

SESS. II.—1879.
NEW ZEALAND.

CULTIVATION OF FLAX

(PAPERS RELATIVE TO).

Presented to both Houses of the General Assembly by Command of His Excellency.

No. 1.

The AGENT-GENERAL to the Hon. the COLONIAL SECRETARY.

SIR,— 7, Westminster Chambers, London, S.W., 4th April, 1879.

I have the honor to inform you that, Mr. Thomas Kirk having communicated to me his desire to obtain information relating to the cultivation and preparation of flax, I have obtained, through the Colonial and Foreign Offices, and forwarded to him by the present mail, copies of reports on the subject made by British Consuls residing in France and Belgium.

I have also forwarded to him copy of a letter which I received from the secretary to the Belfast Flax Supply Association in reply to an application which I made to that institution.

As these papers contain matter which may be of interest to the Government, I have thought it right to send press copies of the same for their information.

I only received one copy, each, of the printed report, and Instructions for the Culture, &c., of Flax in Ireland, mentioned in Mr. Andrews's letter, and these I have forwarded to Mr. Kirk.

I have, &c.,

JULIUS VOGEL,
Agent-General.

The Hon. the Colonial Secretary, Wellington.

Enclosure in No. 1.

REPORTS ON THE CULTIVATION AND MANUFACTURE OF THE FLAX PLANT.

DISTRICT OF HER MAJESTY'S CONSULATE OF NANTES.

1. *Rotation of Crops.*

Well-manured light clay-soils are chosen in preference for the cultivation of the flax plant. They must be well weeded, and follow a pasturage, clover, hemp, oats, carrots, beans, potatoes, beet-root, or colza crops.

It is a common belief among the peasants that, unless they have a very exceptional piece of land, the flax plant should be grown but twice in a man's life; but in the Valley of the Loire, between Cours and Nantes, little or no attention is given to this saying.

Horse-manure and guano are not used, as both are considered as detrimental by drying too much the fibres. The lands are generally manured by herding sheep on them, or else with cow-manure or fæcal matter.

2. *Opinion as to the Possibility of Sending the Flax-Straw to Europe for Manufacture.*

It is the general opinion of the manufacturers spoken to, of this district, that unprepared flax-straw would be simply unsaleable, and most certainly a very unprofitable transaction—first, because the straw sustains a loss in scutching of from 25 to 50 per cent. of useless matter; second, because the amount for carriage of this 25 to 50 per cent. of useless matter would go to decrease the value of the marketable fibre.

In France the fibre is prepared and sorted by the growers prior to being sold to the manufacturers, purposely to get rid of the useless matter.

3. *Best Mode of Packing and Pressing the Dry Straw.*

It is not customary, so far as concerns this district, to pack and press the dry straw.

4. *Price likely to be obtained for Fibre imported into Europe.*

The price for flax-fibre in this district varies from 50 francs to 120 francs the hundred kilogrammes (£20 to £48 per ton). The difference in prices is according to the land and its exposure on which it is grown, and especially to the system under which it is cultivated.

5. *Machinery best adapted for Scutching the Flax and for the Preparation of the Dried Flax-Straw.*

The machinery, or, rather, tools, used for scutching the flax-straw in this district are the most simple and inexpensive, and are termed "broies," "busoires," "cillotes." Several machines for scutching have been proposed, among which Hoffman's invention can be mentioned; yet none appear to have been able to do away with the cheap and primitive tools now in use.

ROBT. CHAS. CHIPPERTON, H.M. Consul.

1. *Rotation of Crops with reference to the Cultivation of Flax.*

Examples.	First Year.	Second Year.	Third Year.	Fourth Year.	Fifth Year.	Sixth Year.	Seventh Year.	Eighth Year.	Ninth Year.	Tenth Year.	Eleventh Year.
Department of the Nord	Rape	Wheat	Potatoes	Wheat and clover	Clover	Beetroot or potatoes	Oats	Flax and turnips	Wheat	...	...
Belgium. Environs of—Commines ...	Tobacco	Rape	Wheat and clover	Clover	Rape	Oats	Flax	Turnips	...	...	...
Thiet ...	Flax and carrots	Wheat	Rye and turnips	Barley and potatoes	Wheat	Rye and turnips	Oats and clover	Clover	...	...	...
St. Nicholas ...	Wheat or rye	Flax and clover	Clover	Wheat or rye	Rye	Oats	Potatoes	...	...	...	...
St. Giles Waes	Potatoes	Wheat or rye	Flax and clover	Clover	Barley or wheat	Oats or buck-wheat	...	...	...	...	...
Sotteghem ...	Wheat	Rye and turnips	Oats and clover	Clover	rye* Horse-beans	Flax	Wheat	Rye and turnips	Oats and clover	Clover	Potatoes

* Turnips are sown after the harvest.

2. *Opinions as to the Possibility of Sending the Flax-Straw to Europe for Manufacture.*

The cultivation of flax (for fibre) has not succeeded in Algiers on account of want of water for the operation of retting; and it has been found impracticable to send the flax-straw to France on account of the carriage—the flax-straw occupies too much space, and only contains from 25 to 27 per cent. of fibre. What applies to Algiers would equally apply to New Zealand as regards the shipment of flax-straw. (Flax is cultivated in Algiers for the seed.)

3. *Best Mode of Packing and Pressing the Dry Straw.*

The question of the packing dry flax-straw has been under consideration at Lille for several years past, with a view to the import of the Algerian and Russian flax-straw; but as yet there has been no solution to the problem, and, as a matter of fact, it is not done.

4. *Price likely to be obtained for Fibre imported into Europe.*

Flax grown in the north of France varies in price from £48 to £96 per ton; some fine qualities reach £120 and upwards per ton. Russian flax varies from £34 to £50 per ton; some fine qualities reach £70 to £80 per ton.

5. *Machinery best adapted for Scutching the Flax, and for the Preparation of the Dried Flax-Straw.*

Flax-straw (after being retted) is first passed in a machine for breaking the straw to which the fibre is fixed. This straw-breaking machine is composed of five or six pairs of fluted rollers, and one pair of plain rollers, suitably fixed in two frame sides. The straw is passed in between the rollers. Six lads will break from 2½ to 3 tons of straw per day of twelve hours' effective work.

After being broken, the flax-straw is presented to the scutching machine, which removes the straw from the fibre. This machine consists of a shaft (running at a hundred revolutions per minute) on which is fixed a cast-iron disc, studded with twelve arms, at the end of each of which is bolted a thin, flexible lath of walnut wood or hornbeam, about 4 inches wide and from 12 to 16 inches long.

The tops of these laths describe in their revolution a diameter of about 6 feet. The "strite," or handful, of flax-straw is securely held at one end in the left hand, and is hung over the edge of a board, which is fixed within half an inch of the plane of rotation of the scutching-blades, so that these blades may strike the strite with great rapidity, and so remove the straw from the fibre. The strite being held in the left hand, the right hand is engaged in opening out the strite, so as to present fresh parts to the blades. It is customary to place a number of scutching-discs on the same shaft; they are placed about three feet apart. As scutching creates much dust, it is usual to box up the whole of the scutching-machine, and to remove the dust by means of an exhaust fan. One man will scutch (per day of twelve hours' effective work) from 130 lb. to 260 lb. of straw, making from 32½ lb. to 65 lb. of scutched flax.

Flax-straw breaking machines are made by Messrs. Jean and Peysson, of Lille; Messrs. J. F. Carl and Co., of Paris; and by Messrs. S. Walker and Co., of Lille.

There are no regular makers of scutching-machines, which are usually home-made.

Calais, 20th January, 1879. BEAUMONT HOTHAM,
Consul.

REPORT on Flax Cultivation and Manufacture in the Department of the Nord, France, and the Imports through the Port of Dunkirk. By Vice-Consul Taylor.

1. *Rotation of Crops.*

Common rotation gives one crop of flax in seven years; the rotations of ten and eleven or fourteen years are sometimes adopted.

2. *Opinion as to the Possibility of Sending the Flax-Straw to Europe.*

The dry straw only yields from 15 to 20 per cent. of its own weight in flax for the spinning-mill, and about 6 to 12 per cent. of waste fibre, called "codilla," or "scutching flax," which is sold at a low

price for coarse cloth, canvas, &c.; therefore it would not pay to send dry straw to Europe, as freight would have to be paid upon such a large amount of useless matter, even if there were no other reasons against it. (See answer No. 3.)

3. *Best Mode of Packing and Pressing the Dry Straw.*

It would not be practicable to send flax-straw a long distance; for it is very bulky for its weight, and it would be injured if it were pressed in packing, and would ferment and rot if pressed and enclosed in the hold of a ship for a number of weeks.

4. *Price likely to be obtained for Fibre imported into Europe.*

The price of fibre depends entirely upon its quality. The range of prices in the north of France is now about £40 to £160 per ton, the finest qualities making more. Some low Russian varieties can be bought as low as £30 per ton.

5. *Machinery best adapted for Scutching the Flax, and for the Preparation of the Dried Straw.*

Very little machinery is used in this part of France. The usual scutching-machine is very simple, consisting only of a number of arms like those of a windmill, mounted in a shaft. An elastic circular disc-scutch, with moveable rest, is recommended; and, as a straw-breaker, a machine of six sets of double rollers, fluted, each set finer in the pitch than the preceding, the last set smooth calendering rollers. This machine, invented by Messrs. Ireland and Honplines, and made by Messrs. S. Walker and Co., of Lille, is rather expensive.

The cultivation of flax is carried on to a considerable extent in this department, where it is the custom for the peasant, or cultivator, to sell the crop as it stands, and before it is ripe, to a flax-worker, who undertakes the pulling, steeping, and after-treatment, and who runs the risk of the crop ultimately yielding well or ill in quantity or quality. In the year 1874, 9,661 hectares were sown (the hectare equals 2·47 acres), and in 1877, 9,648 hectares. These figures show that the cultivation of flax has neither increased nor diminished the last few years in this district, although it is decreasing in France in consequence of the great expenses for labour, &c., &c.; for the cultivation and working of flax requires a large amount of labour, and somewhat skilled, or, at least, trained and practised labour, whether in preparing the land, weeding, pulling and handling the straw, or steeping and scutching it. The French workpeople, dealing with a very valuable article, use great care and skill, and bring out their produce in good style. Undoubtedly there would be a great future in store for those colonies where climate and soil are suitable for the growth of flax of good quality; but skilled labour would be required to properly prepare the fibre for the European markets. In the north of France the usual rotation for crops in soil of good quality is—First year, wheat; second, rye and turnips; third, oats; fourth, flax; fifth, clover; sixth, colza; seventh, potatoes. On good stiff soils—First year, potatoes; second, wheat; third, flax; fourth, clover; fifth, rye; sixth, oats; seventh, buckwheat. On poorish sandy soils—First year, flax; second, rye; third, clover; fourth, buckwheat; fifth, carrots; sixth, potatoes; seventh, barley. On a rich loam, from ten to eleven years' rotation—First year, beet; second, oats; third, clover; fourth, wheat; fifth, flax; sixth, wheat; seventh, beans; eighth, wheat; ninth, potatoes; tenth, wheat; eleventh, oats.

Some of the finest flax is worked (scutched) near Lille (Department of the Nord); not always grown there, but brought from some little distance to be steeped in the River Lys, which is exceptionally favourable for the purpose, and where an entire population has for generations subsisted on this industry.

There are three old processes for steeping, retting, or washing of flax. First, in a running stream; this mode produces the best of all flax. Second, in stagnant water; this produces a strong, good flax. Third, dew-retted. The practice of dew-retting, or steeping by exposure in the field without any water, is practised in some districts of France, and it is a method which might be preferred in a country where the offensive processes of water-steeping would not be tolerated, or where there is a scarcity of water. This system gives a large yield of fibre from the straw; but flax prepared in this way does not command a high price, being generally coarse, and having also some chemical disadvantages. The average value of river-retted flax is now from £70 to £140; highest selections, £240 per ton. Fibre retted in stagnant water is worth from £55 to £80 per ton; though in some cases higher prices are paid. Dew-retted fibre, from £48 to £65 per ton. Low qualities of Russian flax are sold much cheaper. The value of the coarse tow, or codilla, produced by the operation of scutching is from £12 to £30; in some qualities £30 to £36 per ton.

The following table shows the quantity of flax imported through the port of Dunkirk during the past four years:—

Year.	Kilos.
1875	30,230,842
1876	10,830,210
1877	28,266,012
1878	22,937,194

Of the 22,937,194 kilos. (1,015 kilos. equal one ton) imported in 1878, about 90 per cent. came from Russia. The reason of the small importation in 1876 may be briefly stated as the consequence of the crop of 1875 being bad both in quantity and quality, and manufacturers bought as little as possible of it. The reduced importation during the past year was owing to the depressed state of trade, the flax manufacture suffering in common with almost all other industries; but, though trade was bad in the north of France, yet it did not suffer to anything like the same extent as in England. Flax is at present below its normal value, for there has during the past year been a drop of from 10 to 25 per cent. in prices.

Armentieres is the chief centre of the linen manufacture, in this department from 8,000 to 10,000 power-looms being at work, each hundred looms employing 110 workers, independently of a great number of hand-looms in the rural districts. In Lille there are about 2,000 power-looms, and over a

hundred mills are engaged in flax and tow spinning in Lille and the surrounding district. The linen trade is, and always has been, profitable when in a normal state; but there is now depression in all industries, and it has been severely felt by the linen manufacturer. The value of the annual consumption of linen in France is over 500,000,000 francs.

I presume the information respecting flax is asked for by the Government of New Zealand with a view to the cultivation and preparation of the plant in the colony for the European markets. Upon this supposition perhaps I may be pardoned for mentioning that a good deal of the foregoing information has been given to me by a gentleman who for upwards of twenty-five years has been engaged in the various operations connected with the manufacture of flax in the north of France, and who has studied the different processes in vogue in most of the northern countries of Europe. This gentleman, a member of an old-established firm, informs me that he could procure a set of steady, qualified workers, quite sufficient to begin the cultivation of flax, from the preparing of the seed, soil, weeding, bolting, steeping, scutching, drying and bleaching, and, finally, preparing the fibre for European markets, and using up the coarse tow and codillas for the manufacture of bagging for colonial use; and he desires me to add that in the event of the New Zealand Government desiring a man who practically understands the different processes, he would be a candidate for the post.

EDWARD TAYLOR,
Vice-Consul.

Dunkirk, 24th February, 1879.

MONSIEUR,—

Havre, le 14 Janvier, 1879.

J'ai bien reçu honorée lettre d'hier, et m'empresse de vous donner ci-dessous les renseignements relatifs aux questions 3, 4, 6, et 7.

3. Le lin doit être emballé sous nattes, et légèrement pressé.

4. Les prix des lins varient suivant qualité de 80 à 150 francs les 100 kilos.

6. Il y a dans la Seine Inférieure quatre filatures, ayant ensemble de 25 à 26 broches, consommant annuellement environ 4,000 à 5,000 tonnes de lin et de chanvre.

7. On trouverait l'écoulement des lins de la Nouvelle Zélande si la qualité et le prix le permettaient; déjà depuis longtemps on reçoit *viâ* Angleterre des chanvres provenant de ce pays.

Tels sont, Monsieur, les renseignements que je puis vous donner. Puissent ils vous être de quelque utilité.

Agréé, &c.,

Monsieur le Consul de S.M. Britannique au Havre.

A. CARON CAMPART.

[TRANSLATION.]

SIR,—

Havre, 14th January, 1879.

I have received your honoured letter of yesterday's date, and hasten to give you below the information in reply to questions 3, 4, 6, and 7.

3. The flax should be packed in matting, and pressed lightly.

4. The price of flax varies according to quality from 80 to 150 francs per 100 kilogrammes.

6. There are in the department of Seine Inférieure four spinning factories, having together from 25 to 26 spindles, consuming each year about 4,000 to 5,000 tons of flax and hemp.

7. A sale would be found for flax from New Zealand if the quality and price permitted it; for sometime now we have received *viâ* England hemp coming from that country.

This is all the information I can afford you, and I trust it may be of some use.

I have, &c.,

To H.B.M. Consul at Havre.

A. CARON CAMPART.

SIR,—

Flax Supply Association, 10, Donegal Square, W., Belfast, 28th December, 1878.

I beg to acknowledge receipt of your favour, addressed to Mr. John Mulholland, M.P., president of this association, accompanied by an extract from a letter to you from Mr. Thomas Kirk, of Wellington, New Zealand, requesting information regarding the culture of flax and its preparation.

I now forward you, by post, copy of a pamphlet on this special subject which contains reliable information.

With regard to the transport of the dried straw from New Zealand to this country, it would require to be packed in compressed bales; but an important item must not be forgotten—namely, that the dried straw, before being retted, &c., will produce at the utmost only 15 per cent. of fibre, so that you would have to pay freight upon 85 per cent. of refuse. This, in my opinion, would make it impossible to convey the straw such a distance with any prospect of a profit, or even cost being made; besides, to dry flax-straw properly requires considerable skill.

Mr. Kirk is wrong in saying that at present there is any lack of supply in Great Britain. There is ample supply to meet all demands, more especially during the depression in trade which now exists.

To prosecute flax culture in New Zealand the several operations would require to be done on the spot, and the produce forwarded to this country in fibre. This, of course, would require the necessary skill and the requisite machinery for scutching, &c.

I state my opinion freely, as I would be reluctant to encourage any one to enter upon an enterprise unless I was pretty well convinced it would be attended with success.

I accompany the pamphlet with the annual report of this association for 1877, and shall be happy to render you further information, if in my power.

I have, &c.,

MICHAEL ANDREWS,
Secretary.

The Agent-General for New Zealand.

P.S.—If you would wish for a number of the Flax Instructions, I shall be happy to send you a supply.