14. How are the bales made up for carriage, and what is the best mode of packing?
15. What machines are used? State makers' names and addresses.
16. How many do you employ, constantly or occasionally?
17. Are they satisfactory or otherwise? Suggest remedy for defects.
18. What is the annual tear and wear; what the duration of machine?
19. What is the diameter and what are the revolutions of the stripping-drum per minute?
20. What is the diameter and what are the revolutions of the feeding-rollers?
21. How much dressed flax can each machine dress per hour or day of eight hours?
22. By what power are your machines driven?
23. What is the horse-power required by each machine?
24. What kind of scutching machine is used? Describe it, and state cost and amount of work done by it per day.
25. What is the horse-power required to drive it?
26. Do you adopt any mechanical or chemical appliances for washing, wringing, &c.? Describe process of washing flax or freeing it from gum, and cost of same.
27. What time is allowed to elapse between each operation?
28. Is flax allowed to remain any time after being washed and before being spread out?
29. What process do you adopt in bleaching and drying flax—whether on grass, rails, lines, or ovens; and what time is required for each?
30. How many tons of green flax are required to make one of fibre?
31. Are butts and points of green leaves cut off before being manufactured; if so, to what use turned?
32. Is any use made of refuse from machines; if so, what?
33. Is any use made of gum?
34. Is any use made of other products?

No. II.

New Zealand Flax considered as a Fibrous Material.

From actual observations, and experiments performed in 1863-4, *by Dr. Hector and Mr. Skey.*

The flax grows in bunches or groups of plants or shoots: each shoot has five leaves. Ten of these shoots go to a bunch on the average, or, in all, fifty leaves. These vary, according to the soil, from five to ten feet in length, and each consists of a double-bladed leaf, which, when closed, is from two to four inches wide. The lower part of the outer leaves forms a complete sheath or flattened tube, and it is from this portion of the leaf that most of the gum exudes, and where the fibre is of least value.

On rich "flax land" there are over 2,000 bunches of flax to the acre, or 100,000 leaves. When sun-dried, these leaves, after cutting off the gummy and useless lower parts, weigh about five to the pound, so that an acre of ground will yield nearly ten tons of dried leaves. Assuming the outer leaves only to be taken, the quantity will be reduced to four tons. Now, from experiment, it was found that 23·10 per cent. of apparently well-cleaned fibre could be obtained from green flax when all loss was avoided. Mr. Honeyman, of Dunedin, however, only produces about twelve per cent. of fibre, exclusive of tow. We may, therefore, safely anticipate a yield of fifteen per cent. upon these four tons, since they will have gained by their desiccation an additional four per cent. of fibre, calculated upon a loss of fifteen per cent. of water. This will give of clear fibre about twelve per cent., or three-fifths of a ton, only taking the outer leaves. Respecting the proportion of tow to be added to the good fibre no certain data have been obtained, but in ordinary flax the weight of tow is about equal to that of the clean fibre, and from the different character of the New Zealand flax we may expect the proportion to be a good deal less.

On hill land, owing to the shorter growth of the leaves and the wider intervals between the groups of plants, the yield will not average more than three tons to the acre.

The quantity and quality of the flax crop could, no doubt, be greatly increased by artificial culture; and with any permanent establishment for the manufacture of the fibre, it would no doubt be found necessary to undertake the cultivation of the plant, instead of depending alone on the natural supply in the wild state.

The method employed by the Natives for cleaning the fibre is by simply scraping it with a shell or knife when in the fresh green state. By this means a fine quality of fibre is obtained, but only a very small proportion of the whole quantity in the leaf, so that the great loss of material and waste of labour involved in the operation makes it suitable only for the production of such small quantities of fibre as are required by the Natives themselves.

Ever since the foundation of the Colony, attempts have been made from time to time to supplant the Native process for the preparation of the flax fibre by others of more economical application, but as yet, so far as is known, without any successful and practical result; and it is to be regretted that no information was furnished regarding the methods employed in preparing the various samples of fibre that were sent for exhibition, as, without such explanation, it is impossible to form any opinion of the merits of the samples as indicative of a successful solution of the problem.

The relative intrinsic merit of the various samples of fibre is scarcely within the province of chemistry to determine, as those tests which would alone determine them are entirely mechanical, such as the tension the fibre can bear, and the injury it sustains from torsion.

Even without these trials, which would have required peculiar mechanism for their application, it was quite evident that, of all the various samples exhibited, those that had been prepared without the use of chemical re-agents, and especially by the simple method employed by the Natives, were the most superior, in so far that they preserved the qualities of lustre and strength in the highest degree.

In the general absence, therefore, of complete and detailed descriptions of the methods used, we are induced to communicate the results of a few Laboratory experiments, with the methods by which