

DISCUSSION.

The President said when he asked Mr. Saunders to read a paper he told me he could not, but the members will all agree with me that it was a delusion on his part, because his paper has been of the greatest interest to us. He was personally familiar with much of the information, and the plants in Kalgoorlie, which Mr. Saunders described, and he appreciated the difficulties the engineers there had to contend with, particularly with regard to the aerial condensers which Mr. Saunders refers to as being constructed of galvanized iron. Hundreds of these were in use, and were practically the sole source of supply. They were used on sufferance. The life of the plant did not, as a rule, exceed one season, and by the time the next warm season came round another plant was required. It was only on the advent of the water scheme that they were abandoned.

Mr. Kidd remarked that before proposing a vote of thanks to Mr. Saunders, he would like to ask him one or two questions. Is it to be understood that the aerial condensers are just for conserving water? They do not carry any vacuum?

Mr. Saunders: None whatever. In this respect the competition for the supply of the condensers was very keen, and perhaps one plumber would put up a plant of considerably lighter gauge. One or two plants that were so constructed had the misfortune to be struck by a heavy thunderstorm, with the result that the condensers collapsed.

Mr. Kidd: Mr. Saunders mentioned a figure of .72 cubic ft. capacity of steam per square ft. of cooling surface. What is the ratio of the capacity of the air pump and the steam condenser? In the class of condensation the speaker was most familiar with, it is nearly all jet condensing, and with a jet condenser the solution goes into it. Mr. Saunders spoke of one of the condensers carrying a higher vacuum with a counter flow condenser, but the speaker took it that the vacuum has the function of an air pump as well as of a condenser. The author did not say whether the air pump capacity was the same or not.

Mr. Saunders: Professor Weighton found that during the 400 tests carried out, the barometric capacity of the

air pump remained the same. That is to say, he obtained those very high vacuums and big condensation of steam with the old type, which was not nearly so efficient.

Mr. Kidd: With reference to the cooling towers, he could bear out Mr. Saunders' remarks in regard to the use of eucalypti boughs. He had experience of one tower for cooling 190,000 gallons an hour, where, although the atmospheric conditions were at times very trying, there was no difficulty in getting a reasonable amount of cooling. The average reduction in the temperature of the water was between 30 and 35 deg. The water was rarely below 90 deg. when sent to the tower. In actual practice it is not practicable to get the high vacuums that are obtained in experiments. In sugar mill practice he had found that the actual results secured were very seldom above 96 per cent. If it is calculated what the theoretical vacuum should be, a higher percentage would be expected, but with the presence of air it is very rarely that more than 95 per cent. is procured. He considered that the Association was indebted to Mr. Saunders for the large amount of information he had brought before it. The subject had been very fully covered, and he had pleasure in proposing a hearty vote of thanks to Mr. Saunders for his interesting paper.

Mr. Ferrier said that he had much pleasure in rising to second the vote of thanks proposed by Mr. Kidd. Mr. Saunders, in his paper, has certainly given a very wide range of information, and to the speaker it has been very interesting, as showing not only the different designs of condensing plant prepared by the leading engineers of the old world, but also the many classes of condensing plant in use in Australia for the purpose of recovering a large amount of water in places where it is very expensive. In the Goldfields in the West, as well as in some of the fields even in New South Wales, may be found very many instances of plants arranged for this purpose. Even at Broken Hill are to be seen similar large tanks to those referred to by Mr. Saunders, which were simply for the purpose of saving a certain amount of the water. The question of condensing is an important one, but it does not always follow that a plant can be installed and prove economical in every case. He has known many instances where it was

necessary to pump the water up to a considerable height, and when consideration is given to the power required to elevate large volumes of water, it becomes questionable whether it is worth while to do so or not. The higher class surface condensing plants which are now being designed, the speaker thought, were following on the lines of the experimental plant used by Professor Weighton. There are many troubles which accrue in condensing plants, especially in the West, where very dense circulating waters have to be used. Of course, the surfaces of the condensers very quickly become coated and almost inoperative. He had seen in some of the large mining centres, plants in which the condensers have been almost entirely choked up, and which had to be systematically cleaned out in a similar manner to that described by Mr. Saunders. Such work, however, greatly enhanced the cost of working the plant.

It is impossible to come to these meetings prepared with sufficient data to fully discuss the papers presented, and to so increase their value. He trusted that they would soon be in a position to have the papers presented to members in sufficient time to allow them to prepare themselves so that they might thoroughly discuss the subjects.

He had much pleasure, indeed, in seconding the vote of thanks to Mr. Saunders. The members, he felt sure, would agree that the paper must have taken the author a considerable amount of time and thought to bring to such a state of completeness.

Mr. Saunders replied that he had to thank the members for the way in which they had supported the vote of thanks so kindly proposed by Mr. Kidd and seconded by Mr. Ferrier. He was only sorry that the time and opportunity did not permit of his doing the subject more justice. Most of them will realise that now-a-days one has very little time for getting together data for papers, but, such as it is, he was glad if it had been interesting. He must agree with Mr. Kidd's remarks in regard to the results of the tests obtained by even the most eminent authorities. It is one thing to make a test, with the best of water available at the same temperature, and with tubes always clean, etc. To get large quantities of steam condensed per square foot of cooling surface under the best test conditions is credit-

able, but it is another thing altogether to expect an engineer to get the same in practice. He had never been fortunate enough to do so. If they sometimes could carry on with 20 in. to 25 in. of vacuum they would consider themselves very lucky. A great deal might be said upon the general lay-out of condensers, and also upon the question of the exhaust pipe arrangements. It is a common thing to find a condenser, with the air pumps and circulating pumps stuck away beneath the floor. Such an arrangement often lends itself to an easy lead off from steam turbines and cylinders, but plants so placed are generally sadly neglected, and the tendency in all commercial plants—which are really more important to engineers than those installed for testing purposes—is to avoid such arrangements, as invariably when the condenser is placed below the floor it is found that the plants are allowed to get very dirty, and the circulating and air pumps left until they can hardly carry on any longer. He thanked them very much for the vote of thanks, for the way they had supported it, and for the attention they had given to his paper.