VI. *On the Cultivation of Flax upon Captain Dixon's Estate of Skelton Castle, on the River Isis, Tasmania.* *By* Mr. Robert Crawford. [*Read 8th October*, 1851.]

The cultivation of Flax on the farm of Skelton Castle has been prosecuted for the last five years, and in every season good crops have been obtained.

The climate has been found eminently adapted to its growth, and to the after-processes of steeping and grassing. During the first four years it was tried on small portions of land; the breaking and scutching, then effected by hand labour, alone absorbing the value of the Flax raised, and rendering its cultivation unprofitable. In 1849 a scutching machine was put up, which, together with other appliances to lessen the amount of manual labour and the benefit of increased experience, occasioned from that year a greater breadth of land to be sown.

Flax has been sown after grass, after wheat on new land, on fallowed land, and upon land *under* fallow;—that is, instead of fallowing the land and allowing it to be idle the whole year, Flax seed has been sown in the spring, and wheat, as usual, the following autumn.

When sown on new land, or after grass, one ploughing only has been given, immediately preceding the sowing; but after wheat, or other grain crop, the land has been ploughed as early as possible in the autumn, and again in the spring before sowing.

The last week in August and the month of September has been found the best time for sowing. Of thirty acres of land intended for Flax this season, seventeen have just been sown,—

land which, if not sown with Flax seed, would be fallowed. It was ploughed early in the autumn, and is now being re-ploughed and harrowed with a pair of heavy harrows: it will next be rolled with a very light roller, to give an even surface for the seed. Full two bushels of good sound seed will be given, when the land will be again harrowed with a pair of very light harrows—once as the field has been ploughed, and once across. Lastly, it will be rolled, to give a level surface, and ensure quick and even vegetation.

The above quantity of seed per acre we have found to give fine Flax and good seed. As it is sown thick, so does it come up; and the rapid growth of the plant in this climate does not allow weeds to interfere, if the land is moderately clean: no weeding, therefore, is required. From the 20th to the 25th December the plant is ready for pulling; the proper time to commence being when the leaves begin to fall, and the stalk is nearly all turned yellow. It has been pulled at various stages:—when quite green; partially so, as is the Irish plan, by which they lose the seed; fully ripe; and when nearly ripe, which is by far the best practice, having regard to fine fibre and good seed.

Pulling the Flax is by no means a difficult process. After the first day no material difference could be observed between the Irish labourer, accustomed to such work, and those who never before saw it: from three to four active men will pull one acre per day. During the operation care is taken to keep the root ends together, straight and regular, and also to separate the long from the short Flax, should there be any difference: little time is lost in doing this during any of the processes—all go quickly forward; and as each bundle must pass several times through the hands of the labourers before it is brought to be scutched, it eventually becomes pretty regular. When pulled, it is tied near the root ends into

sheaves, about half the size of an ordinary wheat-sheaf, allowing the seed end to be as open as possible: each day the sheaves are collected and placed in two parallel rows about the centre of the ground which has been gone over.

In four or five days, according to the heat of the weather, it is ready for having the seed taken off. Several methods of doing this have been adopted :—rippling when pulled, and drying the seed pods; allowing the flax to remain in the field until dry, and then rippling; carting it to the barn, and thrashing; and that adopted this last season, which has simplified the labour much; it is as follows :—Two wooden portable thrashing floors, twenty feet long by seven wide, with wooden axletrees at each end, on which are low wooden wheels, just high enough to carry the floor clear off the ground, drawn by a horse, are placed between the rows of Flax in the field; two men (one on each side) place a row of bundles (sheaves) of Flax on the floor, the seed inwards, allowing the root ends to project a few inches over the edge, so that any dirt adhering thereto does not mix with the seed: with flat wooden mallets having long handles, that they may stand upright, the two men gently beat the seed from the inner ends of the flax, another man turning the bundles as they proceed, and in a few minutes the work is done. The bundles are well shaken and piled up until there is sufficient to fill a pond, when it is immediately put in. A cloth at the end of the floor receives the seed as it accumulates; and it is either winnowed in the field at once, or carted home, as may be most convenient. This method has been found far superior to any other. Rippling is tedious, and wasteful of both seed and Flax: carrying to the barn and thrashing cause additional cartage, as it has to be carted again to the ponds, and occasion much loss of seed, the capsules containing it bursting on the slightest touch.

Steeping is a most important operation. We have steeped in running water (the river), in a large pond of clear stagnant water, in a small pond of muddy stagnant water—closely packing it with Flax, and in ponds of moderate size with clean stagnant water—moderately filling them with sheaves; and each method has had a different effect on the quality and yield of Flax. Whatever the nature of the pond where the Flax was put in, stones, or more generally sods, were applied to keep the Flax a few inches below the surface of the water. The following plan has been found to succeed in giving a good colour and yield, and lessens the labour required in the process formerly used here and practised in Ireland. In a piece of hollow land, having a clayey subsoil, a long pond or canal, four feet deep and about twelve wide, has been dug and divided into four compartments by partitions having sluice-gates, and each pond has upright posts fixed along its sides about seven feet apart.

When Flax sufficient to fill one pond is ready it is brought, and the sheaves or bundles are laid in slopingly and regularly, with the seed end downwards. When full, a number of poles, corresponding in length to the distance the posts are asunder, are laid pretty thick all over the pond. On the top of these other poles are laid close to the posts, and at each end of the poles a wooden peg is put into a hole in the post to keep the Flax at any desired point under the surface of the water—generally two or three inches; care being taken that the flax does not touch the bottom. By this means the rolling of heavy pieces of timber, carting stones, or cutting of sods to keep the Flax under water, is avoided; and the poles, &c., remain for the operations of successive years.

A few hours after the Flax is placed in the pond the water becomes red; in twenty-four hours quite black; and fermentation, which ensues, and is denoted by the surface being

covered with bubbles, goes on more or less rapidly, according to the heat of the weather. When nearly ready, fermentation ceases, the mass spontaneously leaves the transverse poles, and sinks to the bottom of the pond: it must then be carefully examined at intervals of two or three hours, to hit the exact time when it should be taken out. To ascertain this, two or three handfuls are taken from different parts of the pond, and a stalk of average fineness taken and broken across the woody part in two places, three inches asunder: if the wood at the lower end, on being laid hold of, draws out freely and without dragging any fibre away, *it is done;* or the handfuls are dried, and if, on rubbing, the woody portion leaves the Flax easily, *it is done.* Before being quite done, and *immediately* upon fermentation ceasing, a light stream of water is allowed to run through the ponds, to carry off all impurities caused by the fermentation. The ponds are here connected with the river by means of a drain.

When *done,* a low-wheeled truck, with lattice-worked bottom, is placed close to the edge of the pond: the bundles of Flax are placed evenly thereon, and it is drawn by horses (the bundles of Flax draining as it goes along) to a piece of clean grass-land, where men are ready to spread it evenly and thinly out in rows. It thus remains (unless rain falls, when it is turned) for four or five days without further attention: a dry, hot day is, if possible, selected on which to tie up and cart it to the barn or stack, where it is left till winter sets in, or a wet day occurs, when it is broken or bruised to be ready for scutching. This operation for the first three years was done by hand here, men with flat wooden mallets striking it on a hard floor until it became soft—a process very tedious and expensive. The crop of 1849 was laid in rows on a piece of hard ground, and a cart weighted with

stones drawn over it, a man tending and pushing the Flax backwards and forwards under the wheels: the crop was much injured; the friction of the wheels and grit of the road cut and otherwise injured the fibre so much that, when scutched, it yielded as much of waste tow as Flax. Unfortunately also the flax happened to have been rather oversteeped, by which the fibre had been rendered brittle, and more liable to injury from such a primitive mode of breaking. The crop was shipped to England.

This year the Flax straw is broke or bruised by passing it between heavy fluted rollers, thus:—three wooden rollers, with grooves cut equidistant all round, are placed in a frame one above the other running on brasses, and so placed that the grooves and teeth run into each other, either quite close down, or a little apart, as the Flax straw to be operated on may be fine or coarse. A handful is entered between the top and middle roller: it is quickly drawn in and met on the opposite side by a back of sheet iron, which, conveying it round the middle roller, enters it between the middle and bottom roller, by which it is delivered on the same side as that on which it was first entered. The bundles may of course be passed through more than once if necessary. Three men and two horses with this machine break from three to four tons of Flax straw per day. The Flax straw, after being broken, is made up and tied in handfuls of 10 lbs. each, to be scutched. With the scutching machine now in use, two men as scutchers—one driver and one horse can scutch from 100 lbs. to 150 lbs. of clean Flax per day. Lastly, the Flax is straightened, made up in parcels of 10 lbs. each, and packed in bales of $2\frac{1}{2}$ cwt., when it is ready for market.

The two machines are, so far as I can learn, somewhat similar to those used for the same purposes in Ireland. They

were designed and constructed on the farm, and any moderately-skilled carpenter and blacksmith could make them. They are simple, and easily kept in order, and are worked by attaching them by means of a strap or belt to the works of a small horse-power thrashing machine. When not in use they are removed; and, being portable, they would travel, if required, as thrashing machines do. I purpose making models of them, which, together with samples of Flax, &c., Capt. Dixon will forward to the Industrial Exhibition of the School of Arts, Hobart Town.

I have mentioned the different processes *first* adopted here (all recommended in various works), and also the practice generally pursued in Ireland, as well as those at present followed here, to explain why the culture has been unprofitable up to last season. As now carried out;—by thrashing the seed on portable floors in the field,—using properly constructed ponds,—breaking and scutching by machinery, whereby manual labour is reduced to a twentieth part of what it previously amounted to, (two men having been able to break and scutch by hand at most 6 lbs. per day), it is a remunerative crop; and Capt. Dixon has decided to continue its culture, and to sow this year a greater breadth of land than heretofore—all the seed we have, indeed.

Accurate *daily* accounts have been kept of the cost of each operation—pulling, taking seed off, steeping, grassing, and carting; and labour has been reckoned at an average of £12 per annum, with £9 per annum for rations, &c., being 1*s.* 2*d.* per day for each man employed. On the crop of 20 acres grown here last season, the number of men employed was equivalent to 80 days at pulling, 62 days at taking seed off, 44 days at steeping and grassing, and to 35 days at taking off grass and carting to barn; 2 horses 2*s.* 6*d.* per day each, and three men 1*s.* 2*d.* each, at breaking. Scutching is paid by the cwt.: two men get per

cwt. 5*s.*, averaging 1 cwt. per day, rations for the two 1*s.*; horse 3*s.* 6*d.*, driver 1*s.* 6*d.*, making the cost of scutching 10*s.* per cwt. Had we water power, the last-mentioned items (horse and driver) would be saved, reducing the cost of this operation to 6*s.* per cwt., the price at which it is usually scutched in Ireland.

As the different operations are now conducted, the expense, gross produce, and profit upon one acre stands as follows:—

Dr.	£	*s.*	*d.*
To ploughing twice at 6*s.*	0	12	0
Harrowing, rolling, and sowing	0	2	0
Two bushels seed (raised on farm) at 10*s.*	1	0	0
Pulling	0	10	0
Steeping, grassing, and carting to barn	0	5	6
Taking seed off	0	3	6
Cleaning seed	0	2	0
Breaking 4½ cwt.	0	4	0
Handling and scutching 4½ cwt. at 10*s.*	2	5	0
Packing	0	7	0
Sacking for pack	0	3	0
Cartage to shipping port	0	5	6
Freight, insurance, and commission, &c. on 4½ cwt.	2	10	0
Interest on capital employed in machinery, farming implements, &c.	0	5	0
Value of land as rent	0	15	0
	£9	9	6

Cr.	£	*s.*	*d.*	
By 4½ cwt. flax in English market, at 56*s.*	12	12	0	
100 lbs. tow, sold in colony at 3*d.*	1	5	0	
10 bushels seed, at 12*s.*	6	0	0	
Chaff, valuable as food for cows, pigs, and horses, when mixed with hay chaff	0	5	0	
Refuse woody portion, having been found to be an excellent manure and preventive against slug	0	5	0	
				£20 7 0
Profit on one acre				£10 17 6

On all the items charged to the *Dr.* side in the foregoing account, I have added a little to that at which they actually stand recorded.

As to the *Cr.* side, in the course of the last five years 700 lbs. clean Flax and 20 bushels seed per acre have been obtained, and as low as 200 lbs. Flax and 6 bushels seed; but this small crop has not been general, or in any particular year, and solely arose from sowing on foul land imported seed, which, being very old, partially missed, and came up very thin. Taking, therefore, 4½ cwt. is rather under than over the average of the crops during a period of five years. As to the value given per cwt., small samples of the *first* year's growth, coarse and hand-scutched, were valued in London at 38*s.* per cwt., with this remark attached to account sales—"That it was no criterion of its value, from the extraordinary depression then caused by the large failures of that disastrous year (1848): the price was equal to that of the best Riga flax then in the market."

Small parcels have also been sold in the colony at from 40*s.* to 56*s.* per cwt.; and when it is borne in mind that Flax ranges in Belfast market from 40*s.* to 80*s.*, some fine samples as high as 100*s.* per cwt., the foregoing value of 56*s.*, now that it is mill-scutched, of superior quality, and well got up, it is hoped and believed will be found underrated. Samples of the worst portion of the crop we are now engaged on have been valued in Hobart Town at 60*s.* per cwt. Account sales of two bales middling quality, shipped last year, have not yet been received. As to quantity of seed credited per acre (10 bushels), the produce varies as it may have been sown, thick or thin, for coarse or fine fibre: fine fibre, and 20 bushels per acre have been obtained; no better fibre, and as low as 6 bushels per acre. The value given, 12*s.* per bushel, is that which all that has been purchased has cost the farm, a price

which it would command so long as the supply raised did not exceed the quantity required to meet the wants of the colony.

The following observations have been noted during the experience of five years :—

1st. That the climate is well adapted to the growth and preparation of Flax. A late author, in writing on its culture in Ireland, says—" The humidity of our climate, though favourable to the Flax crop in the early stages of its growth, is, however, a serious drawback as it approaches maturity, often laying down the heaviest and most promising crops, which should then be pulled, however green the Flax may be, as it spoils rapidly by lying on the ground. Again in the autumn, when the succeeding operations are being performed to prepare it for market. In the grassing, especially, much injury is frequently sustained by wind and wet weather, during which the crop cannot be taken up ; and under our present course of management contributes to the production of the *very inferior quality* which the Irish farmer generally brings to market." Yet Ireland raises some 40,000 tons, ranging from £45 to £120 per ton. I need hardly say the causes here lamented are not applicable to this climate. The different processes of pulling, steeping, and grassing may be carried on from January to April without loss of time or material.

2nd. That any fair soil on which wheat can be sown will produce good crops of Flax ; the best crops being on land having a retentive subsoil. Some of our best crops have been on stiff clayey land ; and yet,

3rd. Although it delights in moisture, it is not so liable to injury from extreme drought as grain crops are ; convincing proof of which was had last season. At the latter end of August, 20 acres were sown with Flax ; and a short time pre-

viously, the adjoining land with English and Cape barley. The latter crops were only a few inches high when mown, and would not have been cut down at all but from the general scarcity of fodder. Even the autumn-sowncrops of grain, which received the benefit of the winter rains, were hardly one-third of the usual average; while the Flax crop (now under hand) is certainly a full half above the average.

4th. It is a hardy plant: in several instances we have pulled a self-sown crop which had stood all the year, and good Flax was obtained from it.

5th. It is not an exhausting crop. From a fallow field sown with wheat in the autumn of 1848 two separate acres were reserved for Flax, and sown in the spring: both crops were good. The succeeding year, 1849, the whole field was sown with wheat. On that portion which had borne wheat the previous year the crop was very indifferent; where the Flax grew, the wheat, during its several stages, was distinctly marked by a luxuriant growth, and at harvest was quite equal, if not superior, to the first crop of wheat when after fallow. This year there is a field of wheat on which a strong healthy plant is growing, from which Flax was taken last year, and wheat the previous year. The Flax crop, therefore, is at least not so exhausting as wheat. The best crops of wheat follow Flax. In no proper system of rotation of crops, of which Flax should be one, would it displace an acre of wheat.

6th. The best crops are obtained from land (if moderately clean) under fallow, after grass, or on new land preparatory to grain crops. It may, however, be taken after wheat with advantage.

7th. As a crop, it comes in admirably after hay-making, and before harvest, and does not interfere with harvest operations, but rather otherwise; inasmuch as it actively employs

the ordinary farm-labourers, and secures beforehand the extra labour required for harvest work. Twenty acres were pulled last year without inconvenience, merely requiring two or three extra hands taking seed off and steeping during harvest; spreading on grass and lifting, coming on after harvest.

Lastly. It furnishes ample in-door employment during the winter months and wet weather in breaking, handling, and scutching; during which time these the most expensive operations of the crop are nearly got over without hindrance to ordinary farm labour.

Linseed oil might be extracted were there abundance of seed raised. Linseed has been used here as food for calves, cows, horses, and pigs. For calves, the quantity required for two or three days' consumption is put in soak for 24 hours, then boiled to a jelly and mixed with skim milk, and given three times a day. For cows and horses, it is ground into fine meal, along with barley or wheat, in the proportion of one part linseed to two of grain: it is then made into the compound known as "Warne's," much prized in several parts of England for fattening cattle, in preference to oil-cake; thus to 150 lbs. boiling water add 84 lbs. of the meal: on this alone an old cow and bullock were fattened for farm consumption. For farm horses it has been used thus:—one peck or 18 lbs. of the meal was boiled with four buckets of water, with which was incorporated the daily consumption of *wheat* straw cut into chaff. On this small quantity, of 3 lbs. of meal to each horse, six horses were kept in condition for two months during the winter: they were only worked occasionally however.

No assertion is made or calculation given in these statements but such as has actually occurred and come under our own observation or experience during the five years the Flax crop has been cultivated here. As may be perceived,

much disappointment and great expense attended the first four years; in truth, they were mere experiments during that time: but with the crop now in hand, although the produce of a season of extreme drought and scarcity, the results are becoming satisfactory.

In conclusion, it may not be uninteresting to consider a few of the results which would attend its cultivation, as one crop in a good course of rotation with grain, &c. Taking 30,000 acres (not half the amount devoted to wheat as per returns of 1849) as one-fifth part of the cultivated land of the colony, it would give, at only 1 ton to every 5 acres 6000 tons of Flax, which, valued at say £50 per ton, would give £300,000; 10 bushels seed per acre, 300,000 bushels at 6*s.* per bushel, would give £90,000—together £390,000; circulating, in the employment of 10,000 tons of shipping, mercantile commissions, &c., and labourers' hire, no less a sum than £270,000, and leaving £120,000, besides value of waste, &c., in producers' hands to improve and carry out a judicious system of agriculture. Without mentioning ulterior results, such as the employment of weavers, &c., the employment of hecklers to heckle the Flax would enable us to send home the finer portion only, greatly increased in value, and to retain the tow from the heckles to make coarse sacking. Again, the employment of crushing mills, &c., for the extraction of the oil from the seed, the manufacture of linseed-cake wherewith to fatten cattle, &c., are too important to be lost sight of in such calculations.

Ireland produces some 40,000 tons; why may not this colony produce 6000? *In addition* to what Ireland produces, the United Kingdom imports 90,000 tons, paying annually for foreign Flax and seed no less than £12,000,000

sterling. One firm alone, Marshall's of Leeds, purchase Flax to the extent of £1,000,000 sterling annually.

VII. *Experimental Culture of Italian Rye Grass at New Norfolk, with Table of Results.* *By* John Meyer, *Esq.*, M.D. [*Read 8th October*, 1851.]

The Italian Rye Grass has been successfully cultivated here upon a loamy soil over a clay subsoil, well manured and dug with the spade. The seed should in the first instance be sown in liberal quantities, probably 3½ bushels to the acre; the Grass should make its appearance thick, so as to cover the ground well from the first, as it does not spread like most of the English grasses. I have found that it does not succeed well in low ground, (which is always more exposed to frosts), nor where the subsoil is gravel: warmth and moisture are necessary to secure good and frequent crops. The ground within the walls of the Asylum, which is sheltered during the winter months, with power of irrigation throughout the year, seems peculiarly adapted to its growth. The seed may be sown from April to June; May is, perhaps, the best month. Sown here on 30th April, 1849, the following dates show how often it has been cut since:—15th June, 8th September, 12th December, 1849; 4th March, 18th April, 24th June, 1850.

With regard to quantity;—at one cutting of 10 rods, the weight of Grass per acre amounted to 13 tons 7 cwt., and later in the year the same piece of ground produced at the rate of 8 tons 15 cwt. per acre. In nine months, from 8th October, 1850, to 8th July, 1851, the quantity cut from about 37 rods of ground was at the rate of 56 tons 18 cwt. per acre.