds are available for the latter suggestion, but it is hoped that the various Associations which control the destinies of the Sugar Industry, may be induced to see the great benefits which would result from such a scheme, and that they may be induced to make grants

which would render this possible. In this connection it was pointed out that the Queensland Industry has provided three travelling scholarships, which enable picked men to visit all the principal sugar producing countries in the world.

With the co-operation of the Natal Technical College, the proposed course was inaugurated this year. It is designed to cover a period of four years, the students of each year being divided into two grades according to educational qualifications. Arrangements were made for one term of four months each year, during the months of January, February, March and April. For the first year the S.A. Cane Growers' Association provided the services of two fully paid lecturers. The remainder of the staff was provided by the Natal Technical College, who also provided all lecture rooms, equipment, etc.

The first term started on January 4th, 1928, with 45 students, of whom, 33 were employees of the South African Cane Growers Association, and 12 were employees of the manufacturing companies. The syllabus included the following subjects :—

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| Mathematics      | Chemistry                                     |
| Physics          | Agriculture                                   |
| Sugar Technology | Accounting and Costing<br>in the Sugar House. |

Owing to the difficulty of finding a lecturer for the last subject, this had to be dropped, and the following two subjects were substituted :—

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| Sugar House Machinery | Laboratory Records |
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The work has been carried on in close co-operation with the Committee, who have inspected the classes at work, and satisfied themselves of the adequacy of the instruction being given.

A certain amount of difficulty has been found to arise from the very varied degrees of preliminary educational grounding possessed by different students, but this has to a certain extent, been overcome, by dividing the classes into two groups. The course is at present proceeding very satisfactorily, and the Committee feel that at last, a very definite step has been taken towards providing proper training for sugar factory employees.

It is hoped that the work will have the full support of the whole Sugar Industry, and that eventually the necessary funds will be forthcoming to provide continuation scholarships for those students who show themselves capable of benefiting from such assistance.

In conclusion, the Committee would like to record their appreciation of the substantial assistance of the Natal Technical College in starting this important work.

Chairman : I would like to say how much I welcome the presence here of so many of our students and cane employees who are referred to in this report ; it is on them that the future of the industry in this country from a technological standpoint depends, and it is they who will have to carry on the scientific work of the industry in the days to come.

## DISCUSSION ON VARIOUS PAPERS.

Mr. Foster : I would like to raise the point of determination of sucrose in bagasse. Compared with other methods I consistently obtained lower results by the standard method. I don't think it can be attributed to the coarseness of the bagasse. I think to overcome the difficulty, if we could design some standard means of disintegrating the bagasse and have a standard boiling, we could all have comparable results. At present a mill equipped with a shredder will naturally extract the sucrose far more readily than a mill with only crushers.

Chairman : The Committee in going into this matter, thought that the period specified for boiling hardly seemed sufficient in all cases, and it was decided that the necessary time for boiling should be determined and modified accordingly. But the dangers of overboiling were pointed out at the time, of extracting dextro-rotatory substances which were not sugar.

Mr. Foster : At what point does that occur, that is the whole difficulty? The test is really negated by that. The difference I found in boiling in our old extractors was approximately .6 over a series of samples.

Mr. Bechard : On what authority was the time limit of thirty minutes arrived at?

Chairman : I think it was the general experience of the committee, which was confirmed by the Experiment Station, that thirty minutes was sufficient. Other experiments were carried out at one or two of the factories and that appeared to be the universal experience ; that was for ordinary bagasse as received from the factory.

Dr. Hedley : I am afraid I can't confirm the contradictory results. We tried both the old and the new method at Felixton on several occasions and we got quite concordant results. I think Amatikulu got the same.

Chairman : That has been our experience at the Experiment Station. We found that using the new apparatus both with the cover and without, we got no appreciable difference in the tests:

Mr. Bijoux : We have found that by extending the time to forty minutes, constant results are obtained.

Mr. Bechard : On the determination of individual sucrose by means of the Java ratio, it seems that the Java ratio is not really such a good figure as it was thought to be at the beginning. Would it not be possible for the committee to go further into this determination of sucrose in cane with probably the use of a different figure? We have in the report of the Committee on Fibre determination a suggestion about this figure. It would be possible perhaps, to adopt the Australian figure, taking into consideration the normal juice content of the cane and the normal juice ratio. On the face of it, it seems pretty absurd. If we analyse the Java ratio, it boils down to this, that the Java ratio is normal juice factor  $\times$  by the normal juice % cane divided by 100. As the normal juice content of cane is found to be different with different fibre content, the normal juice ratio is apt to vary very considerably. To be able to meet those variations, we should have a steady Java ratio if there is such a thing. Probably we will not be able to alter any method at the present time, but later on if any provision was made and work carried out on the matter, perhaps we would find out some better method of determination of sucrose percentage.

Chairman : Certainly our experience of the last season

appears to indicate that the method of using the Java ratio for determination of sucrose in cane is open to objection. The subject no doubt will have to be discussed by the Committee. There are one or two other figures which we included in the standard report forms, some of them just to see how they would work out in this country. I refer to such figures as the tonnage ratio for example, extraction ratio, etc. These figures have been followed from the experience of other countries who found them to be of value, and we decided to give them a trial in our conditions. There are a good many mills who have reported them regularly and others have not done so. We have not yet taken them into account in the annual summary, until we get a little more experience of them, but it would be of interest to have any opinions that have been formed regarding these data from those who have been compiling and working with them. It was pointed out to me, for example, by one engineer, that our tonnage ratio takes no account of the diameter of the rollers but only the length, and he considers that it is lacking in that respect.

Mr. Bechard : There is another figure, and that is the definition of the normal juice (reads from annual report). Would it not be better if instead of having this figure made in such a loose form, you put it on a more definite basis? You could very easily calculate the purity of the juice of the cane. That would be the sucrose % cane divided by Brix % cane multiplied by 100. That would be a very much better definition of the purity of the normal juice.

Chairman : We can make a note of that suggestion which is essentially a matter for the committee on standardisation of chemical control to discuss. We would like to have the remarks of any other member concerning it.

Mr. Bechard : Also the Brix of the normal juice could be ascertained in a better manner. I think that the normal juice figure is a very much more important figure than is taken at present. We are finding it extremely difficult, especially in the committee on fibre determination, to have any corroborative figure for the reason that the normal juice figure is more or less guessed at in the past and we have no definite figure. Taking the past figures, we have nowhere to commence.

Chairman : After all, the normal juice is merely an ideal conception. It does not represent an actual separately existing substance, but it is merely a conventional expression which has been found convenient in sugar house calculations.

Mr. Moberly : In future, with this determination of fibre, it is going to be a very important question, and in our paper we consider the normal juice to be the cane minus the fibre ; we then want to be able to determine the Brix and purity of such juice.

Chairman : In view of the recommendation of the committee, it will become of much more importance than in the past and will have to be reconsidered.

Mr. Dymond : What is the method of determining fibre in Australia?

Chairman : I have often wondered that myself. The C.C.S. formula which is used in Australia for the valuation of cane involves the determination of fibre, I have never learned how fibre is determined in Australia.

Mr. Bechard : So far as I can make out from the literature, the fibre is determined directly on the cane and some standard figures are taken out in different fields or

for different times of the year. But the problem in this country is different from Australia.

Mr. Dymond : I think it is not so much the question of trash as the burning. Burning affects the fibre in cane far more than trash.

Chairman : I think we ought to write to Queensland to ask for information on the matter direct.

Mr. Bechard : Another factor that is closely related to that, is the question of determination of bagasse. The general procedure is to determine the bagasse by difference. In other words, everything that is lost, losses by evaporation, or conversely the increase in weight by rain,

etc., is included in the bagasse. This figure is going to become very important indeed, when we come to the question of fibre. Personally, I think there is only one solution to that, and that is weighing the bagasse.

Chairman : It is rather a formidable matter to weigh the bagasse in the mills.

Mr. Bechard : It is done in some other countries. Of course some of the suggestions, bringing the weighbridge nearer the carrier, etc., will probably compensate for the difference. At the same time there is quite a lot of wastage.

At 12.45 p.m. the Conference adjourned to 2.15 p.m.