

The advantage of quantity was in favor of the second leaf this time, and another trial gave from—

1st. leaf, weighing 58.55 grammes	...	...	...	16.26 per cent.
2nd. leaf " 52.68 "	...	...	...	17.89 "
3rd. leaf " 36.35 "	...	...	...	19.06 "

Here the third leaf had the largest relative quantity of fibre, but was little more than 3-5ths the weight of the first leaf.

Although these various experiments do not give invariable results as to the relative strength and quantity of fibre from leaves of different ages, yet it may be concluded from them that they are nearly equal in both respects, and may be used indiscriminately in manufacture.

GROWTH OF PLANTS.

The growth of *Phormium* depends chiefly on the soil and position in which it is placed. In a large flax field of equable soil and moisture, where scarcely two bushes are exactly alike, and the finest varieties are to be found, there is great difference in the length of the leaves, while the same kinds that are stunted and yellow on dry and poor clayey ground, or in stagnant water, will flourish and rapidly increase if planted in a more congenial soil. The *Phormium* luxuriates in rich, moist, and well-drained ground, and reaches its greatest size on the banks of running streams, where the roots are abundantly supplied with nourishment by water that never stagnates about them. Wherever swampy ground has been drained (and not made too dry), there the flax increases in size, and becomes of a deeper green colour. This has been satisfactorily demonstrated by several manufacturers, and especially by Mr. Constable, at Waiuku, and Messrs. Nelson, at Napier.

The flax transplanted by the Natives does not appear to have improved in quality of fibre. The finest and whitest samples of Native-dressed flax, procured by the Commissioners, have been prepared at Waikanae and Otaki from plants growing naturally in and around the swamps; and the Natives never plant an inferior flax by way of improving it.

When every leaf has been cut quite down, as is generally the practice with those who supply the mills, the fan will send up within the first year from four to six full-sized leaves. Captain Hutton says that "swamp flax that had all the outer leaves taken off in January, had so many young leaves full grown by the end of April, that the casual observer would not have known that the plants had been cut at all." Mr. Keleher, of Waiuku, says that flax cut eighteen months ago has now six full grown leaves, and that cut seven months since has three leaves besides the centre one. Mr. Ritchie, of Wanganui, states that the growth of flax between August, 1870, and January, 1871, has been 5 feet. Mr. Seymour, of Picton, says that he can cut leaves every twelve months, and that several from each fan had grown 3 or 4 feet long in five months. Messrs. Benn & Walker, of Canterbury, find that flax can be cut every year, but they take care never to cut the centre leaves. Messrs. Stoneyer & Co., of Kaiapoi, say that they can cut every twelve months; and that flax cut in December, 1870, and again in December, 1871, had in June following four and five leaves to each fan, from 4 to 5 feet in height. How long the roots will continue to bear this treatment cannot yet be determined, for it has not been observed that any plants have been killed by constant cutting; but it is reasonable to conclude that if cut down year after year the plants will gradually be weakened, and die out. (If cattle have access to a flax field that has been cut, they will destroy the plants altogether, by drawing out the young leaves to chew the butts, of which they are very fond).

At a few of the mills, where the supply of water is limited, more prudence has been exercised, and the two or three centre leaves of each fan have been left standing. Messrs. Nelson, of Napier, adopt this plan, and they find that in twelve months, after cutting all but the three middle leaves, four fresh ones have sprung up, and they have four outer ones so completely matured that, if left standing for three or four months longer, many of those on the outside will be so decayed as to be unfit for manufacture, and they have lost a considerable quantity of leaves in this way.

Assuming that there is a similar growth in every flax plant, whether cut or not, *i.e.*, that four fresh leaves will start from the centre each year; and that there are on the average but eight or nine leaves on each fan, we arrive at the conclusion that after two years old the leaf, having reached maturity, commences to decay, and is not fit for manufacture.

Whether well-established plants, annually cut, will send out as many new fans as a bush that is left entire, remains yet to be observed and noted; but probably they will not.

The length and bulk of each leaf depends partly on the season of the year in which it makes its growth; for the flax grows all the year round, but more rapidly of course in the spring and summer. Mr. Rees found that after plants had been burnt down, the first leaves were shorter and less vigorous than those that grew after the plants had recovered the effects of the fire.

The centre fan, that bears a flower stalk, produces no more leaves, but dies away the following year; it may therefore be cut quite down without disadvantage.

The cultivated *Tihore*, flowers very sparsely, and often fails to perfect seed.

The Natives suppose that the best time of the year for dressing is the winter and autumn, and that the fibre is more easily stripped out at those seasons; but none of the manufacturers have observed any difference, and it is doubtful whether any exists in the matured leaves. The Natives strip flax in winter because they are engaged with their crops at other seasons.

VARIETIES OF THE FLAX PLANT.

The named varieties of flax are very numerous, but they are not generally and accurately distinguished even amongst the Natives themselves; and there is no doubt that the same variety has often a different name in different districts.

Tihore is usually a generic term for cultivated plants that have so fine an epidermis that the fibre can be torn out with the fingers only, and without using a shell.

There has been no opportunity yet of satisfactorily fixing the varieties; and it will be only when plants from all parts of the island have been collected at one place that they can be compared, and an accurate list compiled.

In Waikato and the Bay of Plenty, the *Oue* is the favourite variety; on parts of the West Coast, the *Atiraukawa*; at Napier, the *Tapoto* (probably the same as the *Oue*, as Major Heaphy suggests); at Wanganui, the *Huhiroa*; and at other places the *Ngaro*, *Manunu*, and *Rataroa*.

The accompanying list of plants has been collected from different sources, with such information as can be gathered with regard to the quality, strength, texture, and uses of their respective fibres.