137. Do you not think a protective duty would have the effect of encouraging some people to start a manufactory?—I am afraid it would increase the cost of paper, and render the consumption less. The less consumption there is the less is the necessity for establishing an industry.

138. *Mr Steward.*] Is it not a rule that plants which yield fibres suitable for rope making are also available for paper making?—Yes; but the better adapted those fibres are for rope making, the more difficult it is to break them up into a pulp. Their longitudinal adherence prevents their being broken up.

139. Are you aware that the tussock grass has been used for the manufacture of rope with success. Perhaps the ordinary tussock of Canterbury Plains might be useful for paper making?—I was not aware that the tussock would make any but straw rope.

140. You mentioned that when the snow grass is once burnt off it does not readily grow again. That, I believe, is not the case with the tussock grass?—No, not unless the burning is followed by stocking. All grasses will run into tussocks if the country is under-stocked.

141. *The Chairman.*] Have you considered the question of utilising what is commonly called the spear grass?—The spear grass contains very valuable fibre for stuffing, and possesses the same qualities as horsehair; the fibre is springy, and does not break. It would do for paper, but I fancy it would be very difficult to prepare.

142. *Mr. E. Richardson*] stated that he had enquiries made of almost all the principal paper manufacturers in Great Britain with regard to the preparation of flax, and the answers he got were to the effect that £8 a ton was the highest price they could afford to give for the first-class description of flax tow. It would not pay to send that material home under £14.

143. *The Chairman.*] Have you prepared a memorandum on the subject of the Taranaki iron sand? I will read to the Committee what I stated last year. [Read from Minutes of Evidence, 1870.]

144. Since then has nothing taken place to throw fresh light upon the subject?—Not that I am aware of. I have procured all the information I could obtain, and have made some notes which I will read:—"Iron sand was first worked in 1742 by Mr. Horne, a steelmaker and cutler in London, who extracted 60 per cent. of malleable iron from iron sand obtained in America, and which he converted into steel. The Japanese and natives of India have also long used iron sand as ore for the production of a fine quality of malleable iron for conversion into steel. Patents were granted for producing cast steel direct from these sands in crucibles, being in fact an extension of the ordinary method used in the laboratory; but it was not found possible to produce uniform results on a large scale. In 1845 Heath proposed to reduce ores such as ironsand by the addition of a small proportion of charcoal, and thus produce a spongy mass of malleable iron, which was then plunged in a bath of molten cast iron, in a proper proportion to make steel of the compound. A modification of this process is now in use in Sweden, but requires the use of crucibles. In 1868 Leckie, of Montreal, proposed to mix the iron sand up into a lump with charcoal, and place it in a hearth at the back of a bath of molten cast iron in a reverberatory furnace. After the reduction the lump was to be tipped into this bath. This was an attempt to work with a single furnace without crucibles, and by a continuous process. It does not yet, however, appear to have been a success. In 1868 Ellerschausen proposed to decarbonise pig iron by the addition of oxides, such as iron sand, while the metal was flowing from the furnace. This process, which requires very peculiar machinery, is now in use at Pittsburg, in the United States. In 1851, Stenson obtained a patent for working the iron sands of New Zealand by means of a blast furnace, the sand being worked up with clay containing a small proportion of lime, ground in a pug mill and formed into bricks. These bricks were then treated as common earthy iron ores, the result being a pure cast iron, which might be converted into steel by a second process. Many patents have been taken out relative to the New Zealand iron sand, which have all relation to some supposed virtue which they possess from their containing titanium, and which would give them such extra value for the production of steel as to warrant the employment of expensive processes of manufacture. None of these have been a practical success. We thus have four processes for the conversion of their iron sand ores. (1.) By cementation with charcoal, the result being malleable iron. (2.) Being mixed with clay, they are reduced by a flux in an open blast, the result being cast iron. (3.) The cement spunge, obtained by a process like No. 1, is plunged in a bath of cast iron, the result being steel. (4.) The decarbonisation of cast iron by the addition of the iron sand, the result being malleable iron of a fine quality. There is no necessity for experimental research being undertaken, as the iron sand is the same in New Zealand as that which has been, and is being tried on a large scale in other countries.

145. *The Chairman*] It would be useful if you could give the Committee some information about the experiment Mr. Smith has been making?—I can give the Committee a summary of the correspondence which has taken place. The first letter is from Mr. Smith, Government Armorer, dated New Plymouth, 4th October, 1870. He states he has discovered a method by which he can make steel by a single process from the iron sand, and asks the assistance of the Government, referring to previous experiments he had made at the Government expense. That application was referred to me, and I suggested that before the application for further assistance should be granted, Mr. Smith should be called upon to state what expense he had already incurred in testing his process, and the results he had obtained, and also to explain the rationale of the particular part of the process he claimed to be new. Then I pointed out that Mr. Davis, who had come out specially with a view to investigate the iron sand question, was of opinion that it would require £5,000 to test that process thoroughly; and I expressed doubt as to whether Mr. Smith was fully aware of the difficulties that had to be contended with, and that, therefore, it was doubtful whether he was the proper person to make the experiment, if the Government determined to proceed in the matter. Mr. Smith being called on to state the reasons why he should be assisted, sent a very long account of what he considered to be the rationale of his process, and he enclosed also a report which had been obtained upon the principal specimen of the iron from a metallurgist in Melbourne, Mr. Ford, but that report only bears upon the value of the particular specimen that was submitted. There is also a demurrer from Mr. Atkinson, who is in partnership with Mr. Smith, objecting to the latter using the process at all. Upon those letters I reported that I found no novelty in Mr. Smith's process