## DISCUSSION.

Mr. Walter Reeks said he had very much pleasure in proposing a hearty vote of thanks to Mr. Kidd, and he felt sure that the paper would prove a valuable addition to the proceedings.

Mr. R. J. Vincent expressed great pleasure in seconding the vote of thanks, and said he had listened to the paper with a great deal of interest. The subject was one that could not be discussed too freely amongst engineers. He would like to ask Mr. Kidd what was the final temperature of the waste gases?

Mr. R. R. Ferrier said he wished to add a few words to express the pleasure he had had in listening to the paper, and, although he understood the author's reasons for not quoting the figures obtained in the trials, he would ask him whether he would be prepared to discuss, privately, the results obtained?

Mr. A. G. McDonald asked whether the control of the air supply over the fire was left to the discretion of the firemen?

Mr. H. R. Forbes Mackay said that the practical nature of the paper should prove of great assistance to operating engineers. He would like the author to make it clear where the $CO_2$ recorder was placed in relation to the boiler flues.

Mr. James Shirra expressed the pleasure he had derived from the reading of the paper and said he was particularly interested in the author's remarks about the success of the rubber buckets used in the feed pumps, and said that it also gave him pleasure to notice the author's remark that locally-made firebricks had been found very suitable for furnace work.

Mr. G. N. Tregarthen also joined in the discussion.

Mr. James Kidd, in reply to the discussion, said he had to thank the gentlemen who had joined in it for the kind way in which they had received his notes, and he replied to the various questions as follows:—

To Mr. Vincent's question regarding the temperature of waste gases, he would say that he aimed to get the tem-

perature down to 300deg. Fah., and, as to the loss of draught in the chimney due to this low temperature, some readings were taken only a few weeks ago, when the temperature in the base of the chimney was found to average 325deg., whilst the draught was 7-8th inch. It is to remembered, of course, that the installation is worked under forced draught conditions.

To Mr. Ferrier's question as to whether he would be prepared to discuss the results of the trials privately, he would say yes.

To Mr. McDonald he would say that it was endeavoured to arrange that a definite quantity of air be admitted according to the particular rate of working. He did not think it would be safe to leave this most important adjustment to the fireman in charge.

With regard to Mr. Forbes Mackay's question, the $CO_2$ recorder is placed at the end of the main flue, so that the samples obtained are representative of the mixed gases from the whole of the boilers. Fittings were in place to allow of connecting the instrument to any one boiler in about five minutes' time.

As to Mr. Shirra's remarks about the pumping of such hot water as they had to handle, he could assure members that a great deal of difficulty was encountered at first, but that now, with the use of rubber buckets, the trouble was overcome, and the water was often pumped into the boilers at a temperature of 20 degrees above that of the boilers themselves. He could quote one instance of a pump in which the brass plunger rings had only lasted two weeks, whereas rubber buckets had lasted six months.