

to contend with in New Zealand is having a small field in comparison to the Australian Colonies, and much more so in comparison with America, which turns out about six times as much gold and silver as the whole of the Australasian Colonies put together. We have not sufficient capital to experimentalize on the treatment of our ores as they have on those large goldfields, or to erect plants suitable for the treatment of ores. Although we may now and then, by testing small samples, be able to extract the gold from its matrix; still, when the metal comes out, it is found at times that the cost of the treatment is more than the ore itself is worth. What we want is some effective way of treating low-grade ores. I believe that the best way of dealing with the difficulty, and the way most beneficial to the colony, will be by obtaining the best information that can be got on all these questions. And the best way of obtaining that information, in my opinion, is to send some one thoroughly acquainted with New Zealand and its ores to visit America, where mining is carried on on such an extensive scale, so that he may see the principles adopted there. He would be able to see whether such processes as are adopted there could be carried on in New Zealand with advantage. There is no doubt there are plenty of systems in use there that would not be applicable to New Zealand, such as the smelting process in Denver. We had the same thing introduced here by La Monte, but it was not a success. The simple reason was this: that there was too much silica in the ore. This process is successful at Sunny Corner, in New South Wales, where I saw it at work; but the reason of this was that the ores there contain large percentages of copper, galena, iron, &c., combined with gold and silver, and lime was almost close at hand, so that the ore contained within itself the fluxes required for making the smelting process effective. Here we have no ores of this description, with the exception of the Champion Lode at Tui Creek, Te Aroha, that I have seen in New Zealand, suitable for treatment by the smelting process, and it is questionable if even that lode I have referred to does not contain too large a percentage of silica. The result is that the cost of fluxes will be too much to allow of the smelting of low-grade ores. Moreover, the reason why I say that America would be the best country to get information from is this: that the most useful machinery we have got is really of American invention. We have one of the best water-motors in the colony in the Pelton hurdy-gurdy wheel, which is an American invention. It would not have been introduced into this colony had not a gentleman at the Thames seen a description of it published in one of the American papers, together with the experiments made with the other water-motors by the Idaho Gold-mining Company. He was so struck by its novelty that he got one constructed at his own expense to test its capabilities. It has been since almost universally adopted in the Thames District and other parts of the colony where there is water-power. I may mention here that the Newberry-Vautin process, referred to by Mr. Reeves, is not a new process. It is a process which was worked in North Carolina many years ago, known as the "Mears" process. There was a description of it given in a paper read by Mr. R. P. Rothwell on the 20th October, 1883—including the filtration through charcoal—before the Institute of Mining Engineers at New York. Any one reading that paper and the pamphlet published by Messrs. Newberry and Vautin must admit that the process is one and the same. If the Newberry-Vautin process is a success, it is an American invention, and it has taken all these years for us to become acquainted with. It was simply enterprising men who brought it to the Australian Colonies, and used it there for the first time. The treatment of our ores is the chief thing and the subject to which the largest amount of attention will have to be paid. What we are really suffering from is not being able to ascertain the most effective method of treating our ores so as to get the largest possible percentage of metals from them. But the question as to the reduction of the ores is also a matter which enters largely into the cost of obtaining the metals from them. There are several systems, more or less effective, in America, of reducing the ores, and we want to know whether any of those systems can be applied effectively here. The method of reducing by means of the Huntingdon crusher and by steel rolls is described in the American papers as a most effective means of crushing the ore; and I have no doubt in time machinery will be found to supersede stampers almost entirely. We have an instance of that in New Zealand, eighteen months or two years ago. The people of the Blue Spur had a battery, twenty-head of stampers, for crushing cement. They found that the quantity they could put through the stampers was too little to make working of this cement remunerative. After a long time, Mr. McQueen, of Kincaid and McQueen, of Dunedin, undertook to put up a set of large rolls. I learnt that this set of rolls not only dispensed with a great deal of manual labour that was employed at the battery breaking up the large blocks and feeding the stampers, but they pulverize two and a half times more than the quantity crushed by the twenty-head of stampers formerly employed, and does not require near the same amount of power to work them. This, by itself, shows that some other method cheaper and more effective can be employed than the stampers ordinarily used; for, if the cement could be reduced in the way described, ores could also be reduced in the same manner. We want, likewise, information—as much information as we can get—concerning the different systems of amalgamating; for it has become a question, in the treatment of our ores, whether, in respect of these refractory ores, the roasting, chlorodizing, and amalgamating system will have the best effect, or whether the roasting or lixiviation process would be more suitable. Both systems are largely used in America. The lixiviation process is spoken highly of in the American papers. The Russell process is also largely in use there, and is said to give good results. We want also as much information as we can possibly obtain respecting the chemicals used for the purposes of amalgamation, together with the different classes of ores to which they are most suitable. Then, if roasting-furnaces are required, there are several different descriptions of these furnaces used in America—the reverberatory furnace, the Stetefeldt, Howell, Bruckner, White, O'Hara, and other furnaces. It is just the question which is the most economical and best adapted for roasting our ores at a cheap rate. Then, in addition to the treatment and reduction of ores, I think it would be a very good thing to see the different systems of working the mines in America—the modes of timbering, stoping-out, and conducting mining opera-