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PUBLIC NOTIFICATION.

Crown Lands Office,
Auckland, 23rd April, 1867.

I HEREBY NOTIFY that all that piece or parcel of land mentioned in the schedule hereunder written, will, on Monday, the 27th day of May next, at the Waste Lands Office, at Auckland, be offered for Lease by public auction at 12 o'clock, noon. Conditions will be made known at the time of sale.

J. WILLIAMSON,
Commissioner of Crown Lands.

SCHEDULE.

Southern portion of Landing Reserve, in the suburbs of Matakohe, Parish of Matakohe, County of Marsden.

Lot.	Area. A. R. P.	Upset Price.
*54	0 0 20	0 0 0

* Subject to the charge of £160 for improvements.

PUBLIC NOTIFICATION.

By JOHN WILLIAMSON, Esq., Superintendent of the Province of Auckland.

UNDER and in pursuance of the powers vested in the Superintendent by virtue of the 8th section of "The Protection of Certain Animals Act Amendment Act, 1866," I hereby appoint the following persons, (in addition to those already notified,) to be Rangers under the said Act

Given under my hand at Auckland, in the said Province, this first day of May, One thousand eight hundred and sixty-seven.

J. WILLIAMSON,
Superintendent of the Province of Auckland.

Major Thomas Wilson, of Te Kawhia, near Ngaruawahia.
Mr. John Lamb, of Waitemata Mills.
„ John Watson, of Paerata.
„ Patrick Gorman, of Kohimarama.
„ John Moore, of Mount Eden.
„ A. Potter, of Surrey Hills
„ Thomas Brown, of One-Tree Hill.
„ George Lankham, of Auckland.

NOTIFICATION.

Superintendent's Office,
Auckland, May 1st, 1867.

THE following List of Persons who have taken out Licenses to Kill Game in this Province, under the provisions of the "Protection of Certain Animals Act Amendment Act, 1866," is published for general information.

J. WILLIAMSON,
Superintendent.

No. of nse.	Name.	Residence.
1	Mr. J. B. Jordan	Mahurangi
2	„ W. B. White	Mongonui
3	„ Wm. Butler	„
4	„ H. F. Speedy	Mauku
5	„ Wm. Cornthwaite	Mercer
6	„ A. H. Collings	Duck's Creek
7	„ Charles Mellsopp	Papakura
8	„ Robt. Maclean	Howick
9	Capt. Machell	Epsom
10	„ Wm. Fraser	Tauranga
11	Major Hamley	Auckland
12	Mr. John Udy	Epsom
13	„ E. P. Donnely	Howick
14	„ Wm. Hall	Mangarei
15	„ John Ogilvie	Mt. Eden
16	„ C. D. Foulke	Whau
17	Capt. Reeve	Auckland
18	Lieut. Creagh, M.T.	„
19	Mr. R. A. Eyre	„
20	„ J. Hately	West Tamaki
21	„ Wm. Trice	Maraitai
22	„ George Trice	Maraitai
23	„ Edward Owen	Auckland
24	„ Henry Greenacre	Papakura
25	Capt. Campbell	Auckland
26	Mr. George Purchase	„
27	„ Hargraves	Parnell
28	„ Thomas Cooper	Mangarei
29	„ Lyall	Epsom
30	„ George Brett	Parnell
31	„ W. Macgreor Hay	Papakura
32	„ Charles Paice	Mt. Roskil Road
33	„ Joseph Paice	„ „
34	„ Henry Jackson	„ „
35	„ Samuel Thomas Seddon	Howick
36	Colonel De Quincey	„
37	Mr. T. B. Gillies	Mount Eden
38	„ James Farmer	Official Bay
39	Capt. Edward Wheeler	Nelson
40	Mr. Wm. Young	Remuera
41	„ Thomas Russell	„
42	„ Wm. Walters	Papakura
43	„ Henry Hill	Auckland
44	„ Charlton Dawson	H. M. 18th Regiment, Auckland
45	„ Harold H. Fenton	Port Waikato
46	„ Richard Hobbs	Auckland
47	„ Jas. McCosh Clark	„
48	„ Edward Jones	„
49	„ Thomas Masefield	„
50	„ David Albert Parsons	„
51	„ Andrew Cunningham	Newmarket

CULTURE OF EUROPEAN FLAX.

PUBLIC NOTIFICATION.

Superintendent's Office,
Auckland, 25th April, 1867.

THE following correspondence relative to the culture of European Flax (*Linum Usitatissimum*), together with a Lecture delivered by Mr. James Macadam, Jun., "Secretary to the Royal Society, for the Promotion and Improvement of the Growth of Flax in Ireland," are published for general information.

J. WILLIAMSON,
Superintendent.

Waste Lands Commissioner's Office,
Auckland, 17th April, 1867.

DEAR SIR,—As I have reason to know that you were well acquainted, in Ireland, with the several processes connected with the cultivation and preparation of European Flax, as well as with its commercial value in that country; and as I am led to believe that the culture of it extensively throughout this Province would very materially conduce to the public advantage and prosperity, I am anxious to avail myself of the valuable aid and advice which your experience and judgment qualify you to afford, in bringing this question before the public for consideration.

With this view, I have the honour to submit to you the following queries, and to request that you will have the goodness to favour me with replies thereto at your convenience.—I am, &c.,

J. WILLIAMSON.

Thos. A. Kidd, Esq.,
Auckland.

QUERIES.

1. Are the soil and climate of the Province of Auckland suitable for the culture of European Flax?
2. Is there at present a class of settlers in this Province who have been accustomed to the culture of Flax?
3. Would such culture afford profitable employment to a large class of settlers, and be ultimately beneficial to the Province?
4. What encouragement would be sufficient to induce qualified persons to commence this culture in the first instance?
5. What would be the probable cost of growing the flax and preparing it for market?
6. Would there be a continuous demand for flax at such prices as would make the culture profitable?

Auckland, 20th April, 1867.

SIR,—I am in receipt of your letter of the 17th instant, relative to the culture of Europeon Flax in this Province.

To your queries therein proposed, I beg leave most respectfully to reply as follows:—

1st. Query.—Are the soil and climate of the Province of Auckland suitable for the culture of European Flax?

Much of the soil of this Province appears very suitable for flax growing. Strong deep loams on clay subsoil, rich alluvial deposits, and all lands that are suitable for wheat, are not only suitable, but should be exceedingly productive under European Flax.

The climate of this Province possesses in a high degree the essentials for the growth of flax,—moderate heat, moderate moisture, freedom from frost and drought. In the United Kingdom, and in Holland, Flax can only be sown at one season of the year, viz., April, or immediately after danger from late spring frosts is past; if later, a dry summer might prove injurious to the growing crop, both in quantity and quality, a dropping season being the most profitable for the grower. Flax, when grown for fibre, comes to maturity in little more than three months. When grown for seed it must remain longer in the ground to ripen: this, however, injures the fibre.

I have reason to believe, from the mildness of this climate, that flax might be sown during several months, and good yields of fibre obtained. Should experience confirm this opinion, the advantages of Flax culture in this Province would be enormously increased. There is an abundant supply of water throughout the Province for the purpose of steeping flax, and also for supplying power to numerous scutching mills that may ultimately be required.

2nd Query.—Is there at present a class of settlers in this Province who have been accusto ed to the culture of flax?

I know of many settlers from the north of Ireland who were regular flax growers at home; and I believe nearly all settlers from the north of Ireland, and many from Germany, have been accustomed to the culture and preparation of flax, having had full experience from the ploughing of the land and the sowing of the seed, to the finishing of the flax for market. Should it become desirable to spread the knowledge of flax culture throughout the Province, I believe men could be selected thoroughly qualified to become practical instructors. If the result of practical experience be that this Province is suited for the growth of European flax, the cultivation would speedily become very important. I am sanguine enough to believe that the natives would adopt the culture. There is nothing uncongenial to native habits in the labour or in the manipulation of flax. The land which they at present cultivate around their dwellings is very suitable for growing European flax. The requisite knowledge would be soon picked up from seeing others handle the flax crop; and though each native cultivation might be small in extent, ere many years the aggregate amount of flax produced by natives would be astounding. It has been said by the chairman at a meeting of the Royal Society for the Promotion and Improvement of the Growth of Flax in Ireland, that "Flax is essentially the poor man's crop. Flax can be cultivated in small quantities with much greater profit to the growers, and to the manufacturers who have subsequently to convert it into linen, than on a large scale. The careful preparation of the land, the large amount of labour necessary for its production, and the labour which its manipulation in the straw necessitates, are all reasons why the poor man should be able to cultivate it with a greater profit than the large farmer."

3rd Query.—Would such culture afford profitable employment to a large class of settlers, and be ultimately beneficial to the Province.

The amount of employment in the cultivation of flax is large, but of a nature requiring more the dexterity of women and children than the strength of able-bodied men. To clear bush, or break up some new ground, will employ a man more profitably than weeding flax, which his child can do quicker, and better, and with less injury to the delicate flax plant, than he could possibly do himself.

A great bulk of the flax grown in Ireland is grown by the smallest farmers, with the assistance of their families alone, the only money outlay being for purchase of seed and the hire of the scutch mill. The large farmer, who hires labour, estimates the cost at from six to ten pounds per acre, which is mostly earned by the families of the small grower.

The ultimate benefit to the Province would be incalculable. The prosperity of the north of Ireland is mainly to be attributed to flax production. It possesses no advantage in soil or climate. The land is divided into very small holdings, thirty

acres being considered a large farm. Rents are higher and better paid than elsewhere. A population of 235 to the square mile is maintained in peace and comparative comfort. Auckland has a better climate: land equally suitable for growing flax. Only prove that flax can be grown here, and you will soon have thousands of the very men who now grow the Irish flax flocking to your shores, not to ask for employment, but to settle on land of their own, and to employ themselves and their families in growing flax; thus producing a valuable article for export, of easy transit, and small bulk,—creating a new trade of almost unlimited extent,—increasing and improving agriculture,—forming nucleus of villages, &c.

4th Query.—What encouragement would be sufficient to induce qualified persons to commence this culture in the first instance?

Very little encouragement would be necessary to induce persons who have been accustomed to flax culture to resume so profitable an employment, if the question were settled as to the suitability of this Province for the purpose. A certainty of a supply of good seed, and a certainty of a regular market for the finished flax, at fair prices, would suffice.

To induce a first and a fair trial will not be an expensive affair. I would suggest that, say, 20 barrels of the very best liga flax seed be imported, which would probably cost in Auckland about (This would be sufficient seed for about 25 English acres.)	5	0	0
Premiums should be given for the best growing crops of flax, in three classes or more	50	0	
Premiums for the best scutched flax, also in three or more classes	50	0	0
A market should be guaranteed for the produce of this seed, say about 7 tons of scutched flax, at a price equal to the value of Irish flax of similar quality. As the object is the encouragement of growth, a loss may naturally be calculated between the price paid for flax here and the nett proceeds of sales, say, e [illegible], at £10 per ton	70	0	0
Probable cost of experiment	£220	0	0

The proceedings for the second and third year would be regulated by the experience of the first. I would expect, if the affair were taken up with spirit and well managed, that three years should establish the culture on such footing that further interference would be unnecessary.

The seed should be ordered by first homeward mail, and should arrive in Auckland not later than October. In the mean time, such persons as have had former experience should be induced to prepare suitable land, and seed should be guaranteed to them in proportion to the land they would prepare. The seed to be supplied free of cost, on condition of the produce being produced as scutched flax in Auckland, for exhibition, or for sale, or for shipment. As far as possible seed should only be supplied to qualified persons free of cost.

5th Query.—What would be the probable cost of growing the flax and preparing it for market?

Several detailed statements have been published from time to time by the Royal Flax Society of Ireland, one of which I annex:—

"Statement by John Barr, manager of the Earl of Caledon's model farm.

"CROP.

"Produce of 1a. 1r. 39p.—95st. 5lb., at 11s. 9d. per stone—94s. per cwt....	£55	19	7½
"Scutching tow	0	8	0
"130 bushels green flax bolls, value for cattle feed, 8d. per bushel	4	6	8
	£60	14	3½

"EXPENSES OF CROP.

"5 bushels of seed.....	£3	16	6			
"Weeding (by children) ..	0	10	0			
"Pulling, rippling, and steeping	4	3	8			
"Taking out of steep and spreading	2	1	4			
"Lifting and tying	1	2	8			
"Scutching at mill.....	4	9	4½	16	36	½
"Profit at the rate of £29 13s. 10d. per acre.....				£44	10	9"

This of course is the result of the best and most careful labour, and no necessary expense spared. I see no deduction made for rent or for preparation of the land.

The value of an acre of flax is estimated at from £20 for middling, to £40 for really good, per acre, and the cost of labour and scutching from £6 to £10 per acre.

6th Query.—Would there be a continuous demand for flax at such prices as would make the culture profitable?

The consumption of flax has been on the increase for many years, and prices have been gradually advancing. Flax spinning mills have been extending yearly. Very large quantities of flax are annually imported into Great Britain. Great exertions are made to extend the growth of Irish flax, yet the manufacturers express anxiety as to supplies. The latest prices I have seen quoted for Irish flax are from £60 to £120 per ton, as in quality. The demand for coarse, medium, and fine flax being equally brisk.

A system of selling flax in the straw has been commenced of late years, consequent on the introduction of new systems for steeping and preparing flax. A rettery is built in which every process of flax preparation is carried on under the closest inspection and in the most scientific manner. The grower pulls the flax and sells it in the straw at one of the rettery establishments, and has no more trouble with it. One farmer gives a statement of 18a. 0r. 27½p., Irish measure, which produced 77 tons 7 cwt. of flax straw, which he sold at £3 10s. per ton, amounting to £270. The cost of the crop, including rent, seed, and labour, poor rate and county cess, was £6 18s. per Irish acre, leaving a clear profit of £7 19s. per Irish acre.

This system has since been carried further. The proprietor of the rettery rents ploughed land, ready for the seed, for which I see by a late newspaper as high as £7 rent per acre has been paid for one crop of flax. He sows the seed and attends to the crop whilst growing, pulls the flax, and removes the straw to the rettery, where it is converted into the finished fibre, costing in the growing and various processes £45 per ton of fibre, which fibre is sold, according to its quality, at from £60 to £120 per ton.

These retterys would be equally suitable in New Zealand when the progress of flax culture would warrant the expenditure of erection. When I lef Ireland the spinners gave the preference to flax prepared by the growers on the old system of steeping.

I will be happy to answer other queries and communicate any further information I possess.—I am, sir,

Yours very respectfully,

John Williamson, Esq. THOMAS A. KIDD.

Auckland,
23rd April, 1867.

DEAR SIR,—I have to acknowledge the receipt of your communication of date the 20th, and to thank you for the promptness with which you have furnished the information I solicited in my letter of the 17th.—I remain,

J. WILLIAMSON.

Thomas A. Kidd, Esq., Auckland.

LECTURE

ON THE PRODUCTION OF THE FLAX PLANT, and the various Modes of Preparing its Fibre for Manufacture, by JAMES MACADAM, JUN., Secretary to the Royal Society for the Production and Improvement of the Growth of Flax in Ireland.

The production of the flax plant, and the preparation of its fibre for manufacture, have latterly attracted increased attention, both at home and abroad, and the Council of the Society of Arts have deemed the subject worthy of a place in the present course of Lectures. This raw material, and the various textile fabrics manufactured from it, were largely illustrated in the Crystal Palace; the former being shown by England, Ireland, and Scotland, Belgium, France, Russia, Austria, the Zollverein States, Switzerland, Holland, Sweden, Spain, Portugal, Turkey, and the United States of America, and the latter, by Great Britain and Ireland, Belgium, France, Prussia, Saxony, Wurtemberg; Austria, Switzerland, Spain, and Italy.

I propose to divide my Lecture into two parts: 1. The production of flax throughout the world; 2. The different modes employed to obtain from the plant that fibre which is the aliment of one of the four great textile manufactures of the globe.

I believe that the fibre of the flax plant *(Linum usitatissimum)* was among the earliest substances adapted to the clothing of mankind, as we find in the Old Testament frequent references both to the plants and to the fabrics made from it. Mr. Baines, in his "History of the Cotton Manufacture," observes, that in the time of Joseph, 1700 years before the Christian era, it is recorded that Pharaoh arrayed himself in vestures of fine linen (Gen. xli. 42). Allusion is again made to the same manufacture, two centuries later, in the time of Moses (Exod. xxxv. 25 and 35). So that linen appears to have been the national manufacture of Egypt, whose tombs afford strong evidence of the antiquity of this industrial occupation, and lead us to infer that, at least 3500 years ago, the delicate stems of the flax plant waved on the banks of the Nile, and that the spindle and shuttle—or some substitutes for these implements—were busily plied among a swarming population of wearers of linen. Paintings representing the culture of the plant, have been found on the walls of sepulchres at Eleithias and Beni Hassan, in Upper Egypt; and the latter contains an illustration of a kind of rude loom: linen, in fact, appears to have been the only kind of clothing in Egypt until after the Christian era. The Egyptians exported their "linen yarn" and "fine linen" to Israel, in the days of Solomon—2 Chron. i. 16; and Prov. vii 16), there "fine linen" to Tyre (Ezek. xxvii. 7), and the same fabric to Greece at the time of Herodotus; and under the Roman emperors they continued famous for the manufacture of linen and export of flax; and, indeed, up to this period linen was the chief article of clothing in all the countries west of the Indus. The material of which the mummy-cloths consist was long a *quæstio vexata* among the learned; but the late Mr. Thompson, of Clitheroe, has set all disputation at rest by his microscopic investigations, which proved that they were all linen fabrics. The term *byssus* used by Herodotus, had been variously translated; but we must now conclude that this byssus of the ancients was linen. I have prepared drawings of the fibres of flax, and of the same in their manufactured state, as unravelled from the mummy-cloths, with other sketches of the fibres of cotton. It will be seen on comparing these, that flax, whether in the fibre or the yarn, appears in the form of transparent tubes, straight and cylindrical, and articulated or jointed, like the sugar-cane, although the tenacity of the fibre is not thereby impaired. The cotton filaments are flattened cylinders, twisted like a cork-screw, and without joints. It is a curious fact, that although the majority of the mummy-cloths are of coarse texture, some of them have been found of a fabric rivalling the finest cambric; while, at the present day, the flax o Egypt imported for our manufacture, is the coarsest flax of commerce, and cannot be made into yarn, even with all our modern ingenious mechanism, fitted for weaving into a web one-third as fine as the Egyptians, with the rudest appliances, upwards of 3000 years ago prepared as wrappers for their dead.

It is probable that the culture and manufacture of flax were carried from the East to Europe by the Phœnician merchants, or the Greek colonists of Egypt and Syria; and in Homer we find allusions to the manufacture of linen in Greece. Once introduced in Europe, it rapidly spread over countries whose soil and climate were congenial to its growth. The history and tales of every part of the Continent teem with references to it, as one of the most general and best-understood departments of domestic routine; and, at the present day, there is scarcely a nook of that Continent where the plant is not grown to a greater or less extent. The greatest developement of the culture is between the forty-fourth and sixtieth parallels of latitude. North of these the climate is against its success, and south of them, although some is grown, the fibre is generally of such indifferent quality that the attention of the cultivator is chiefly directed to the production of seed.

At the head of all flax-growing countries stands Russia, whose vast superficies contains many favourable localities for its production. The average annual quantity furnished by Russia for export and home manufacture is about 150,000 tons, of which fully one half is exported, chiefly to Great Britain and Ireland, with a portion to France, Belgium, and other linen-manufacturing states. The provinces which furnish it are, in the east, Wologda, Jaroslav, Gostrorna, and Wiatka; and in the west, Pskow, Witebska, Lithuania, Courland, Esthonia, and Livonia. The greatest quantity is grown between 48° and 60° north latitude, and 22° to 28° east longtitude. The produce of these districts is shipped from the ports of the Baltic and the White Sea, fully one-half of the entire quantity being exported from Riga. In the provinces about the Black Sea and Sea of Azov the plant is also cultivated to a great extent, but solely for the seed, the stems being used as fuel. Russian flax ranges from very coarse to medium quality, being now worth from £26 to £48 per ton. It is never fine, since the rapidity of growth during the short, hot summer, and the want of moisture in the climate, tend to make the fibre either wiry and harsh or else cottony, without the peculiar oiliness of feel and glossiness of appearance, which are the certain indications of a fibre easily divisible on the hackle, and capable of being spun to fine Nos. of yarn. Among the many specimens of Russian flax in the Exhibition, I noticed some very silky, lustrous fibre from Vladimir, which was, however, very uneven in quality; also some immensely long from Esthonia.

In the peninsula of Scandinavia flax is, in all except the most northern districts, grown to a small extent for domestic manufacture, and some is exported. In Denmark, the climate being more favourable, better fibre can be obtained; and there has lately been an improvement in the quality, through more pains being taken with the details of culture and preparation.

Austria produces about 65,000 tons annually, chiefly in Bohemia, Gallicia, Hungary, and Transylvania. About 1000 tons are annually exported, and some 800 tons are imported, for local manufacture, from other countries. The samples from Hungary and Transylvania shown in the Exhibition were above average. The Styrian specimens were short, and not fine.

Switzerland possesses a few spinning factories, and flax is cultivated for their wants, as well as for the domestic manufacture of linen among the peasants. The specimens of fibre exhibited by that country, were of coarse quality.

Throughout Germany a large quantity of flax is grown, especially in Silesia, Wurtemburg, and

Bavaria. Very little is exported. The quality varies considerably, being, in some cases, pretty fine; but, owing chiefly to want of skill in the manipulation, the bulk is inferior.

France produces annually some 25,000 to 30,000 tons, of which a portion of the finer qalities is exported. The northern departments, and more especially the districts along the river Lys, are the best adapted to its culture; and some of what is grown in them rivals the Belgian in quality. The average value, at present, is about £70 per ton. In Brittany, and other districts where hand-spinning prevails among the peasantry, the quantity grown for that purpose is considerable. In Poitou, Anjou, Touraine, and other midland and southern provinces, the crop is still cultivated, though to a less extent than formerly.

The Iberian peninsula, possesing so great a variety of climate and soil, is in many places well suited to this culture. Galicia and the Basque Provinces are its chief seat in Spain. Zaragoza produces some of fair quality. Segovia, Leon, Huesca, and Aragon, have all shown specimens at the Exhibition, from which, however, it is manifest that the culture and preparation are in the rudest state. Portugal showed some fine, short straw, but the samples of fibre were soft and weak.

In the Mediterranean countries little flax is, at present grown, and that chiefly for home use. In the rich plains of Italy hemp is produced with more success than flax, the fertile soil and great heat giving a luxuriant growth of strong, hard fibre, fit for cordage and other coarse purposes, but unsuited for the range of fabrics to which flax is generally applied. In Piedmont, Asti and Montferrat furnish a considerable quantity, but of indifferent quality. The Island of Sardinia grows much flax, which is used for home manufacture, or sold to Genoese merchants.

Holland ranks high for the excellence of her flax, and with her neighbour, Belgium, was early celebrated for her linen manufacture; the term *brown hollands* being to this day applied to certain kind of fabric made largely in Ireland. About 6000 to 8000 tons of fibre are annually produced, and chiefly consumed in England and Ireland. The quality is very good, and strongly resembles Irish flax.

Belgium occupies the same position as to quality that Russia does as to quantity, the Belgian flax being, indisputably, the finest in the world. From 20,000 to 25,000 tons are annually produced—a large proportion being of sorts that sell from £90 to £140 per ton. Great Britain, Ireland, and France, are the greatest consumers of this fine flax, although a considerable quantity is retained for manufacture in Belgium, where, among other fabrics made from it, is the exquisite lace of Brussels and Mechlin, the thread of which is in some cases worth double its weight in gold. It is in the two Flanders that the crop is chiefly grown; but in Brabant, Hainault, Namur, and other provinces, it is also to be found in large quantities. The fertile district extending from Ghent to Antwerp, and known as the Pays de Waes, furnishes more *fine* flax than all the rest of Europe. Although Belgium possesses peculiar natural advantages for the culture of the plant, much of this success must be attributed to the extreme skill and care of the cultivators, who have attained absolute perfection in the treatment of the crop; and it is very probable that, were the same pains taken elsewhere, some favoured districts of other countries might rival Belgium in this branch of husbandry.

Of our own countries, Great Britain furnishes but a small quantity of flax, while Ireland produces a much larger proportion. In Yorkshire, the Eastern counties, Devonshire, and Somersetshire, some is grown, though, with the exception of Yorkshire, to an unimportant extent. In the south of Scotland a little is also grown.

But in Ireland, in which, from a very early period, the linen manufacture has been successfully prosecuted, flax culture is now progressing rapidly, and presents an important feature in Irish agricultural produce. The growth has increased during the last four years from 53,863 to 138,609 acres, which last year's statistical returns show to have yielded 34,000 tons of fibre, and it is calculated that the value of the crop is not much under £2,0 0,000. This remarkable increase, where the article has to compete with foreigh flax admitted free of duty, shows the natural elements of its successful production to be present to a large extent. And, latterly, in consequence of the pains taken to introduce the best systems of culture, and the carrying out of new inventions for the after-processes, the quality of the fibre, and the manner in which it is prepared for market, are both improving. Irish flax sells at prices varying from £35 to £100 per ton. The province of Ulster has hitherto produced nearly all the flax grown in Ireland; but through the exertions of the Royal Belfast Flax Improvement Society to spread it over the other proviuces whose natural capabilities are equal, or in many cases superior, it bids fair to be generally grown throughout the island, as, while in 1848 only 2860 acres were grown without the bounds of the northern province, in 1851 there were 14,893 acres. This extension must be looked upon as a great boon to the Irish farmers, who have been suffering so severely from the change of duties on other agricultural produce, aggravated by the total loss of their main crop, the potato, and the desolating effects of famine and pestilence.

The success attained in Ireland has naturally led the sister countries to bestir themselves, and there is every reason to believe, that flax will soon take its place among other crops in all the districts of Great Britain which are so circumstanced as to allow of it being profitably cultivated.

In many parts of Asia some flax is grown, though, since the days of the Jewish kingdom, this branch of industry, deserting the East, has sought its extension rather in the West. In Hindostan, a considerable breadth is still cultivated, solely for the seed, which is exported to England, and is all consumed by the oil-mills.

Egypt, the natal soil of the plant, and the earliest linen-manufacturing country, still produces about 2500 tons of fibre annually, which is exported, and the quality is very inferior. Until within a few years past, the mode of cleansing the fibre was of the most primitive nature, the stems, after steeping, being beaten with stones to loosen the pith, and the fibre then roughly cleaned by striking them against a wooden post. In the development of Egyptian agriculture, begun by Mehemet Ali and continued by Iblahim, flax was not forgotten, and a number of scutch-mills, of the most approved construction, with steam-engines to drive them, iron ripples for taking off the seed, and other necessary implements, were obtained from Belfast; persons acquainted with the several processes were hired from the north of Ireland, and the result of these measures has been a considerable improvement in the quality and handling of Egyptian flax.

On the continent of America, although much land is suitable for flax, and the climate of many localities favourable to the maturing of an average quality of fibre, but little has as yet been grown. The great obstacle has been the sparsity of population and high price of labour. In the United States the crop is grown in different districts. About the Ohio, and in the Western States bordering on the Mississippi and its tributary streams, in their rich alluvion, a large breadth is grown for the seed, which is locally consumed in the oil-mills, and the cake made from it forms an item in the imports of American produce at Liverpool. In the State of New York, the Report of the Commissioner of Patents, notes upwards of 40,000 acres to be grown, partly for the seed alone, but a proportion also for the fibre, since the population is less scanty, and constant immigration maintains the wages of labour at a lower rate than in the Western States. More attentian has recently been directed to economizing the fibre. An individual from Belfast has settled in Wisconsin,

and established a factory for retting and scutching. This spring several Americans have visited Ireland to obtain information, and it is probable that Schenck's system of retting, originally invented in America for the treatment of hemp, will be adopted there for flax also.

In Canada some flax is grown, especially among the French "*habitans*," who have followed the early practice of their mother country in making linen for family use. The fibre does not constitute an article of export, though some seeds occasionally finds its way to England. In the colony of Nova Scotia an effort is now being made to establish the culture, with proper machinery for preparing the fibre.

The only other country of the American continent to which I have occasion to refer is Mexico. While, in the "*tierra caliente*," and the low lands generally, the plant could not be profitably grown, in the high table-land of the Andes, about Puebla and Orisaba, recent experiments have ascertained that it will thrive, the altitude and the genial moisture of the climate overcoming the disadvantage of intertropical heat. Scutching machinery has been taken out by some enterprising traders, and skilful persons engaged from Ireland. Mexico is a large consumer of our linens, and I believe it is in contemplation, if the growth of the raw material progresses favourably, to commence the manufacture of the fabric, as has already been done in the case of cotton.

On the continent of Australia, although flax has frequently been spoken of as a prospective branch of agriculture, I fear the great aridity of climate, and the scarcity of water for steeping, will preclude any chance of success, while the dearness and small supply of labour would render the culture unremunerative. In Van Dieman's Land, however, it is stated, that some successful trials have lately been made, the climate having sufficient moisture, and the supply of water being pretty abundant. In New Zealand the *Phormium tenax* has so much occupied attention that few trials have yet been made of the *Linun usitatissimum*, with which it is often confounded, from the term *flax* being indiscriminately applied to both plants I have no hesitation in saying, that from their humid climate and maritime position those islands should be peculiarly suited to its growth ; and it is not at all unlikely, that, as population increases, New Zealand may be a large exporter of flax fibre.

From the foregoing survey, a few general facts may be gathered relative to the range of climate and soil in which the flax plant may be cultivated, with the peculiarities of the products, as affected by locality.

It will be seen that the temperate zone is the flax region *par excellence*, in so far that within its limits the fibre attains the greatest length and the finest quality. Northern latitudes, at the extreme verge of this belt, or beyond it, are unfavourable to the maturing of fine fibre, in consequence of the shortness and warmth of their summers. In order to perfect a soft, yet strong, pliable, and lustrous fibre, easily devisable by mechanical means into minute filaments, a slow and regular growth is requisite. Where a powerful sun draws the plant too rapidly to maturity, the fibre is hardened, splits with difficulty, and is wanting in silkiness. In intertropical countries the plant grows with sufficient luxuriance, but has a tendency rather to extend latterly in branches, bearing a large quantity of seed, than to push forward a slender, upright stem, almost or entirely branchless, while the fibre of hot countries is invariably coarse and hard.

Humidity being indispensible to promote regularity of growth, and to enable the plant to elaborate from the atmosphere the constituents of its fibre—chemical analysis having demonstrated that this valuable substance is chiefly derived from that source—maritime districts, especially those which first receive the evaporations of the ocean, are those in which the flax fibre is produced in the greatest perfection. Belgium, Holland, Denmark, the north-west of France, the British isles,—especially Ireland—are all more favourably situated than countries within the same latitudes in the interior of the Continent.

As to soil, the plant takes an extensive range, and will, in fact, grow well on almost any kind, provided the climate be favourable. In the artificially enriched sands of Belgium, the polders of Holland, the clay-slate of Ulster, the peat of Connaught, and the limestone of central Ireland, excellent flax is grown. To show the variation of some of the leading constituents in flax soils, I give the following table of a few from analysis made by Sir Robert Kane, and by Messrs. Mayer and Brazier :—

Per Cent of	Russia.		Belgium.		Holland.	Ireland.	
	Livonia.	Lithuania.	Hesteert.	Duffel.		County Derry.	County Armagh.
Silica . .	79·34	85·09	75.08	92·78	60·94	64·93	73·72
Lime . .	Traces	·85	·35	·35	·36	3·04	1·67
Alumina .	11·62	2·24	2·10	·48	5·62	6.65	8·97
Iron . .	Traces	Traces	3·29	1·20	6·04	·60	·31

But, notwithstanding the great diversity of soils in which flax will succeed, the alluvial deposits of rivers furnish the best fibre Holland and Belgium, composed in great part of the alluvion brought down by the Rhine, the Scheldt, and the Meuse, are eminent for their flax ; and in Ireland the low lands along river banks are, for the same reason, found to furnish a superior fibre. There can be no doubt that the supply of rich, friable loam, afforded by the yearly overflow of the Nile, has been the cause of Egyt so long continuing a great flax-growing country, while other fertile tracts of Africa, in the same latitude, have not cultivated it to any extent.

For the production of seed, hot climates are the most favourable, the yield being greater, and the seeds larger, plumper, and more oily than in temperate countries. Seed-crushers find the flax-seed of India the most productive, as it contains about 28 per cent. of oil, while Baltic seed gives but 22 per cent. In like manner, the seed shipped from the Black Sea and Sea of Azov, yields more oil than that from the northern parts of Russia.

I now proceed to the second part of my subject, viz., the different methods employed to prepare the fibre for manufacture.

After the flax crop has been pulled, when the seeds are separated from the stem, the latter consists of three distinct substances,—the pure fibre, the ligneous stalk, and the gum, glue, or resin, incorporated with fibre. By quantitative analysis, with incineration, the entire plant exclusive of its seed, is stated, by Sir R. Kane, to be composed of the following elements :—

Carbon	38·72
Hydrogen	7·33
Nitrogen	·56
Oxygen	48·36
Ashes	5·00
	100·00

Thus only five per cent. appears to be solid, the rest consisting of gaseous matter. The pure fibre, when analyzed, gives a scarcely appreciable amount of ash, so that the great mass of inorganic matter is contained in the ligneous stem and the gum ; the stem containing, according to the same chemist, 1·57 per cent of ash, and the disiccated extract of the steep water, in which the gum had been chemically changed and dissolved, gave 42·01 per cent of ash.

On breaking a stem of flax, and stripping off the fibre, the interior appears hollow, like a stalk of hay. The fibre, though apparently clean, will, on microscopic examination, be found coated with a gummy or resinous matter, which prevents the minute filaments from coming asunder. As this gum cannot be separated by mechanical means, it is necessary to get rid of it by chemical decomposition. It is probable that, in the earliest period of the linen manufacture, the fibre was employed just as separated mechanically from the stem, and that observation of the effect of water and of the atmosphere, in the bleaching and washing of the linen, equally called attention to the advantage of purifying the fibre, before spinning and weaving, and pointed out the simplest mode by which this purification could be effected The saturation of the stems, at a temperature of about 70° Fahrenheit, was found to cause decomposition in the gum ; and by freeing it from the fibre, rendered the latter capable of being spilt into finer filaments, and of being more easily spun, while it avoided the great loss in the bleaching of the linen

The constituents of the gum are found, by analysis, to be silica, lime, alumina, potash, chlorides of potassium and sodium, magnesia, and sulphuric phosphoric, and carbonic acids The most usual mode of decomposing the gum is that termed steeping or retting—the flax stems, either when freshly pulled, or after being dried, being immersed in lakes, rivers, or pits artificially formed and filled with water ; when the putrefaction ensues, the gases and salts are set free from the earthy matters, the earths being held in suspension by the water, the salts dissolved in it, and the gases evolved. In seven to twenty-one days the purification of the fibre is complete, the flax stems are taken out of the water, and after being spread to dry on grass land, they are subjected to the scutching process, which beats away the ligneous interior, and leaves the fibre in a state fit for the manufacturer. This is the system so extensively practised all over of Europe by the growers, and nine-tenths of the flax of commerce have been thus treated. In some districts of Holland and Belgium, alder leaves, the mud from the bottoms of the pits, and other substances, are empirically used as a covering for the flax, to impart to the fibre a certain tint.

The river Lys, which flows through the north of France and the south of Belgium, has been found peculiarly suited to flax-steeping, and the celebrity of its waters has given rise to a system of factorage ; the growers, even at a considerable distance from its banks, finding a market for their straw with persons whose business is to steep and prepare the fibre for their own profit. They pack it in wooden frames, which are anchored in the stream, and kept, by means of weights, under its surface, and the fibre so treated has a much lighter colour than the most of what is steeped in pools. Latterly a practice has obtained some extent of steeping the flax twice, that is, of taking it out of the river when the fermentation is about half completed, drying it partially on the bank, and then again immersing it until the process is fully completed. It appears that this modification of the usual plan renders the fibre stronger, and gives a larger yield. The peculiar virtues of the river Lys have led many persons to imagine that its waters contain some particular chemical ingredient which acts upon the gum or the fibre. In order to ascertain whether this could be the case, I obtained some of the water from opposite Courtrai, and had it analysed by Professor Hodges, of Queen's College, Belfast. He did not find anything peculiar, except a small deposit of vegetable fibres, which the microscope showed to be minute filaments of flax. Although it was in mid-winter that the water was taken from the river, and that the steeping is carried on only from April or May to October, the great quantity of flax prepared in this stream apparently causes its water always to contain, in suspension, a portion of the fibres of the plant. Hence, Professor Hodges supposes that, in addition to the natural advantages of the Lys, from the slowness of its current, and the softness (to use a vulgar but well understood term) of its water, the presence of these small fibrous particles may act like yeast in brewing, and hasten or facilitate the necessary changes in the fresh flax stems, or, in other words, that the whole water of the river may be looked upon as a sort of weak infusion of flax.

Another system of retting prevails, though to a less extent, in the east of Russia, and in certain parts of Germany, Belgium, England, and the United States of America: it is termed *dew-retting*. The flax straw, in place of being immersed in water, is spread, either after harvesting, or in the following spring, on the open fields, where the rains and dews, and often the snows, effect, by maceration, the decomposition of the gum. This mode is much more uncertain in the duration of the process, and rarely produces a fine quality of fibre, which it has a tendency to render harsh and dry.

Several plans have been suggested, from time to time, for puryfing the fibre by direct chemical agents, in order to obviate the defects of the ordinary mode of steeping. These defects consist in the uncertain time required for the process, every change of temperature in the air, and every fall of rain, affecting the fermentation. Thus great attention is demanded from the farmer to ascertain the precise moment when the gum is entirely disengaged, and before the strength of the fibre has been injured by the action of the water, which has become charged with the substances separated from the former, and chemically altered. As the necessary degree of skill and care is not possessed by many farmers, nothing is more frequent than under-rating or over rating : the fibre in the first of these events remaining harsh and coarse, and in the second becoming weak and cottony. The agents tried with a view to supersede steeping have been acids, alkalies, lime, soap, &c., but in all cases they have failed to produce a fibre with the qualities sought by the mannfacture.

About four years ago, Mr. Schenck, of New York, patented a mode of steeping, which had been employed with advantage in America in the treatment of hemp—the former mode of obtaining the fibre from that plant being analogous to that adopted with flax. His plan, which has since been extensively carried out in Ireland, and tried in Great Britain and Germany, consists in maintaining the water at a uniform high temperature by the means of steam. For this purpose wooden vats are employed, having a false bottom, under which coils of metal pipes are introduced, and the flax straw being packed in, the vats are filled with water, and the steam introduced into

the pipes, so that the temperature of the water rises to 80° or 90°, which it is not allowed to pass. In this way the fermentation proceeds rapidly and uniformly, and in about sixty hours the fibre has become completely purified. The water is then drawn off, and the flax straw taken out of the vats, the sheaves untied, and the stems placed between flat wooden sticks, fastened at the ends, and hung up to dry in open sheds constructed for the purpose, after which it is scutched and sold to the spinners. Although this method of steeping is now employed pretty extensively in Ireland, there being last year eighteen retteries, at which the produce of about 8,000 acres were purchased, there are many different opinions as to the most judicious mode of carrying it out. The principle is universally approved of, the advantages of the division of labour being here, as in everything else, fully apparent. In place of the individual growers taking up the critical operation of steeping once in the year, there is a regularly organized establishment, where this business is constantly carried on, and the workers, consequently, become very expert; as an instance of which it may be stated, that in one of the Irish retteries fifty persons now can do the work that eighty were required for at first, so greatly have they acquired the facility of manipulation from a twelvemonth's practice. The uncertainty, caused by variations of temperature and atmospheric changes, is avoided, by the maintenance of the water at a regular heat, and the process being conducted under cover, the grower is relieved from all trouble, by his crop being purchased at maturity. In so far the advantages of the plan are obvious, but there are different views as to the best mode of carrying it out. Some maintain that 80° is too high a temperature, and state that they obtain a better and stronger fibre by employing less heat. Some steep the straw twice, others once, and others again wash it, after steeping, by letting off the saturated water, and allowing it to soak for some hours in a fresh charge of water. Others, before hanging it up to dry in the sheds, spread it for a few days on the grass. But all these points must be decided by experience, and no doubt the retters will ultimately arrive at the best and most economical modes of conducting the various processes.

A curious method of retting has been recently invented by Mr. Bower, of Rawcliffe, in Yorkshire. The straw is placed in an iron cyliender, from which the air is exhausted by a steam-engine. Hot water is then driven in, and immediately forces itself into the hollow stems, thoroughly macerating them, and rendering the fibre in a few minutes capable of being separated by scutching. It is spread on the grass for some days before scutching. As yet this process is not sufficiently tried and developed to enable me to express a decided opinion on its merits.

I have already adverted to the mechanical separation of the fibre, without previous steeping, as probably the earliest means employed. This plan has been at different periods revived, and has latterly been again brough forward by Mr. Donlan, and others. The fibre, thus obtained, cannot be considered suitable for the manufacture of any fabric requiring to be bleached, since the gum would have to be got rid of afterwards; and of course it is better to begin with a fine fibre than with one loaded with foreign substances, certain to be decomposed in the wet-spinning, the boiling of the yarn in alkaline ley, to boiling of the linen in the same, the alternate dips in acidulated water and solutions of chloride of lime, the washing with soap, and the final bleach on the grass. It would be impossible to obtain a close, compact, and strong web, if the fibre containing the gum were employed. But it has been stated, and with every appearance of accuracy, that for all coarse purposes, where no bleach is required, such as for ropes, cordage, bagging, rick and truck covers, waggon-tilts, &c., &c., the dry-prepared fibre may, with advantage, be employed, as it possesses great strength. In many of these cases, the oiling, painting, or pitching of the fabrics, would further secure them against the effects of moisture on the decomposable matter.

There remains only to notice M. Claussen's process by which he proposes to convert cut flax-fibre, through the alternate action of certain acids and salts, into an article resembling cotton, and capable of being spun on cotton machinery; and likewise, by similar means, to reduce it to a fibre resembling wool, and possessing its properties of felting. On the details of this process it is not necessary for me to enter, as it has been so frequently brought before the public. Until sufficient proof of the correctness of the inventor's expectations, founded on the actual working of the flax-cotton and flax-wool in Lancashire and Yorkshire, be adduced, it would be unbecoming in me to lay before you any opinion of my own concerning them, further than to say that, should experience verify the inventor's statements, a greatly increased demand for flax would take place.

Having detailed the different modes of preparing flax-fibre for manufacture, I may allude briefly to the mechanism employed in the final, or scutching process, which is that by which the fibre, freed from its impurities, is separated from the woody stem, and rendered fit for the spinner.

Throughout the Continent, in all flax-growing countries, hand-labour is employed for scutching flax, and the instruments by which it is accomplished are very simple. The straw, when steeped and dried, is beaten with a wooden mallet, until the woody parts are bruised and broken up. The fibre is then freed from the wood by being struck repeatedly with a narrow wooden blade, and is sometimes afterwards scraped with a blunt knife, to free it from any bits that may still adhere, and to split up the broad ribandy knots of fibres into their component filaments. Much employment is afforded by this process, especially in the winter months, when all out-door labour is in abeyance.

In Ireland, while a considerable portion of flax is scutched by hand, the process is chiefly effected by machinery. In common with all other departments of labour, where the action of machinery can be substituted for the human arm, it is rapidly taking the lead, and successive improvements in the principal of the mechanism are bringing the process nearer perfection, both as to the neatness and regularity of the workmanship, and the avoidance of waste. The machinery consists of two distinct parts;—the first for breaking or bruising the flax-stems, and the second for cleaning out the fibre. The bruising is effected by passing the straw through several pairs of metal rollers, fluted or grooved to different widths;—the first pair having these grooves about two and a half inches wide, and the others decreasing to half an inch. The wood of the flax-stems is thus at the same time crushed flat by the weight and pressure of the rollers, and nicked or broken at intervals by the action of the grooves, while the fibre remains uninjured. The second, or scutching process, is an adaption of the plan employed in hand-labour, the wooden blades being attached to the extremities of arms inserted, like the radii of a circle in an axle, and when driven by power. They revolve with rapidity, striking, with considerable force, on a handful of the bruised stems, presented to their action by a workman who skilfully twists or spreads them, so that the blades may act upon every part.

There are some inventions intended to combine with the striking-blades the action of a scraper or a brush, with a view to cleaning off any remains of the bark or gum, and of splitting up the bundles of fibres. The machine invented by Mr. Plummer, of Newcastle-on-Tyne, and shown in the Exhibition, displays the adaptation of brushes of wire; hair, and whalebone, to the scutching-blades.

A machine lately brought out by a Belgian, and adopted to a small extent in Ireland, being to a certain degree self-acting, possesses the advantage of dispensing with skilled labour, and thus reduces the cost of working. In it the beaters are two long sets of iron bars, rotating in opposite directions; and the

flax straw, after being bruised, is placed in metal-holders, something similar to those used in Marsden's hackling machine; and these holders, being placed upon a slide, are carried along the machine by a leather band, the beaters striking the flax during their passage.

Notwithstanding the many improvements in scutching machinery, it still requires further attention. The chief desideratum is to clean the fibre thoroughly, without tearing off any of it with the wood. A considerable waste occurs, even with the best machinery at present in use, consisting of torn fibres matted together, which, under the name of codilla, or scutching-tow, brings in the market only a sixth or a tenth of the value of long flax. The cost of scutching bears also an undue proportion to the other processes, and will no doubt be, at some future time, more economically performed.

The employment of machinery for scutching is, as might be expected, leading to a displacement of the hand labour. Many scutch-mills have been exported to Egypt, Russia, Germany, Denmark, France, and other countries, and no doubt both the scutching and the spinning of flax by machinery will soon be universal.

In the details which I have had the honour to lay before you, taking for my text the display of flax products in the Great Exhibition, I have endeavored to present some general information on the distribution of the plant at the present time throughout the globe, briefly describing the different methods employed for the separation of its fibre.

I should be highly remiss were I to conclude, without an allusion to the influence which the Exhibition may be estimated to produce upon the quantity and the quality of this raw material, that shall in future be furnished for the aliment of the linen manufacture. By the display of the article produced by different countries, visitors have been enabled to compare and weigh the merits and demerits of each sample; to observe in what respect the Russian differed from the Belgian, the Egyptian from the Irish, and the Dutch from the French; and to note which was suited for canvas, which for threads, and which for fine linens, damask, or cambric. In examining the fibre produced by different modes of retting, and cleaned by different methods of scutching, and in inspecting the machines exhibited, those interested in developing the resources of their respective countries have doubtless carried away many useful ideas. The evident room for improvement which still exists in the retting and scutching operations will turn many ingenious minds to the devising of more efficient modes of effecting these processes. Indeed, since the closing of the Exhibition, several new plans respecting these have been brought forward, some of which appear to possess considerable merit.

An influential association organized at Belfast, eleven years ago, by the union of the leading landed proprietors of Ulster and the flax-spinners and linen-manufacturers of Ireland and Great Britain, having acquired, through its experience, much valuable information, and having been the means of introducing several useful improvements in the culture and preparation of flax, naturally attracted the attention of those foreign exhibitors and visitors who were interested in these subjects. I cannot more appropriately demonstrate the general tendency of the Exhibition in arousing a spirit of inquiry, than by quoting the following passages from the Report of the Royal Belfast Flax Society for 1851:—

"The interest," it remarks, "which has for some time prevailed in foreign countries on the subject of flax culture, and the curiosity excited by the Society's labours, caused a number of persons to come from the Exhibition to Belfast, in order to inquire into the improvements which the society has introduced. Among these were individuals from Russia, Prussia, Austria, Saxony, Bavaria, Wurtemburg, Spain, France, Sweden, and Sardinia. According to invariable practice, all were received with courtesy, and the information required was freely accorded them. The Society's instructors have ever been well received on their visits to Belgium; and in reciprocating such good feeling to foreigners, it has appeared to the Committee that, while no attempt to conceal improvements can prevent them from being ultimately discovered, it is of great advantage to Ireland that such generous rivalry should be encouraged; for she, in her turn, may profit, as she has already profited, by foreign discoveries; and it must be considered a privilege that the Society has thus been enabled, in however slight a degree, to cement those bonds of good feeling and mutual friendly offices, which, by encouraging international commerce, must tend to the advantage of the world at large."

It may be advantageous to append to this lecture a few remarks upon the most judicious mode of entering upon or of improving the cultivation of flax in the British Islands. The tendency of recent legislative enactments has been to draw attention to the agricultural products which the climate and soil of the British Isles are best calculated to furnish with profit to the occupier of land. It has been already stated, that all the elements of success in the production of flax are present, and it is only necessary to provide that proper instruction in the details of culture shall be given the grower, and that the mechanical appliances for preparing the fibre for sale shall be provided. The best soil is a friable loam, well drained. Flax may follow a corn crop, and clover and grass seed may be sown with it. Two ploughings and harrowings in winter, and a third harrowing before sowing, are necessary, but no manure is required. The seed may be either Riga, Dutch, or home-saved. Riga gives the hardiest plant, Dutch the finest fibre; but well saved seed, grown at home, from a sowing of Riga in the previous year, is equal, if not superior to foreign. In subsequent years it deteriorates, and should only be used for feeding or sold to the crushers. April is the best month to sow, the land being made up in flats about ten feet wide, and the sowing broad cast harrowed in with a bush harrow. If weeds rise, the crop should be carefully cleaned by children, care being taken not to injure the delicate stems of the flax. In the latter end of July or the beginning of August the crop may be pulled up by the roots, not cut as grain. Then, after taking off the seed-pods, by drawing the stems through a machine with iron pins, termed a "Ripple," the stems may be at once steeped in pools of water, or the plant, as pulled, may be tied up in small handfuls, and stooked as grain, but so that all the tops are exposed; then, when thoroughly dry, stacked, the seed threshed off in winter, and the stems steeped in the following summer. When steeped in the ordinary method, in pools or streams, from one to three weeks are required. The test of the fermentation being completed is the power of separating the fibre from the woody stalk, by breaking the latter in the middle, and pulling off the fibre for the entire length of the stem. When taken from the steep the stems are spread on the grass to dry, turned when the upper side is dry, and then stooked again in bundles for a few days and stacked afterwards. The scutching or cleaning of the fibre for sale, is accomplished as previously noted in this lecture. Leeds, Belfast, and Dundee, are the chief markets; and the value of British and Irish flax ranges from £30 to £160 per ton. The produce of a statute acre is about five hundredweight of fibre, and fifteen bushels of seed. The latter is worth 5s. to 6s. per bushel for feeding.

Owing to the high price of labour in England, flax cannot be profitably scutched by hand. Hence in a district where it is about to be introduced, a scutch-mill is absolutely necessary; the machinery for which, exclusive of buildings and motive power, costs about £150, and will clean the produce of an acre per diem. The best machinery is to be procured in Belfast.

As a rotation crop flax is very valuable. It is the best nurse of grass and clover, since the pulling of the flax moulds or top-dresses the young plants, which

thrive much more vigorously afterwards, than when sown with barley or oats. From the short time it occupies the ground—from April until August—it is possible to take a crop, afterwards, in case grass and clover have not been sown with it. Late kinds of turnips, such as stone or Norfolk globe, rape, or winter vetches, may be sown after the crop has been pulled.

It has now been ascertained by direct chemical analysis, as well as by practice and experience, that flax is not, as is commonly supposed, a peculiarly exhausting crop, but that in point of fact it draws less organic matter from the soil than most of the plants commonly cultivated.

It is, therefore, at the present time, very deserving of the attention of the British farmer, as, if extensively cultivated at home, the supply from abroad of flax, flax seed, and oil cakes, amounting to £6,900,000 sterling per annum, could be replaced by the produce of British soil and British labour.

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