

DISCUSSION.

Mr. James Shirra, in opening the discussion, said that he considered we were much indebted to the author for his very able paper.

In pumping a viscid like molasses, we would like to know if they ever tried any special pump. The ordinary pump, with contracted passages and sharp turns was bad enough for water, especially if worked at any speed. But for molasses, he thought it impracticable, as it could only travel very slowly.

A special pump designed with large passages and no sharp bends with valves power driven, might get over the difficulty of the slow transport of molasses. He thought there was a hydraulic analogy often heard about any electrical conductors. If the resistance of the circuit was very great, perhaps the additional resistance in the pump was hardly worth noticing. Mr. German might state whether he had tried anything with power-driven valves.

He had much pleasure in moving a vote of thanks to the author, for the excellent paper and illustrative slides.

Mr. Macartney said he desired to second the vote of thanks to Mr. German for his interesting paper. He thought there was very little room for discussion. Very few have had experience in carrying molasses. He had a little experience once carrying a cargo of sugar (raw). During the voyage, which occupied several weeks, the sugar melted, and in a week or two it was molasses. They had only the ordinary bilge pump, fitted with flat valves. It did not take very long before it glued up with the molasses. There was one question he would like to ask: if, after emptying the tanks in the "Fiona" they were cleaned out? If they were not cleaned, at any

rate, every second or third trip, fermentation would set in.

Mr. W. Hillhouse said the author's paper so nearly covered all the ground that he did not think there was any room for him to say anything. But there was one point that he mentioned, in which the shrinkage of molasses was drawn attention to. His experience was that they had trouble in the other direction. During the last few months they had a shipment of molasses delivered from Mombassa to Latouka, and as the drums were allowed to remain in trucks for several days, and were exposed to the sun's rays, fermentation did arise. These steel drums were specially designed for the purpose of transport from the outside mills to Latouka. When the fermentation took place many of them burst, the pressure generated in several of them was sufficient to blow the ends completely out of the drums and to send these ends a distance of about 50 or 60 feet.

Mr. Hector Kidd said he would like to congratulate the author on his excellent paper, which described very clearly the industrial importance of molasses, and the steps taken by the Colonial Sugar Co. in transporting it from their factories in New South Wales, and also from Fiji, to their distillery in Sydney.

He doubted if there were many members present who have had experience in the handling of molasses by means of pumps, and it may be interesting to give a few particulars which have come within the speaker's experience.

Molasses, as generally found in sugar mills, contains about 20 per cent. of water and 80 per cent. of soluble solids. In many factories its viscosity is moderate, and permits it to be pumped by an ordinary reciprocating or rotary pump; but in others it is often so viscous and sticky that it is difficult to get an ordinary pump to handle it. It seemed to him, therefore, that

the author was well advised in adopting Montejus and compressed air as the method of conveying the molasses through pipes of such great length.

It would seem at first sight that the use of compressed air would require more steam to do the work, but this is not so, for in the case of compressed air the engines driving the compressors are usually designed to work with a considerable degree of expansion, and therefore the weight of steam used in cylinders per air horse-power delivered, may range from 45 to 50, whereas with the special type of pump designed for handling molasses, the steam consumption may reach from 80 to 100lbs. per horse-power.

This special type of pump—usually named a Massecuite pump—has no suction valves, the suction inlet being in the central of the barrel, and is opened and closed by the pump piston. The mechanical efficiency of this type of pump is very low, and the piston speed only about 15 to 20 feet per minute, and hence the large steam consumption per horse-power. Massecuite pumps have been in use for more than 25 years for handling massecuite, containing 90 per cent. of soluble solids, and clay slurry containing 85 per cent. of solids and 15 per cent. of water. The difficulty in handling viscous fluids, or fluids containing a large percentage of solids similar to clay slurry, is to get the material into the pump, and then to get the suction valves seated quickly to prevent the fluid from flowing back into the suction pipe. This, of course, is obviated in the design of the Massecuite pump.. In handling the molasses by Montejus, the inlet pipes and valves can be made of large area, and the rate of working thereby increased much beyond what could be done by means of steam pumps.

The slides shown during the reading of the paper have added much to its value, by showing clearly many

of the details used in overcoming the difficulties experienced with the vertical and side motion of the vessel.

The thanks of the Association are due to Mr. German and the C.S.R. Co. for the very instructive paper.

Mr. R. J. Vincent said that the "Magna" was the only pump that would handle this sort of semi-liquid. He had some trouble at soap works, and the scour of wool also proved difficult. These act in a similar manner—they get gluey.

The President (Mr. E. J. Erskine) said that before conveying the vote of thanks, he would like to combine the following resolution. They were indebted to the Colonial Sugar Company every session for three or four papers which are valuable. He thought it was time they recognised, in some way, their indebtedness to the Colonial Sugar Company. He would therefore like to combine with the motion just moved, the following,—
"That this Association places on record its appreciation of the kindness shown by the General Manager of the Colonial Sugar Refining Company Limited, in having so frequently permitted his officers to place before the Association particulars and details in connection with the engineering work of the Company."

The Sugar Company is, perhaps the one company which has done a great deal of pioneering work. Perhaps their engineers are most able to put before us new ideas of the new works that they have carried out. We do call upon them very often, and they come up every time with the permission of the General Manager, so he would ask them to combine that resolution.

Vote of thanks carried by acclamation.

Mr. German, in reply, desired to express his appreciation of the kind vote of thanks accorded to him, also on behalf of the General Manager, Mr. Knox, for the hearty acknowledgments made for his having, on so many occasions, allowed particulars of works carried out

by that firm to be given to the Association. With regard to the questions asked, he thought most of them had been answered by Mr. Kidd. As Mr. Kidd stated, molasses gets somewhat clammy; you can almost work it about like indiarubber. What it would be like in extremely cold weather he really did not know, but would suggest that we might ask Mr. Peary, or someone else, to take some on their next journey to the Pole. He thought that all that was necessary to be said on matters of pumps for dealing with this liquid had been said by Mr. Kidd. The sole solution was to get it into the pumps and make the suction passages large enough, let the pumps be slow-acting, the piston large enough in area, and that would force it out. Of course, it cannot be elevated more than 4 or 5 feet. With regard to the question as to whether they cleaned the tanks, he would say "No," for the simple reason that when the tanks get coated thick with molasses it acts as a preservative to the iron. If water were applied it would get a consistency that would ferment. Thick molasses, as transported by his company, could not ferment. It may have done so in Mr. Hillhouse's case, but perhaps it contained water, or the molasses was particularly thin. For keeping molasses in tanks, the main point is not to dilute it.