

## DISCUSSION.

MR. J. B. HENSON said that although he moved the adjournment he had not done so with the intention of discussing the paper, as the subject was one that he was not conversant with, but he hoped that other members would give further information. The subject was one of very great importance to Australia.

Mr. G. Ashcroft considered that the reading of the paper would do a service by calling the attention of the engineering profession to the necessity of studying the best machinery for the treatment of low grade ores. This was one of the most important questions that should occupy the attention of engineers, as it had a direct bearing on the prosperity of the country, as there were hundreds of places where low grade ore could be obtained, but they could not be treated on account of the expense by ordinary methods. The Engineering Association could do great good to the country by devoting its attention to the best method of treating these ores, and more especially to the designing of suitable machinery. A grave error was sometimes made by companies in having an idea that no one in the colony knew anything about mining and that it was necessary to send to England or America for an expert, who very likely had no experience of the particular ore to be treated. On the advice of this gentleman the directors of the mine purchased and erected costly machinery, which on being put to the test was probably found to be quite unsuitable for the purpose, with the result that the shareholders lost their money and a decided check was placed upon the development of a most important industry. From his own experience he was quite confident that there were numbers of men in the colony that were quite as

competent to manage these affairs as any man that might be imported, also that we had engineers who could do full justice to their portion of this most important question if they were allowed to proceed in a tentative manner. A great deal depended upon the proper development of the mining industry, and to attain this object it was absolutely necessary that the work should be carried out in slow, cautious and tentative manner.

Mr. A. D. Nelson (the President) considered that the author had undertaken a considerable task in condensing so much information into one paper, and great credit was due to him for the very successful manner in which he had carried it out. It would give him great pleasure to hear a paper from the author on the Lixiviation process, as in his (the speaker's) opinion there were many mines in the colony in which this particular process would be found to be attended with success. He quite agreed with the previous speaker with regard to the manner in which mining business was carried on in the colony. No doubt many of those present had had experiences—bitter experiences too—in silver mining, and would agree that it was necessary to be very cautious in these matters.

Mr. G. Fraser considered that the principal requirement in the application of any existing method or process of silver extraction was in having that knowledge to successfully decide upon one or other process for the particular ore to be operated on. Many thousands of pounds had been wasted on machinery by the want of this knowledge. The matter of silver treatment was essentially an engineering question, quite as much so as it was to design plant for sugar, cotton, or paper machinery, all requiring an intimate knowledge of the material by the designer to enable him to carry out his purpose. The engineering of this question did not exist merely in constructing stamper batteries, furnaces, &c., but in the complete knowledge of what was required to mechanically or chemically obtain the highest percentage of metal at the least possible outlay, also in carrying

out the same idea in the designing of the necessary plant. For this branch of engineering what was required was a thorough metallurgical knowledge, coupled with a good practical mechanical experience, to enable a man to advise and design the necessary machinery necessary for the various systems of treatment mentioned by the author. It was to our interests to encourage a professional education for this purpose, subject to Government examination before practicing, as a safeguard in the developing our great mining industries. The importance of our silver mining industry could be realised in comparing the following figures. Australia produced in the year 1880 8000 lbs. weight of silver. The Broken Hill Proprietary Mine was now producing 750,000 lbs. weight per annum. Among the principal silver producing countries for the year 1880 were :—

Saxony...	...	...	output	60,000 lbs. weigh
Hanover and Brunswick			,,	30,000 ,, "
France ...	...	...	,,	130,000 ,, "
Spain ...	...	...	,,	120,000 ,, "
Norway ...	...	...	,,	20,000 ,, "
Great Britain ...	...	...	,,	42,000 ,, "
North America...	...	...	,,	3,750,000 ,, "
State of Nevada	...	...	,,	2,500,000 ,, "
Comstock of Nevada, alone			,,	1,460,000 ,, "

Australia was now fast assuming second position in the world's production of silver, and yet we were only in the infancy of our mining.

Mr. J. W. Ashcroft, in replying, thanked the members for the manner in which they had received his paper, and expressed his willingness to prepare a paper dealing more particularly with the lixiviation process if the members considered it of sufficient importance.