DISCUSSION.

Mr. W. H. German said: That as he was personally acquainted with the proprietors of the estate upon which the scheme of irrigation had been carried out, and had also known Mr. McGechan—their chief engineer—for many years, he thought it would not be out of place for him to offer a few remarks upon the matter.

The estate in question, owned by Messrs. Young Bros., had for many years rightly been considered one of the most progressive sugar plantations in Queensland. It is situated in a district unfortunately liable to extensive periods of drought, so that one could readily imagine the great value of an efficient and reliable system of irrigation, as applied to cane land there.

The description of the work was, in his opinion, a practical object lesson of immense value both to engineers and the "man on the land," for it instanced so clearly what could be done, how it could be done, and what had been done—where, from a water supply not in sight, but hidden under the earth, experiments had been made in a small way, until having gradually felt their way these enterprising men were now obtaining a continuous flow of nearly three-quarters of a million gallons of water per hour, which was being distributed to the growing crops extending over some three square miles of rich country. The successful carrying out of such a scheme was no mean undertaking, and he thought members were much indebted to Mr. McGechan for his lucid description of the details of the plant and the cost of the works, and especially to Messrs. Young Bros. for their courtesy in having allowed the data to be thus presented to them.

It was particularly interesting and encouraging to them, as engineers, as showing the scope that existed for mechanical appliances in this branch of Australian industry.

THE PRESIDENT said that the paper and diagrams gave a clear description of a most interesting method of application of irrigation. They showed how a scheme begun in a small way and followed up by enterprise, determination and skill had attained large and successful proportions, a result on which all connected therewith were to be congratulated.

The figures given were very interesting; they showed that the 10 stations so far at work were capable of delivering 735,000 gallons of water per hour, equal to 17,640,000 gallons in 24 hours. The present proportions of the scheme might be more readily brought home to them if their attention was drawn to the fact that the capacity of the plant was nearly equal to the daily consumption of water in Sydney and suburbs. He understood that, at present, that was about 20,000,000 gallons per day, but it would be remembered that during the severe drought two years ago, it was reduced to about 16,000,000 gallons per day.

The figures might be looked at from another point of view, and one which would, perhaps, appeal more to the "man on the land." Distributed over 1785 acres, 735,000 gallons was equal to almost 412 gallons (411.76 gallons exactly) per acre, and as 1 inch of rain over 1 acre of ground was equal to a fall of almost 22,688 gallons (22,687.5 gallons exactly) of water, it would be seen that, if the water was uniformly distributed, the plant was capable of supplying 1 inch of water to each acre in practically 55 hours (22687.5 divided by 411.76 equals 55.09 hours) or rather less than $2\frac{1}{4}$ days. It was not, therefore, to be wondered at that the owners got a 50 per cent. increased yield from their property, even after an exceptionally dry season, and they well deserved the 75 per cent. increase which it was stated they expected this season.

Of course, a considerable quantity of the water must be lost through evaporation when passing through fluming rather more than $4\frac{1}{2}$ miles long, and, afterwards, when being dis-

tributed over the land. It would be interesting to hear how far down into the ground that which actually soaked had been found to penetrate. Perhaps the author would give some information on that point. It was stated in the paper that the first 4 feet from the surface consisted of black soil and that below that there was about 10 feet of clay. It was not to be expected that the water would soak downwards through the clay, and if that was the case it could not find its way back into the water bearing strata from which it was originally drawn.

The horse power of No .11 Station was not given, but assuming it to be the same as No. 10 (the size of pump and capacity are the same) it would be seen that the total nominal horse power of the system was 82, which, he thought, might be taken as equal to about 250 effective horse power.

It would be interesting to have some particulars of the kind and quantity of fuel used—say per hour, with all stations at work—the cost of same and the cost of attendance and maintenance. If the author was at liberty to give such information, he felt sure members would be greatly interested and indebted.

From the description of the plant, it appeared to be one to which electric driving would be well adapted, and probably if, and when renewals were required, the owners would put down a central generating plant at the mill—where he understood exhaust steam could be profitably used for boiling—and use direct coupled motors for driving the centrifugal pumps.

The system described could, of course, only be adopted under favourable conditions, but he ventured to think there were areas in this State to which it could be profitably applied.

To the writer of the paper (Mr. McGechan) and to the owners of the plantation (Messrs. Young Bros.) who had kindly consented to the information being communicated, members were much indebted.

Messrs. Young Bros. (Bundaberg) wrote that they were glad that members of the Association were interested in the account of irrigation as practised on their plantation, and trusted it might lead others to try the same system, where conditions were suitable, as they considered it a very great success.

Mr. James McGechan (Bundaberg) wrote that it was very gratifying to him to learn that his short account of the Fairymead irrigation scheme had been so much appreciated, and that it might benefit others in the future. Had he known that the notes which he had sent were to be treated as a paper, he would have gone more fully into the subject.

Replying to the President's remarks, he said that the supposition that none of the water used for irrigating got through the clay, back into the water-bearing strata, was correct. The only losses were those caused by evaporation (amount not determined) and by an occasional break-away of a surface embankment on an irrigation channel. A small quantity was, of course, used for boiler feeding, but the bulk of the water was retained by the soil or taken up by the plants.

The fuel used was wood, chiefly blood wood, which was brought by tramway to the mill in 4ft. lengths; it was there cut in two by a circular saw, and afterwards carted to the various pumping stations.

The total cost of pumping was .246d (almost one farthing) per 1000 gallons, which included cost of fuel, cutting and carting same, drivers' wages, and all stores.

Electric driving by direct coupled motors, was seriously considered, after the first plant had proved successful, but as the makers required too long a time to deliver, and as the 1903 crop had to be saved, driving by steam engines was adopted. Most of the engines were obtained in Australia and without delay.