

3. It is unfortunate that practical firms were not consulted along with brokers in London, for looking at letter, Appendix No. 1, it is to be regretted that such a value as £65 to £70 should have been quoted, and a comparison made with Algerian flax, this being the true flax (*linum usitatissimum*), and fit for the same purposes as European flax. The writer of these notes had an opportunity of carefully examining Algerian flax in its respective department in the Paris Exhibition of 1867, and many of the samples there were equal to good Russian flax.

In Appendix No. 4 a comparison is made with Irish flax (also the real flax), and the price of New Zealand flax is spoken of as "it will ultimately range much higher, on account of its finer quality."

It is not very apparent on what grounds this result has been arrived at, and such a statement cannot be endorsed from what is mentioned. If this opinion is at all correct, the New Zealand flax must have been used for some purpose, or manufactured in some manner quite unknown in Scotland.

4. From the experience of persons in Dundee, endorsed also by the information generally given in the Progress Report, New Zealand flax is a harsh fibre, unsuitable for general manufacturing purposes such as into linens which are made from the real flax (or even manufactures made from Indian jute). Looking at the cost (supposing it was suitable in other respects) as spoken of in Appendix No. 2 *for good*, namely 1s. per lb., or £112 per ton, the price alone would render it impossible to compete with European flax, at this time used in the manufacture of linens in Forfarshire at prices varying from £28 to £58 per ton. Even 4d. per lb. for New Zealand flax, as stated in appendix No. 2, is £37 per ton.

5. In conclusion it must be repeated, as mentioned in Appendix No. 6, page 10, lecture by Captain F. W. Hutton, "that all attempts to produce an article to compete with European flax will only result in disappointment," and that the point should be (page 11) "to aim at a strong fibre suitable for the manufacture of rope, and not attempt to produce an article to compete with European flax." Even on this head, the quality sent to this country has produced only very inferior rope, and Russian hemp must be competed with. It may be also stated that Manilla hemp is considered a superior fibre in many respects.

It is well known in Dundee that the late attempts to make New Zealand flax take the place of, and be suitable for the purposes of European flax, have been a failure, and have only resulted in the loss of money.

6. In connection with this subject, it may not be out of place to state that as regards *all new fibres* considered fit for manufactures similar to those made from flax or jute, for jute manufactures have now taken the place which coarse linens formerly held, and which are also frequently spoken of as linens, it must be kept in view that these two fibres are to be competed with both in price and quality.

The present price of the first has been already mentioned, and the manufactures from it are well known. The quality of jute is such as to be suitable for all coarse purposes, as packing cloths, sackings, bags, &c., &c., and it is the cheapest fibre presently known fit for these manufactures, ranging on an average at a price from £15 to £25 per ton. Dundee is the seat of this trade, and fully 80,000 tons were imported there in 1870.

The Progress Report is herewith returned.

The Secretary Board of Trade, London.

I have, &c.,
(Signed)

R. STURROCK,
Secretary.

A LECTURE on the MANUFACTURE of NEW ZEALAND FLAX, delivered before the Auckland Institute, July 12, 1870, by Captain F. W. HUTTON, F.G.S.

It was not until the year 1869 that New Zealand Flax began to be known in the London market; for although it had been exported to England for many years previously, it was only shipped in small quantities at a time and sold privately, so that few manufacturers knew anything about it except from report. Ever since the foundation of the Colony the value of the plant has been recognized, and many people have spent considerable sums of money in trying to produce from it a fibre that could be sold at a profit. Failure, however, followed failure, until at last, in 1867, a machine was produced which was brought so far towards a state of perfection that it reduced the time and cost of producing the fibre to such an extent that it was apparent that, where circumstances were favourable, *Phormium* fibre could be produced at a profit. I do not here mean to attempt to trace the early history of this manufacture, nor to discuss the question as to whom belongs the credit of inventing the present machine; my object is to look forwards and not backwards—to explain the system at present in use, and to point out where improvement seems most wanted.

All our knowledge is derived from observation and experiment. Observation or the noticing of occurrences, may be either the haphazard observation of things that happen to fall in our way; or it may be the scientific observation of examining closely and minutely those things that we desire to have information about. Experiment, or the noticing of effects produced by causes under our own control, may also be either the haphazard experiment of trying what will be the effect produced by any agent that happens to be easily available; or it may be the scientific experiment where the experimenter has carefully considered what is the effect he wishes to produce, and what is the agent most likely to fulfil his purpose.

In all the arts and manufactures these two methods have been followed, unconsciously perhaps, in arriving at the processes to be employed, in order to produce the best results. Haphazard observation and experiment come first. They are the means employed in the earlier stages, and by all savages and uncivilized nations. Scientific observation and experiment follow after, when civilization has trained the minds of men to inquire more curiously into cause and effect. Haphazard observation, when extending over a long series of years, may sometimes arrive at processes of such perfection that the best scientific observation and experiment cannot improve upon them. The European flax manufacture furnishes us with a good example. The value of retting flax, or causing it to undergo