

as compared with other competing fibres. The ultimate fibre is the third of an inch in length. When thus reduced to the ultimate fibre it passes into stuff like what I have just shown the Committee—a sort of paper pulp. When it is in that state, and even when it has become partially dry, it can be so treated mechanically that it passes from a state of pulp into a state of felt. It is really a vegetable fibre which can be subjected to the application of a felting process like certain animal fibres. When it has undergone that process it can be fixed with size and passed over hot rollers, or by several other processes that might be mentioned so altered as to prevent its returning again to its soft state by absorbing water and so losing its strength. That is the process which is alluded to in the book at page 54, but not fully worked out. That points to one particular application of what might be called the waste from any process to which the fibre has yet been applied. There is always a certain amount of waste, either of first or second quality of tow, which is never applied to a profitable purpose. It can be applied profitably to the manufacture of stout paper that could have a texture and strength more resembling calico than any paper known, and which might be used for many purposes.

771. You say that the first and second-class quality of tow could be used for that purpose?—Yes; there should be no waste in a properly conducted manufactory. If attended to at the proper time a ready sale for it could be obtained. My opinion has ever clearly been that there never would be any proper trade in flax, or the flax industry will never be properly established in the country, until the flax used is cultivated—until there are flax-farms, where the very best kinds are cultivated under the most favourable conditions for collecting it. At the present time the use of wild flax is attended with great waste of time and money, and the process of gathering it is most rude and barbarous.

772. *Major Steward.*] You know the *tihore* flax?—The *tihore* is the sort cultivated by the Natives up the Wanganui River. It was carried a great distance and planted out in good land up the Wanganui River, for supplying the fibre for beautifully-worked silky mats the Maoris used to make.

773. *The Chairman.*] Is that all the evidence you can give us on this point beyond what is given in this book?—Yes, the evidence in support is arranged in that work.

774. *Mr. Walker.*] Does it relate to *tihore* and other kinds of flax?—Yes; you will see a catalogue at the end of the book on *Phormium tenax*. At page 76 there is a list of the names of the varieties. We had the whole of these varieties gathered together, and we had nearly the whole of them grown, first from shoots in the gardens and afterwards from seeds from the same plant, in order to see whether the seed would bring up the true variety. The result was that we found that it did not.

775. You think it is a mistake to dress our flax in order to compete with manila?—I do not say it is a mistake, but it is not exhausting the whole of the useful qualities of the flax. It may not pay at the present time to do anything else. Perhaps it is the most profitable application of the wild flax, because whenever flax is cultivated under proper conditions and treated in a proper manner, then every part of the cellulose in the flax-leaf should be saved and applied to the purpose for which it is fitted by its nature.

776. Can it be produced at such a price as to compete with other raw material in the market?—Yes: the reason for that is that the phormium plant is valued for the quantity of fibre it contains. It contains four or five times as much fibre for the weight of green leaf as any other plant of the same class. I think the manila plant yields only about 5 per cent. fibre as against 25 per cent. of the yield in *Phormium tenax*.

777. The increased cost of producing phormium fibre would be great as compared with manila?—I do not think it would be so costly. The reason of the very low cost of producing manila is on account of the cheapness of labour. At page 35 of the book it will be seen that two persons produce 25lb. of clean manila a day.

778. Then the sulphite process does not destroy the strength of the fibre in the least?—No; that is its peculiarity. The process has been carefully worked out by Mr. Cross. Singularly enough the action of the soda compound is very slight upon the phormium fibre, slighter than upon most fibres. Mr. Cross distinctly states, page 374 of his report: "The results obtained with the basic alkaline sulphites are such as to give a complete range of treatments down to the isolation of the ultimate fibres, with the minimum of chemical modification of the fibre constituents, and therefore alteration of the natural colour of the fibre." He means that by altering the temperature and strength of the solution you can so modify the action upon the fibre that you can do whatever you like. Thus, you can simply free the major fibre bundles, or by simply modifying the process you can carry it to such an extent that you can actually dissolve the flax down to ultimate fibres without changing their chemical nature, or decomposing the valuable cellulose.

779. You could not destroy them?—You could destroy them by great excess; but you do not need to destroy them.

780. Many of the chemical processes by which the flax is scoured require great care, otherwise the fibre is destroyed, and still at the same time it is scoured?—Well, of course, the moment you attempt the chemical process it presumes you are going to employ skill. It is not simple, and not to be done by persons utterly ignorant of what they are dealing with.

781. But is the chemical process a safe and dependable process?—Yes; it is perfectly safe. This sample of fibre is strong; it is the best dressed fibre that can be had. I believe its strength would be about 10 per cent. to 12 per cent. above that of manila. I have dressed flax ranging as high as 20 per cent. above manila.

782. *The Chairman.*] Has this flax to undergo a chemical process?—Yes. The whole thing is described at page 12 of the book. You must select the leaves. Those leaves must be bruised—that is, simply to break the hard shiny epidermis so as to allow the chemical to act without undue waste of time, otherwise you may have too much chemical action set up on one side—the exposed side of the leaf—before it had dissolved the hard shiny side of the leaf; then maceration of the fibre in the