

They do the work better, but they reduce the quantity done in the time. If it were not for that drawback, Pownall's machine and Bull's machine would be valuable in the market.

816. *Major Steward.*] Is Bull's machine a scraping machine?—I think it is; I have not seen it. Any machine that would do the work better, or produce a more valuable article. The bonus offered by the Government would be a mere drop in the bucket when compared with the profit to the inventor.

817. *The Chairman.*] Assuming that a certain amount of money was set apart for a bonus, would you devote a portion for improved machines and a portion for development by a chemical process such as you have indicated?—Well, it is not so much the process that you want in either case; it is the application of the process you want.

818. The production of a certain number of bales up to a certain standard?—I think the principles of the processes are very well understood; it would be impossible to patent them further than they are—I mean the chemical processes. It is, therefore, the successful commercial application of the thing the Government should aim at. In the case of the utilisation of the waste fibre, I question if it would be possible to make it commercially successful, dealing with the wild flax. The present wild flax supply is an ephemeral thing; it will soon be done, except in a very few localities. As to giving a bonus for an improved machine, there could be no harm in that if the conditions were well defined. It may occur to some one to turn out a machine that would be really a great mechanical improvement. Such things are always occurring.

819. *Mr. Walker.*] There is one point which Mr. Seymour was very strong upon—that a new machine, an ideal machine, should reduce the cost by at least one-half the cost of production. Apparently you complain that the present machines do not get fair-play, by the process being hurried on too carelessly?—I think that is the cause of most of the bad flax sent out of the country, and the use of too little or of bad water; in fact, want of knowledge in the preparation. The principle of each machine that was known to me at the time is described in page 94. That does not include anything beyond 1872. From 1872 up to Mr. Bull's machine I do not think any new machine has been put in the market at all.

820. *The Chairman.*] I think you state in this book that phormium is not likely to fire on board ship by the presence of any moisture?—When the fire broke out in the "Mariposa" a number of communications were addressed to the Government, and they were referred to me. I then gave my opinion, which I shall read:—

*Memorandum re Spontaneous Combustion of Phormium Fibre.*

5th June, 1889.

THERE is no record of any conflagration that was clearly proved to have originated from spontaneous combustion of phormium fibre in bales. Flaxmills have in some instances taken fire owing to the light dust and boon that is produced in the manufacture having ignited in contact with oily and hot machinery; also the green refuse lying in heaps has been known to ignite, in the same way as any other damp vegetable matter does when undergoing putrefactive fermentation. It is possible that if the fibre is baled up in a rotting condition, or so damp as to supply the oxygen required to promote such fermentation, that the rotting would go on, but the rise in the temperature would be controlled by the compression that had been applied to the bales, as in the case of the manufacture of ensilage from green fodder, in which the temperature is kept to 135° Fahr. simply by pressure. If the fibre were in an oily state, and either accidentally or intentionally mixed with oily or fatty substances, there would be danger of spontaneous combustion from another and purely chemical process, it being well known that the temperature of vegetable matter, if soaked or mixed with oil, grease, varnish or such hydrocarbons, will rise sufficiently to ignite the bulk. The danger from this cause is so great that railway companies and shippers have refused to take the risk of certain mixed silken goods in the manufacture of which vegetable fibre and oils are used; and it is the same chemical action which causes the spontaneous conflagration of cotton when the bales are imperfectly isolated from other goods of an oily nature on board ship. In the case of the fire on board the "Mariposa" there does not appear to be the slightest evidence that it originated from heat generated in the centre of the bale. If the outsides of the bales had been smeared with grease and moisture it is just possible that heat might have been generated between bales tightly packed together in the hold, but the heat required to ignite the flax could not, in my opinion, have been generated in the short time that had elapsed between the taking in of the flax and the outbreak of the fire. It seems unfortunate that the question should have been raised, as there is nothing to show that *Phormium tenax* fibre is more prone to take fire than such articles as coal, greasy wool, cotton, manila, sisal, jute, kauri-gum, and many other articles of commerce that are carried without question. If the matter is to be made the subject of an experimental investigation I think that in fairness to New Zealand other flax substances should also be tested, and the results made comparative. The experiments will be costly, and will extend over at least three months. It will be necessary to build strong brick or timber sheds, in which the conditions in the hold of a ship can be imitated, and several bales of each sample to be tested would be required. Special thermometers must be contrived, and a special machine for applying graduated pressure; and, as there is no record of similar experiments having been previously made, so far as I can find, there might be many trials before a satisfactory method is arrived at and reliable results obtained. Under these conditions I think a special authority for the necessary expenditure should be given, and perhaps it would even be desirable to appoint a commission of experts to superintend the experiments.

Hon. Mr. Richardson.

JAMES HECTOR.

—That answers all I know about spontaneous combustion.

821. You said in your book that the flax is very much damaged by the mode of packing?—Yes, that was the evidence we got. The object at that time was to get bales of flax in such a state that they could be sold to the same persons who purchased the bales of manila. The baling that