

19. Generally speaking, you think the prospects at some future date would be very good for the purpose of developing the industry?—Yes, but at present the cost would be too high. That is, we cannot possibly compete with outside iron and steel, and our local demand is too small to enable a blast furnace being kept going all the year round.

20. I quite agree with you there, unless it was a very high-grade ore, and you say it is not a high-grade ore?—No, it is not a high-grade ore.

21. *Mr. Hudson.*] Are we to infer from what you say that there is no use New Zealand doing the treatment and developing this ore at present?—Yes. At the present time our demands are too small to warrant the erection of a blast furnace and steelworks. We could not keep them going more than half-time with our present requirements, and the export of iron and steel to other countries, with our cost of production, is out of the question entirely.

22. What is the position in regard to pig iron?—The cost of production of pig iron in New Zealand at the present time, or immediately before the war, would considerably exceed the retail price that was then paid—£5 per ton, c.i.f., Wellington.

23. *The Chairman.*] It would cost more than that to produce?—Yes, owing to the high cost of coke and wages, and then there is the smallness of the output.

24. *Mr. Hudson.*] Speaking about coke, do you consider the coal produced on the spot is unsuitable?—Yes. No coal containing more than 1 per cent. of sulphur is suitable for blast-furnace coke. The only two collieries in New Zealand producing the coking-coal which we require—that containing a small quantity of sulphur—are Paparoa Colliery and the Liverpool State Colliery.

25. Does that mean that coke would have to be brought from there?—Yes, or from Australia.

26. Or from Greymouth?—The Liverpool and Paparoa Collieries are both near Greymouth.

27. When you speak of Parapara I presume you include Onakaka and Washbourn?—Yes.

28. Do you know Mr. Turnbull, who is interested in Onakaka?—Yes, I have met him.

29. You have never seen a report furnished by him?—No; it was furnished some years ago, I believe.

30. *The Chairman.*] I would like to ask your opinion of the possibilities in connection with the smelting of ironsand?—During December, 1917, I was asked to report upon the operations at Moturoa. I furnished a report after witnessing the smelting operations and going into the matter thoroughly.

31. Has that report been published?—It is on the Mines Department's file.

32. Is it confidential or otherwise?—All the official files are confidential—i.e., they are the property of the Government.

33. Are you prepared to advise the Committee as to the prospects?—Yes. I was advised by the Under-Secretary that I should answer any questions.

34. What is the practicability of the smelting of ironsand as a commercial undertaking?—I have a number of samples here, the product of Taranaki ironsand [samples produced]. I may say that experiments have been made with the ironsand there since 1850, since when they have been endeavouring to successfully smelt the magnetic ironsand. I may also say that nowhere in the world has magnetic ironsand been treated successfully commercially. Attempts have been made in Canada, and all have hitherto failed. I do not say that the smelting of Taranaki ironsand has failed, but so far the results have not been profitable. They have evolved a process called the Heskett-Fraser process for smelting Taranaki ironsand. They have experimented by that process on several occasions, and on each occasion they have got an improved product. They have not arrived at perfection yet, and they cannot guarantee a marketable pig iron. The defect has been up to now that the class of pig iron varies between white and grey. White pig iron is practically steel, and is too hard for working in machines.

*Mr. Luke:* I put through 20 tons of it in our furnace with the last briquettes they had, and all the iron that we got was about the size of my hand.

*The Chairman:* That was a long time ago.

*Mr. Reed:* Samples were sent to several foundries in New Zealand. Samples were sent to Robertson and Co., Luke and Co. (Wellington), Duncan (Christchurch), and Reid and Gray (Dunedin). I did not visit Messrs. Lukes' works, but visited all the others. I got samples of castings at the different foundries, and they all reported to me the same—namely, that the pig iron from Taranaki was patchy in quality, some being too hard and some workable. The difficulty was to separate the good from the bad, the result being that the castings came out partly white and partly grey iron. White iron is harder than grey. I here exhibit to the Committee [produced] a piece of a casting from Messrs. Robertson and Co., of Wellington, from pig iron supplied by the New Zealand Smelting Company, Taranaki. This is grey and white iron, and it will be seen that the extremity is white iron, which is much too hard to work in a machine. I have here [produced] a piece of iron casting supplied to me by Messrs. Reid and Gray, of Dunedin, showing the extremities to be white also, which is, as I have explained, much too hard to work in the machines. It requires 2,200° F. to produce grey iron, but 2,000° F. may produce white iron, which is valueless and detrimental here. This sample [produced] is a piece of a cast-iron cylinder ring from Messrs. Robertson and Co. The casting is good grey metal. This is a good casting made from Taranaki ironsand by Robertson and Co. I may say that in the tests I have shown you all but one exhibit the same defect—i.e., white-iron extremities; but at a subsequent trial at the furnace some months afterwards, when the process had been improved, the results were much better, but white iron or steel was in evidence. I believe that with a few more attempts they would be able to produce a marketable pig iron.

35. *Mr. Hornsby.*] Is it possible to mix Taranaki ironsand and the Parapara deposit and work the two qualities together, and so get a high-grade iron?—It would be quite possible; but I do not see where it would improve the quality, because both of them carry more phosphorus