An essay on the cultivation of the white poppy : presented 4th February, 1830 / by Isaac Weld.

(17.)

TRANSACTIONS OF THE ROYAL DUBLIN SOCIETY.

AN ESSAY

ON THE

CULTIVATION

OF

THE WHITE POPPY.

PRESENTED 4th FEBRUARY, 1830.

BY

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DUBLIN:

R. GRAISBERRY,

PRINTER TO THE ROYAL DUBLIN SOCIETY.

1830.

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ON

THE CULTIVATION

OF

THE WHITE POPPY.

PREPARATORY to the few observations which I am about to offer to the Royal Dublin Society on the nature of the White Poppy and its cultivation, I beg leave to submit for their inspection, samples of its two important products—opium and oil.

The opium has been broken from a mass of which several trials have been made in medical practice; and the effects, as I have been informed, were not less powerful than those from foreign opium. Neither does there appear any occasion for doubt, upon this subject, since after repeated trials in the London Hospitals of the opium grown in England, practitioners of eminence have given their opinion that it was fully as efficacious as the opium of the East.* Indeed some English druggists have assured me that the home-made opium was more esteemed by those who were intimately acquainted with its properties, in consequence of its being, in

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* See Transactions of the London Society of Arts, &c., vol. xv. xvi. xvii.

general, free from impurities, and from the artful adulterations practised so commonly in Turkey and India upon the opium of commerce.

The samples of oil extracted from the seeds of the Poppy will please the eye by their beautiful colour, and remarkable transparency. That in the larger bottle was made about six years ago, the other during the present winter. The seeds were of my own growth, and the oil made at home under my own inspection. Poppies are cultivated for their oil, on a very extended scale, in France and in the Low Countries, and also in Germany and in Switzerland: The best quality is sold for olive oil, either quite pure or mixed with it, for the use of the table; the secondary description is consumed for painting and various other purposes: it will remain fluid at a much lower temperature than oil of olives, and is not so liable to rancidity; and hence is frequently mixed with the latter for the express purpose of preserving it. It is one of the purest oils, and the most free from any peculiar taste or smell; and when eaten, as oil so commonly is, with vinegar, salt, mustard, pepper, it would require a very nice palate to distinguish it from fine olive oil.—I speak here of Poppy oil that is perfectly well made; for if the seeds are allowed to contract any mustiness from bad harvesting, or improper keeping; or if the oil bags are not clean, as well as every part of the apparatus, the oil will readily imbibe a bad flavor. In Switzerland, where it is customary for small plots of Poppies to be cultivated for oil, for domestic consumption, and where great pains are taken to have it of a fine quality; I found that I had been eating it for a full month, at a summer residence which I had in that country, without having any suspicion that the oil which was supplied to me was not oil of olives, and of very fine quality.

Poppy Oil has been highly extolled for painting. A fixed oil with more transparency, or less colour, is, perhaps, not to be found; and for all the more delicate descriptions of

painting it must be admirable. But I have been informed that many artists of the English school do not consider it sufficiently thick and tenacious to hold the masses of colour which are frequently used in their full and broad style.

I have been informed also, on the Continent, that Poppy Oil is not adapted for the woollen manufacture, in consequence of its disposition to dry. The observations which I have made on Poppy Oil of my own produce, induce me to think that it does not dry so rapidly as walnut oil, in its simple state; but if merely boiled, it becomes thick, and will soon set like varnish. In proportion as it is exposed to heat it assumes a brownish hue, not nearly so deep, however, as that of boiled linseed oil.

The cultivation of Poppies is generally found to extend after being once introduced into a country, the surest of all proofs that it is advantageous. How long it has been the practice to draw oil from the seeds, is not easily ascertained. Though Pliny enumerates several berries and seeds from which oil was usually extracted, yet he makes no allusion to the seeds of the Poppy, except as an article of food. Nevertheless there are few seeds which betray their oily nature so evidently as those of the Poppy; for if a single grain be crushed on any smooth surface of wood or stone, a spot of grease will immediately become visible; and even the oil itself, blended with the meal of the seed. Probably it began first to be used, or at least in considerable quantity, after the great loss of olive trees in the south of France, in consequence of severe frosts, particularly that of 1709. But the introduction of it led to commotions of a most violent character, owing to the prevailing belief, that the oil must partake of the poisonous nature of the Poppy head. In vain did the lieutenant-general of police in Paris appeal to the faculty of medicine; neither their attestations of its inno-

cent quality, nor those of the ablest chemists, published at a subsequent period by certain societies for the improvement of agriculture, were able to allay the popular prejudices. It was found expedient to pass a law in the year 1735, imposing a fine of 3000 livres for every adulteration of olive with poppy oil: and this not being deemed effective, the makers of Poppy Oil were commanded by a decree, to mix with it one-fourth of turpentine, before it was offered for sale, in order to distinguish it in the market, but leaving it available for the purposes of painting. Notwithstanding these severe measures, Poppy Oil crept gradually into use, and is now sold in immense quantities, on the Continent, as olive oil, for eating. In fact there is as little connexion between the seeds of the Poppy and the narcotic juices of the capsule, as between the delicate kernel of a fresh walnut and the acrid green outer husk with which it is enveloped.

The prejudice, and it is not dispelled even at the present day amongst ourselves, is the more remarkable, because it is well known that the Poppy, particularly the white one, has been cultivated for the express purpose of food, time immemorial; and it is difficult to suppose that whilst the whole seeds were harmless, the oil should be obnoxious. Virgil,* who calls it the eatable poppy, gives directions when the seed should be put in the ground; and Pliny† describes the uses which were made, in preceding times, of the seeds of the White Poppy, toasted and served up with honey, at the se-

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* "Necnon et lini segetem et Cereale papaver
"Tempus humo tegere et jamdudum incumbere aratris."
GEORG. i. 212.
——————————— Vescumque papaver.
GEORG. iv. 131.

† "Papaveris sativi, tria genera: *Candidum* cujus semen tostum in "secunda mensa, cum melle, apud antiquos dabatur."
PLIN. NAT. HIST. lib. 19, 53.

cond course. In India these seeds are considered an article of great delicacy for the table.

Description of the White Poppy.

The White Poppy, *Papaver Somniferum* of Linnæus, is a tall plant, which commonly reaches the height of five or six feet, and sometimes more. It receives its name from its delicate large white single petals.* These come out in two pairs, but afterwards separate, so as to assume the appearance of four distinct petals. The duration of the flowers is but for a few days. The heads never exceed four in number, and when they attain their utmost perfection are as large as some oranges. They have the remarkable property of not opening at the crown like many other poppies, when ripe, and of never bursting or spilling their seed, unless injured: thus the White Poppy has a peculiar advantage over almost all the plants which are commonly cultivated for the seeds to make oil. How liable the pods of rape and of similar plants

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* I am totally at a loss to account for the occasional appearance of *purple* instead of *white* petals on the poppy. Seldom have I had a crop in which there have not been a few, though the seed has been most certainly taken from the white leaved plants alone; for I have invariably ordered all the purple leaved to be exterminated as soon as they shewed their colours. Last year there were, I suppose, about one in five hundred. It seems to depend on some accident—one of those arcana of nature which baffles our research—analogous to that which produces the brown or purple grains in the heads of maize or Indian corn; and which are so rare in a crop, that, according to the accounts which are given of the gay parties made in North America for husking corn amongst neighbours, the finder or opener of a purple head becomes entitled on the spot to some of those little privileges—some of these innocent familiarities with the opposite sex, which are allowed by ancient usage at the games of Holy-Eve, and Christmas.

after they have attained a certain stage of maturity, are, to open and to drop their seeds, is but too well known to those who have engaged in the cultivation. It is not unusual to lose a third of the crop in a few hours, particularly when warm sun-shine comes after rain; and it is generally found expedient to thrash in the field: the heads of the White Poppy, on the contrary, can be removed with perfect safety. It may be considered also, as rather a hardy plant, having, with me, frequently stood over the winter; and during ten years that I have regularly cultivated it, I have never observed any loss from spring frosts. The common time recommended for sowing is from the middle of March to the middle of April; but some of the finest crops I have had were not sown until the first of May: the finest individual plants, however, have been those which have sown themselves, and stood through the winter.

The White Poppy may readily be transplanted, and the abundance and richness of the leaves, will give promise of its reaching maturity; but *no White Poppy that has been transplanted will ever bear heads.* At least such is the observation which has been made by several other persons; and after repeated trials, at various stages of their growth, made for curiosity, and with the greatest care, I have never succeeded in getting a single plant to bear which had been so treated. This seems attributable to its throwing out, at a very tender age, a slender filament, which, like a top root, early penetrates to a considerable depth, and upon the complete preservation of which the future fecundity of the plant depends. But the ground nevertheless may be freely hoed, and contiguous plants eradicated without the least danger to those which are left.

Of extracting the Opium.

Opium is the inspissated juice which exudes from the capsule of the poppy, after being wounded, and which, as almost

every body knows, has at first the appearance of milk. On exposure to air and light, the juice becomes discoloured, and coagulates; but a considerable time will elapse before a large quantity of the juice will either attain a uniform dark colour, or a solid consistence. Artificial heat will accelerate the process, and may be safely employed. The heads are not to be scarified until after the petals have fallen; nor until the capsule has attained a certain degree of firmness.

In the East, the rule for beginning is to wait until the seventh day after the fall of the petal. A very slight experience is sufficient to determine the time: for if the operation is begun too soon, the juice will be too thin, and will drop down upon the leaves below; if too long delayed, it will flow very sluggishly, or perhaps none at all will come. In a description of the system pursued in India, by Mr. Devis, in the Transactions of the London Society of Arts, the same poppies are said to be tapped every other day for a fortnight or three weeks together; a practice very difficult to reconcile with the nature of the poppy in this climate; for here the head will become hard and dry long before that period; and it is not easy to imagine that the process of maturation, under the sun of India, goes on slower than it does in this moist climate. Rain is said to increase the quantity of juice; and in the East, they water their poppies very abundantly.

The wound must not be made deep, otherwise the head will open and split. Little instruments of steel, with double pointed edges, calculated to give two cuts at once, are used in the East; and these are wound round with thread, so that the cutting edge or points may not penetrate beyond a certain depth. An engraving of the instrument may be seen in the Transactions of the London Society of Arts. A common penknife wound round with thread will answer the purpose; or if the operator has a sure hand, it may suffice to press the thumb upon the blade, and to choose

a proper distance between the nail and the point. The lighter the scarification is made the better, provided the juice flows. In the East they scarify in the evening, and collect the juice somewhat coagulated in the morning, before the dew is off. Here, where rain, which is so frequent, might wash away the opium, it will be a safer course to wipe off the juice while it is fresh; an operation easily to be performed with the thumb; which, in its turn, is to be wiped on the edge of some vessel, a small tin one for example, fastened to the breast. The scarifier may proceed first, and the gatherers follow at such intervals as may be found most advantageous. In an account of a crop of poppies in Scotland, published in the second and third numbers of the Edinburgh Philosophical Journal, a boy is represented as being able, in this manner, to collect fourteen ounces of juice in ten hours, which, when dried, will give three ounces and two drachms of opium. This agrees very nearly with the estimates I have made upon my own crops.

If the operation of scarifying has been performed with care, the seed, or at least a considerable portion of it, will ripen, nevertheless. But it does not appear so plump as that from heads which have not been injured; and I should doubt very much that it would give as much oil. The safest way of making the incision is horizontally across the heads; and the little vessels being thus cut across, will also bleed more freely. But in the East the incisions are made vertically from stalk to crown. The heads are far more liable to split when cut in this latter manner.

Of saving the Seed.

The seed may be left for a considerable time in the pods, or it may be taken out as soon as the heads are hard enough to be broken or threshed. If the heads are found brittle, a very simple course is to break them in a sack, and then to

shake and stir it, so that the seed may fall to the bottom. I have usually had each head opened with a knife, and the seed shaken out, in order to preserve the best, and to avoid any that was objectionable. The great aim in the harvesting or saving is, to have the heads quite dry. The whole plants may be pulled up, for they readily quit the ground when fully ripe; and then they may be bound in sheaves and put standing, in the field, for the heads to dry, if the weather is favourable; or the heads may be cut off, tied up in bundles, and left to dry by themselves. On a small scale, such as I have myself hitherto pursued, I have found the surest course was to hang up the bundles of heads under cover. In damp weather there is a liability of the seed becoming mouldy and fusty; and if it once falls into that state, though it will still yield oil, yet it will never be of the finest quality. Or the seed may be taken out very early, by opening the heads separately, and afterwards it may be spread out to dry on a cloth upon a floor, under cover: but great care should be taken that the seed does not heat; to avoid which it should be very frequently turned, and the heap not made too large. The seed, in its perfect state, is of a white colour, with a slight tinge of yellow, and it should be plump, with rather a glossy coat.

Of making the Oil.

The seed is not fit for oil until it is quite dry, and until it crackles on being pressed between the teeth. The first part of the process, which is the same as for oil seeds in general, consists in crushing or grinding the seeds to a coarse meal, or rather paste, for it is always disposed to adhere, from the oil being set free. To have the finest oil, the meal or paste should be put into the press, without being exposed to fire; but to draw out the whole of the oil, recourse must be had, at a subsequent stage, to torrefaction. The cakes from which the cold oil has been drawn, may to this end,

be re-ground, then heated, and again exposed to pressure; and this operation will have to be repeated two or three times to get the whole of the oil. The last drawn oil is said to form a most beautiful soap, which has a peculiar property of whitening linen thread, and is used very largely in Holland and the Low Countries for whitening cambric and lace.

The oil cake from poppy seed appears grateful to animals, on the very first trial; and is eminently useful in fattening poultry. I have eaten it myself, when fresh from the press, and found it palatable.

The cold drawn oil very soon falls fine of itself, without any artificial assistance.

Of the Value of the Crop.

On the continent, Poppies appear to be cultivated almost exclusively for oil; in the East, on the contrary, where there are other and more abundant sources of oil, opium is the great object. Opium and oil may both be obtained from the same plants; the oil indeed in a smaller proportion than if the heads had been left uninjured, but the diminution will depend very much upon the skill with which the scarifications may have been performed. I have endeavoured to make experiments on this subject but without a satisfactory result; nor does it appear to me that they could ever be made accurately, without a very perfect apparatus for extracting the oil, and without working on a large scale. But it will be evident, I think, notwithstanding, that the greatest profit from Poppies will be derived by taking both opium and oil.

To gather opium, it is necessary that a free access to the plants should be provided, which may easily be accomplish-

ed by means of the drill system: but in the East they sow broad cast, in small beds, surrounded by paths, raised above the general level of the ground, which are thus made to serve the double purpose of a dam to the water with which the plants at particular periods are inundated.

The Poppy delights in a rich, free, open soil, though it will grow almost anywhere; and the more space and air it enjoys, at least to a certain extent, the more vigorous will be the plant, under equal circumstances. In poor ground, or where much confined, it will never bear four heads, and seldom more than one; neither will that one head be large: in general the largest heads are found on the vigorous plants, which bear their full number. The larger the heads, the greater the quantity of opium to be obtained from them; but although the large heads also yield the most seed, it will not be abundant by any means in the same proportion; and but little difference will sometimes be found between the produce of heads of the fullest size and others considerably smaller.

I have usually allotted fourteen inches to the drills, and have had the plants hoed out to about ten or eleven inches from each other, on which system each plant would occupy about one square foot; but it would answer equally well, probably, to have the drills in pairs of only ten inches asunder, alternating with a broad furrow of fifteen inches; and if so, an advantage would apparently be gained. The estimates which I shall venture to offer will be made, however, on the supposition of each plant occupying a foot square; but it still remains open for experiment, as far as I am aware, whether a greater or lesser space will afford the most advantageous crop? In Switzerland I have counted as many as forty plants to the square yard in a crop sown broad cast; but not a single plant bore more than one head, and that always a small one. At the distance of one plant to the square foot, the number of heads with me has been mostly two and three

to each plant; and I have never had four on any great number standing together. I am not disposed, therefore, to take a higher average for an estimate than two and half heads per plant, on each square foot. Such heads, on the average, and I have had some thousands of them examined, yield seed at the rate of 1lb. avd. to 68 heads.

An estimate for opium is more uncertain, because a great deal depends upon the state of the atmosphere, and upon the skill with which the heads have been scarified. Some persons have calculated upon as much as a grain and a half of opium from each head: but a single grain seems to be a more just allowance; nor will even that quantity be procured without repeated scarifications on different sides of the head at different intervals. The quantity of oil obtainable from the seeds has been variously estimated also, at one part in three and a half;—one in four;—one in four and a half: one in four appears to me a fair allowance.

At one plant then to the square foot; two and a half heads to each plant, 1lb. to 68 heads, and one part in four of oil; and taking the specific gravity of the oil at 9.13; the British statute acre would yield, as nearly as may be expressed in whole numbers, 43 Imperial gallons of oil;—and the Irish plantation acre, 72 Imperial gallons. And according to the same rule of calculation for opium, that is one gr. to each head, the quantity would be to the statute acre 15½lbs. avd.;—to the plantation acre 25lbs.

These calculations and estimates agree very remarkably with the account published in the Edinburgh Philosophical Journal, (vols. ii. and iii.)of the produce of a crop of Poppies in opium and oil upon a space of 129 falls 18 square yards, equal to about 4976 square yards. The opium is stated to have amounted to 19½lbs., and the oil to twenty-five gallons: at which rate, the statute acre would yield in opium 19lbs.

and the Irish plantation acre 30lbs., omitting small fractional parts. But the produce in oil, impaired as it might be supposed by the previous extraction of the opium, was only at the rate of 24 gallons to the statute;—and 39 gallons to the plantation acre.*

Opium at present, as I am informed, is worth twenty-three shillings per lb. avoirdupois; but during the war the price was nearly three-fold. The cold drawn Poppy oil of the best quality should bring nearly the same price as fine olive oil, and the residue is more valuable than linseed oil; for besides being good for painting, it is far clearer and better for burning than the best spermaceti oil, and never gives out the least smell;† as the samples of oil which I have laid before the Society, made six years, will sufficiently prove.

In estimating the value of the crop, there should also be taken into account the oil cake, which constitutes three parts in four of the seeds, and which is far more palatable and nutritious than any other kind; the broken capsules, which are largely used for medical purposes, and the haulm or straw for the farm yard.

Of the Profits.

As to the profits, I forbear to say much, because my own crops, which never exceeded a rood in any one year, do not

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* The calculation is made from the gallon, whatever it may be, alluded to in the Scotch account. If the old gallon, then the difference would be still greater, as compared with the Imperial gallon, on which my original estimate is made: the Imperial gallon contains 10lbs. of pure water; and the specific gravity of the oil is taken as 9.13.

† The prices which I have paid this winter have been, for the finest olive oil per French bottle,—3s. 6d.; for spermaceti oil, the Imperial gallon,—7s.

afford sufficient data; and because so much depends upon good management, and upon the skill and dexterity with which the produce is collected. In the Transactions of the London Society of Arts; in the Bath papers, and the Edinburgh Philosophical Journal, Dr. and Cr. accounts may be found * of various crops of Poppies; but it has ever appeared to me, that the chief use of agricultural publications, was to make people think and reason, leaving them to form their own conclusions, from a thorough acquaintance with their own local circumstances. Climate, soil, shelter, manure, tillage, to say nothing of the accidents of weather, will occasion great diversity in crops; so that not only no two fields yield the same, but very frequently great variations are experienced in different parts of the same field.

The main points to which it has been my object to call attention are, that Poppies are extensively cultivated on the Continent; that the cultivation increases in those districts where it has been once introduced: and that they will grow extremely well in this country. During ten successive years I have never lost a crop. Insects have occasionally injured the plants when in a very tender state; but the period for sowing admits of such a wide latitude, that it is easy to repair any gaps which may have occurred in a drill. High winds may likwise be prejudicial, after the Poppies have attained considerable height. But although beaten down, the process of collecting opium may still be carried on, only with somewhat more difficulty; the heads will likewise continue to grow, and will ripen their seed. Small birds do

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* In Mr. Ball's account of English opium, published in the Transactions of the London Society of Arts, and transferred to Miller's Dictionary, Martyn's edition, Article PAPAVER, the estimate of the produce of a statute acre is set down as fifty pounds; yet according to the data on which the calculation is founded, the actual produce would amount to little more than 6lbs.

mischief, by pecking at the heads; and if they once get a taste of the seeds it is very difficult to keep them away. Wind is more prevalent here than on the Continent, and we have decidedly more small birds.* The experiment, however, of such a crop is easily made; a few months suffice to bring it to maturity, and any piece of sheltered ground that has received ordinary tillage and manure, will suffice; though, of course, the deeper, the richer, the more friable the soil, the better will be the crop.

There will be some difficulty, however, in obtaining fair samples of the oil; for at the large mills commonly used in this country, it is hopeless to obtain such from small quantities of seed, impregnated as all the parts of the apparatus are with oil of an inferior quality. And even if the whole were thoroughly cleansed for the purpose, and new bags procured, yet they should be worked with the poppy seeds, under several pressings, before the perfectly pure oil would flow.

I felt myself obliged, therefore, to construct a press of my own, in order to prove the quality of the oil which I could grow. It has answered the purpose; and as a similar contrivance, or even better, may be within the easy attainment of others, I shall give a brief description of it. A stout

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* On the Continent, it is more the custom to pursue small birds for food as well as sport; men,—and those fully caparisoned for the field,—not disdaining the *game* which is here consigned to boys.

It really appeared to me, that near Geneva, there were more doubled barrelled guns than birds: the consequence was, that in the spring time, the hedges were filled with insects, webs, eggs, larvæ, the natural food of small birds, but which there were no small birds to devour. I have seen proclamations issued by the government, enjoining all occupiers of lands and gardens to clear their hedges of vermin, under pain of a considerable fine. Thus it comes from destroying a link in the chain of Nature.

piece of the trunk of an elm-tree, about seven feet in length, roughly squared, was laid horizontally, and firmly fastened upon massive blocks, which served as legs to raise it a little above the ground. In the upper side was cut a chamber, six inches wide, twenty-four inches long, and which should be ten or eleven inches deep at the least. The end of this chamber, destined to receive the seed, was lined with tin; and a hole cut through at the bottom, with a spout of tin, to let the oil drop out. Three sides of this chamber were then set with moveable plates of sheet iron, drilled with numerous holes; and the seeds, enclosed in a hair cloth, were forced up against the plates by means of a moveable block, on the fourth side, driven home by wedges.

In Rees' Encyclopedia, and in the Supplement to the Encyclopedia Britannica, (article, Oil Mill), the way of arranging the wedges may be seen. They should all be made exactly on the same plan, so as to fit accurately to each other; and the height should be small, in order to gain power. In using the wedges, care must be taken always to have one in the series with its head downwards, and not to let it come nearer than three or four inches of the bottom; otherwise it would be a most difficult piece of work to set the wedges free after they were once locked; but with the aid of the inverted wedge, a few blows will loosen the whole set, though ever so firmly fastened. Of course, additional blocks, and thin pieces of wood must be provided in readiness, to increase the pressure as the bag shrinks on parting with its oil.

The seeds were prepared for the press by pounding them in a granite trough, such as is commonly used under a pump. But a large mortar either of metal or stone would answer equally well, or perhaps better. And here I shall just beg leave to mention, for the information of those who may not be directly acquainted with the fact, that in using any heavy instrument for pounding or stamping, the operation is

facilitated in a wonderful manner, by having it suspended by a string or strap, to a spring pole fixed horizontally above the head, on the plan of the poles used by turners. The spring must be sufficiently strong to hold the instrument suspended, so that, in using it, no exertion need be made, excepting to draw it downwards; it should fly up of itself.

With the aid of such an apparatus, which is not expensive, is easily made, and will last for generations, any family may be readily supplied with oil of the finest quality. The wedges alone wear out, but if these are made of hard wood and strapped with iron, they will also last for several seasons. The apparatus will not suffice indeed to extract the whole of the oil; but a considerable quantity of what the seeds contain may be obtained, and that decidedly the best of its kind: what remains behind will only render the cake the more valuable for home use.

In Switzerland and Holland, countries, where minute attention to economy and unremitting industry go hand in hand, small oil mills abound. The cost is inconsiderable, and the advantages and profits are well ascertained. Surplus oil is a ready article of sale, and the cake is carefully kept at home to feed animals and enrich the ground.

Oil mills, in common with all other machinery, have latterly undergone much improvement; they can be made of any size; there is no mystery in working them, and probably few more ready methods of improving a large estate could be devised, than in erecting an oil mill in a suitable district, where none has existed before.

THE END.