COMMITTEE ON BOILERS AND BOILER PRACTICE.

Dr. HEDLEY: The Committee on Boilers and Boiler Practice met this last season several times and we discussed quite a number of questions and we did quite a bit of work which does not appear in this report. Among other things we spent nearly £250 in the purchase of the requisite instruments for testing the efficiency of the boilers at the Sugar Mills, and we should like the mills to utilise this first experiment which the Millers have made possible,—utilise it to the fullest capacity. It is not necessary at this stage to emphasise the necessity for a complete log of a boiler. The Engineers know so thoroughly the value of costing out the supply of water and fuel from actual measurements of these services and then the resulting steam. By means of this you can get a line upon the efficiency work of your boilers which it is impossible to get unless such a thing is done. I am sure I am giving away no secrets when I say that this has been done by the Natal Estates in the past season or two, and I am assured by Mr. Campbell himself that it has been worth while spending the money on the instruments and the employment of a man to do this work. I was connected, before I fell upon the sweet days of sugar, with an industry which did this in every department. Everything was measured out to the last drop, and from the measurements department costs made out, and when the War broke out the Managing Director of that concern was cabled for by the War Office to go Home, and he made the explosives of England. He was more responsible for that than any other man. That man's methods were published as blue books by the British Government in, I think, eight or ten books at the conclusion of the war. The efficiency methods which he introduced into the factories in Old England, which thought they knew all about how to make explosives, came from South Africa. Those things have got to come in the Sugar Industry before we get a thorough knowledge of which department is doing its work properly. Now there would have been a much more lengthy paper had Mr. Pat Murray not had to go Home. He was the convenor of this Committee and he went Home in rather a rush and did not get this little note written out before he went. I will now read it.

During the past year, 1931, this Committee have to report considerable progress. The Association were granted funds to purchase instruments to enable tests to be taken on the boiler plants at the various estates. This will enable the factories to get accurate data and generally improve the boiler operation, which is of considerable importance in view of the new canes now being developed which have a lower fibre content than the Uba variety.

The Committee greatly deplore that an engineer representative was not sent to the International Conference at Porto Rico. A most important opportunity was missed in not having an engineer there to collect data and study furnaces for the general good, especially in view of the fact that in a short time the mills will have to deal with the soft canes which the Experiment Station has distributed. This will mean a reduction of from 4 to 5 per cent. in the fibre available as a fuel.

New types of furnaces have been installed at Empangeni, Amatikulu, Felixton and Doornkop of the flat hearth type, and these have given encouraging results. These factories installed steam meters and other control gear. They have given high steaming rates and 7½ lbs. evaporation per square foot has been observed over long periods, and much greater rates for shorter periods.

The old steaming rate was 2½ to 3½ lbs. per square foot, so it will be seen what an advance these new steaming rates represent. Instead of adding more boilers to increase capacity, it will pay most factories to attend to their furnaces. These new furnaces have shown temperatures up to 2,250° F., which can be compared with 1,450 to 1,600° F. in step grate furnaces.

One lot of B. & W. boilers with flat grate furnace showed temperatures about 1,900° F. and an evaporation rate of round about 4½ lbs. per square foot of heating surface, which is the best observed for the older type of furnace.

We are of the opinion that flat grate furnaces are better than step grate, but Natal Estates are installing an improved step grate furnace with tuyeres, and its performance will be awaited with interest.

The flat hearth furnaces were designed for a steaming rate of about 5 lbs. per square foot, and when operated at the larger rating of 7½ lbs. there were considerable smuts, the volume of the furnace being too small for this rating. The volumes given in previous reports were about right, but with these larger ratings other volumes must be increased proportionately. It is not to be thought that with the higher furnace temperature there would be higher flue gas temperatures, as it was observed that this did not exceed 600° F.

With the heavier milling of the cane the bagasse is now approaching the state of dust, and furnaces must develop on the lines of coal dust furnaces with water walls, then we may expect not the ordinary boiler as we have on the sugar estates, but the steam generator type of very high efficiency such as has just been installed at Congella.

With these improved rates, greater care must be taken of the boiler feed water, and more intelligent operators employed to look after the plant.

Furnaces must be constructed of the best class of materials to stand the high temperatures, also the arches should be of flat suspended type, although excellent results can be obtained by the ordinary arch if perfectly designed. Flat hearth furnaces are no use for coal or molasses burning, and a combination of the flat hearth and flat grate is the best, where extra fuel is required.

In a great many factories the boilers are blamed for steam shortage, when the boiling-house is the cause of the trouble, thus the pan operators using an excess of live steam.

When there is an excess of exhaust steam the prime should be examined for leakage.

A steam meter is a necessary instrument which, besides giving the boiler output, can indicate the steam consumption of any unit by shutting down the unit, noting the reading, and starting it up again and noting the reading.

Such figures will open the eyes of many managers and engineers to the steam "eaters" and make them wary when installing new units, to see that they are economical. Too much attention has been paid to price in the past, and not enough to the efficiency of the unit. Some machines are dear at any price.

We hope by next season, with the aid of the instruments, to give more detailed information, but we are pleased to say this section is moving rapidly to a high grade efficiency.

THE COMMITTEE ON BOILERS AND BOILER PRACTICE.

P. MURRAY (Convenor).
G. WILSON.
E. CAMDEN-SMITH.
J. R. SIMPSON.
J. C. BIHL.
E. P. HEDLEY.

Dr. HEDLEY, at the request of the Chairman, gave an outline of the instruments which had been obtained for boiler testing. Continuing, he said:— I want to draw attention to this fact. Most of the Mills have stated that they would like to use these instruments in the coming season. It will therefore be necessary for us to know, and for you to know, what alterations you have got to make to your feed lines in order to use these instruments, and we propose to have a Boiler Committee meeting as soon as possible after this Congress so that we can tell you what alterations you will have to make to your feed lines if you are going to use them. We are particularly desirous of doing good work this year because it is the first time that the Millers have voted a sum of money for experiments like this and we earnestly hope and ask for the co-operation of the Managers and Engineers of mills in making a success of this year's experiments. As soon as practicable we will let you know what we suggest and we hope that you will make all the efforts you can to prepare for these tests.

Mr. STODDART: I would like to draw attention to the third paragraph in this paper. It says "They have given high steaming rates and 7½lbs. evaporation per square foot has been observed." That figure is on the extremely high side.

Dr. HEDLEY: I know, but I should like to say that I have seen in Mr. P. Murray's office "electro-flo" records, which show that the figure has actually been touched and maintained for a short period.

CHAIRMAN: Another paragraph on the optimistic side is the statement that bagasse is now approaching the state of dust. We would like to see it approaching that state but I think we have still got to go a long way before we can deal with bagasse as dust fuel.

Dr. HEDLEY: We are certainly approaching a very finely divided bagasse which, as the engineers know, has been very difficult to burn. It has given a great deal of trouble, as the finer the bagasse gets, the more trouble it is to burn.

Mr. SIMPSON: I think Mr. Stoddart is quite right when he states that the figure is a little on the high side. I think that is what we would like to think we would get, but it is really on the very high side. So far as the fineness of bagasse is concerned, we did find a lot of trouble in burning fine bagasse, but that has been overcome now by these up-to-date furnaces we have.

Dr. HEDLEY: Mr. Watson says that while he has not found 7½lbs. per square foot evaporation he says that the Cooks furnace is an excellent furnace for burning this fine bagasse when you have balanced draught. I daresay that is also Mr. Simpson's experience.

CHAIRMAN: Mr. Watson has asked me to say, in reference to the second paragraph of this paper, that he very much regrets he was not able to go to Porto Rico to represent us there. He was the member chosen as Engineer representative, but unfortunately private circumstances entirely prevented him from going. I am sure it is not only his loss but our loss as well. (Hear, hear.)