

tribe; it consists of the hairs, which are of considerable length, and which grow upon the surface of the seeds, lying between them and the envelope in which they are contained. Thus, unlike linen, which is manufactured from the toughest of vegetable tissues,—the woody or fibrous,—cotton is composed of the most delicate—the cellular; hence the superiority of linen to cotton in point of strength. The cotton plant is valuable also for an oil expressed from the seeds, and for an oil-cake similar to the linseed oil-cake, and used like it for fattening cattle.

Jute, or Bengal hemp, is the inner bark of the *Corchorus Indicus*, nat. order *Tiliaceæ*. In India, rice bags, fishing nets and lines, ropes, and a coarse kind of cloth are made from it. It is put to similar uses in other countries, and is largely imported into England.

The *Phormium tenax* belongs to the natural order *Liliaceæ*, or the lily tribe. The flax plant of Europe, and the *Phormium tenax* or flax plant of New Zealand, are totally dissimilar. In the former the fibre is situated in the cortical part of the woody stem. The stem of the *Phormium tenax* lies underground, and the fibre is situated in the substance of its long and flattened leaves. The similarity and consequent confusion of names, formerly led to misapprehension of the true character of the New Zealand plant, and probably to the faulty construction of the machinery intended to free its fibre.

There are very many other plants from which fibre of varying strength and usefulness can be obtained, but those I have named are such as are most important and best known, and it is with them that our flax fibre will have to compete in the various markets of the world.

With a climate to suit the *Linum usitatissimum*, or flax plant of Europe, and a low rate of wages, it forms a very valuable crop, as in Ireland and other countries from which Great Britain receives her supply; but with anything like the scale of prices for all labour at present ruling in New Zealand, I am afraid the attempt to grow it here would be a speculation almost sure to end in failure. The amount of labour required for cultivation and separation of the fibre is very great; and in Belgium, where the finest kinds are produced, from which the beautifully fine lawn and cambrics (the latter so called from Cambray, a manufacturing town of Flanders) are made, the ground is so worked as to be almost as fine as if intended for an onion bed, and the soil, at each successive crop, is carefully supplied afresh, by the aid of agricultural chemistry, with those constituents of the plant which have been taken by it from the soil to be absorbed as food, and incorporated with its substance.

Ireland possesses a climate particularly favourable to the growth of the *Linum usitatissimum*, and there, from the cheapness of labour—averaging, perhaps, not more than a shilling a day for all employed in its cultivation—it forms a most valuable staple. But to be successful even there, as in all other countries, it requires the greatest care and attention, such as draining, deep ploughing, and reducing the land to the finest possible state, dressing with special manures, weeding; and when ripe, come the pulling, rippling to collect the seed and seed-capsules; steeping in water for from ten to fourteen days that fermentation may take place in the juices of the plant, and the gummy matter which connects the fibre with the stem, that so they may become loosened—during which process a highly offensive odour is emitted. After the steeping, follow the spreading, or grassing and turning, for from six to fourteen days according to weather, for exposure to the sun, air, and the night-dews; stooking or setting it up on end to facilitate the drying; after which it is carried, and either stacked and kept dry for future manipulation, or at once scutched, hackled, spun, and sold to the manufacturer.

In consequence of the constant care and labour which the cultivation of the plant demands, the Irish farmer grows it but as a rotation crop, and this can only be done in from six to ten years, and by that time the necessary constituents which the flax requires to nourish and bring it to such a state of perfection as will give it any chance of being sold at a profit, have accumulated in the soil from the various manures which have been applied to the land for the support of the crops of the intervening years; which crops, not having required those special ingredients which the flax cannot come to perfection without receiving, have therefore not assimilated.

When flax is grown as a rotation crop, the Irish farmer usually stacks and thatches the dried stalks (or straw, as they are called); and the scutching (*i.e.*, the breaking and beating away of the useless woody stem), the hackling, and sometimes the spinning, are carried on under cover by himself and family during the idler winter months, and in this way he makes his crop of flax yield a profit.

Mr. William Charley, a gentleman of Belfast, greatly interested in the cultivation of flax in Ireland, and one of the jurors of the Exhibitions in 1851 and 1862, in his work on "Flax and its Products in Ireland," gives a statement of the cost of growing an acre of European flax, together with the commercial value of the crop; and this will enable our farmers to judge whether it would be more to their interest to cultivate, improve, and utilize our indigenous *Phormium tenax*, or cast it aside for the flax plant of Europe.

The most practical method, however, of deciding the question, will be to grow the two crops side by side as an experiment, and carefully note the result, at the same time remembering that the flax plant of New Zealand is perennial, while that of Europe is but annual. Without doubt, the flax of Europe would be a desirable addition to our list of acclimated crops for rotation at long intervals, even for the sake of its seed, for which, at present, it is chiefly grown in India, where a valuable oil is obtained from it for export; but at the present cost of colonial labour, I fear, from its being such a troublesome crop, that whether for seed or fibre it would not prove sufficiently remunerative to warrant any great outlay in its introduction for exclusive cultivation in New Zealand.

The following is Mr. Charley's statement for one statute acre, under an average crop:—

Total expenses on one acre	...	...	...	£9 15 10
Cr.			£ s. d.	
By sales, 29½ stones, at 8s. per stone	...	...	11 16 0	
By bolls, for feeding, 30 bushels, at 8d.	...	...	1 0 0	
				12 16 0
Leaving on the acre for profit	...	...	...	£3 0 0

With respect to the crop, the above is under the average, and Mr. Charley afterwards states that the average produce in Ulster is 30 to 35 stones of flax to the acre, and the average profit £4 to £5.