

A
TREATISE

ON THE
Propagation of SHEEP,

THE
MANUFACTURE of WOOL,

AND THE
Cultivation and Manufacture of FLAX,
with Directions for making several
Utensils for the Business.

By JOHN WILY.

WILLIAMSBURG:

Printed by *J. Royle*, MDCCLXV.

The PREFACE.

AS it is customary for the smallest Pamphlets to have a Preface to recommend them to the Publick, I suppose it will be expected there should be one to this, though I am of Opinion it needs no other Recommendation than the present Circumstances of the Generality of the Inhabitants in this Colony, who are more in Debt than they can possibly raise Money to discharge, our Paper Currency being almost exhausted, little or no Gold or Silver amongst us, Tobacco (our Staple Commodity) of so little Value that it is scarce worth making, and Goods at a higher Price than was ever known in this Colony before. I think this a sufficient Recommendation of these few Sheets to the Publick, and hope it will plead a sufficient Excuse for my undertaking a Task which I must acknowledge myself incapable of in Regard to penning it in a grammatical and methodical Form; but as it is intended chiefly for the Benefit of the common and poorer Sort of People, I hope the Learned will not condemn it, but lend their kind Assistance to the publishing a better Piece on the same Subject, for the Encouragement of Arts and Manufactures amongst us: For as we have got in Debt by our Indolence and Extravagancy, sure there is no better Method to retrieve ourselves than by our Industry and Frugality. And I must believe, and hope, this small Treatise will forward those Manufactures, as I have given the plainest Directions

The P R E F A C E

for the Performance of every Operation in each of them; so that a Person, of a common Capacity, may go through the whole Processes without any other Instructions. Though Fortune hath not placed me in Circumstances to be so great a Benefactor to my Country as she hath those who can afford to lay out two or three Hundred Pounds to improve the Breed of Horses amongst us, yet my Labour in writing this Pamphlet I hope will be serviceable, and as well accepted by the Publick as the Widow's Mite was in the Treasury; and I hope it will prove very beneficial to every Purchaser. This is the sincere Wishes and Prayer of him who begs Leave to subscribe himself the
Virginia Farmer's

Most Obedient and

Very Humble Servant,

JOHN WILY.

*For the Propagation of SHEEP,
and increasing the Quantity of
WOOL.*

THOUGH Sheep are the most beneficial Creatures we can raise, they affording us both Food and Raiment, yet there is no dumb Creature taken so little Notice of in *Virginia* as they; there being but very few People here that take Care to sow any Thing for Winter Pasturage for them, or provide or give them any other Food than a few dry Blades in the Winter. And as Wool is a Commodity greatly wanting in this Colony, I hope it will not be taken amiss if I here give the Readers my Opinion how to manage their Sheep to have more in Number, with finer Wool, and larger Fleeces, than is at present got from the common Flocks.

First. Make choice of a likely large Ram Lamb, that has the finest and longest Wool, and give him always his Fill of good Food, and not suffer him to run with the Ewes until he is two Years old, by which Time he will have a good Growth; and I must likewise be of Opinion it is proper to keep the Ewe Lambs from the Ram until they are a Year old or upwards, for the Ewes having Lambs before they have their Growth is a great Disadvantage to the Breed of our Sheep.

In the Summer remove or change your Sheeps Pasturage as often as you conveniently can, and do not pen them in the Summer Nights, for as they cannot bear the Heat of the Day, it is the only Time they have to feed, unless a little in the Mornings and Evenings ; but if you are unwilling to lose the Benefit of their Dung, pen them in the Day Time, and have good Arbours for the Sheep to lie under in the Heat of the Day : The Pens should be frequently removed, or cleaned out, and the Dung carried away ; for all Kind of Filth is pernicious to them.

For Winter Pasturage for your Sheep, sow Wheat, Rye, Clover, or Timothy, for them to feed on when the Earth is free from Snow ; and sow large Patches of Turnips, to feed them with in snowy Weather, when they have not the Opportunity of getting any green or moist Food. You should take Care to dig your Turnips when your Earth is clear of Snow, and keep them in a Cellar, or Cave made for that Purpose, until you have Occasion for them ; then take them out and wash them, and lay them in a clean Trough, and there with a Spade, or some cutting Utensil, cut and chop them to Pieces ; then lay them in long Troughs, for your Sheep to feed on. Oats or Pease is exceeding good Food for Sheep in the Winter ; and sometimes wet the Oats, and throw a little Salt amongst them, for I look upon Salt to be very

serviceable to all Kind of Stock. In the Winter Season, have a good tight Roof for your Sheep to lie under; the Sides to be open, for the Benefit of the Air; have the Shelters often cleaned, and the Dung carried away; and give them fresh Litter. You should take Care not to let your Pasture be eaten down about the Time of your Ewes yeaning, but to procure some good Grazing to turn your Ewes on just before their yeaning, which will occasion them to have a Plenty of Milk for the Lambs, and will prevent there being so great a Loss of them as is common where the Ewes have only dry Food to feed on. If any of your Ewes year whilst the Earth is covered with Snow, that they have not the Opportunity of grazing, you should supply the Defect by giving them a greater Plenty of Turnips. If any of your Ewes refuse to take their Lambs, put the Ewe and Lamb in a close House, and tie a Dog in the same Place, and they will own the Lamb immediately.

The proper Time to shear your Sheep is in the Increase of the Moon, in *May*; and, if you have the Conveniency, make a Pen near some Water Course or Pond, and wash your Sheep before you shear them: As soon as they are washed turn them into a small Enclosure that has a Plenty of Grass, and let them run on it two or three Days, or until you see the fatty or oily Substance shedding amongst the Wool. Then is the proper Time to shear them, for

that is a great Preservation to the Wool. If any of the Sheep have shed Part of their Wool, be sure to clip the young Wool, to prevent its shedding again. The next Spring, as soon as the Fleece is off, take a Brush with a little Oil on it, and rub it on the Sheep; and it will occasion the Wool to grow the faster, and cause the Water to shed off them the quicker if they are caught in cold Rains, which is very hurtful to them.

I make no Doubt but there may be many more very useful Observations made on the Propagation of Sheep, but I am in Hopes those I have made will be sufficient to stir up my Countrymen to take more Notice of their Sheep than they formerly have done; and I make no Doubt but the Methods I have prescribed will be of great Service to the improving our Sheep and Wool, as well as increasing the Quantity of both, if well followed.

As there are different Sorts of Wool on a Sheep, the Neck being the finest, the Belly next, the Sides next, the Shoulders and Thighs the coarsest, it will be proper the Person employed to shear the Sheep should carefully roll up each Fleece by itself, turning it inside out, beginning at the Neck Part, and leaving out the Shanks; that the Person employed to sort the Wool may with the greater Ease separate the fine from the coarse, and likewise that which is suitable to be combed for Worsted from that

which will answer for other Uses. After your Wool is well culled or sorted, the fine from the coarse, then have it well washed; for if you wash your Wool before it is sorted, it afterwards will be very difficult to separate the fine from the coarse as it ought to be.

I am persuaded that many industrious People have been discouraged from attempting to have larger Quantities of woollen Cloth prepared and drest at the Fulling Mills, on Account of what they have had done drawing and puckering up in divers Places, which was altogether owing to the Mismanagement of the Wool; and this was one Reason for my undertaking to write this Pamphlet, in Hopes by this Means to put those that make any hereafter into a better Method of managing their Wool, and advise them to observe and be guided by the following Directions.

When your Wool is well sorted, the fine from the coarse, and clean washed, if you are desirous to have a Piece of fine Cloth, take the finest of your Wool and spread it on a Floor, and sprinkle a little Oil, or any soft Grease, on it; then turn it over, and sprinkle it again; and so proceed until you think it is sufficiently greased to spin. Then, with a Pair of coarse Cards, card it slightly; so as to make it into Bats, such as is put in Quilts. Then let three or four Persons take about an equal Quantity of those Bats under their Arm, and, walking round on

a Circle, with their other Hand pluck off small Quantities at a Time, and throw it altogether in a Pile in the Middle of the Circle. Then take it up and card it slightly, and make it into Bats again; and mix them as before. This should be repeated two or three Times, or oftener; that the Wool may be well mixed together, which is the only Method to prevent your Cloth being uneven: For if you card or spin your Wool in the common Way, taking it just as it comes to Hand, it will certainly be liable to that Misfortune; for the coarse and fine Wool, nor the Wool of an old Sheep, and Lambs, will not shrink and mill alike. And if you have a few Quills of fine, and then a few of coarse Wool, filled or shot in your Cloth, it is impossible to prevent its being puckery and uneven, as soon as it gets wet. This I am fully convinced to be the Reason of Cloths being uneven, for I have always observed that the Pieces of mixt Cloths which have been brought to the Fulling Mill I am concerned with are not liable to that Misfortune; for by the Owners endeavouring to mix and mingle the different Colours together, they have so mixed the different Sorts of Wool together that it made the Cloth as even and free from Puckers as that imported here from *England*, or elsewhere. This Method of braking or mixing of Wool I am informed in the old Countries is called scribbling of Wool, and is Business many People get a Living by; to perform which they have a Pair of Cards about fourteen Inches long and nine

Inches wide, the under Card to be nailed to a Plank fixed to a Bench or Form, in the same Form or Position as the Fall of a Desk or Writing Table, and to be about the Height of a Person's Breast, as they sit a-straddle on the Bench to work; the Plank that the under Card is fixed to must be supported by three other Planks, one to be nailed to the End of the Bench, the other two to the Sides of the Bench, to stand up endwise, those at the Sides to be sawed beveling at the upper Ends, to nail that on which the Card is fixed to; so that these Planks form a large Pigeon Hole to keep the Wool in ready at Hand: When your Card is thus fixed, put on your Wool; then with the other Card, which hath two Handles, one as common Cards, and the other standing upright, so that the Person that works with it hath the Advantage of working it with both Hands, and having a great Purchase with their Body, makes the Operation much easier performed than with the common Wool Cards; as a Pair of these Cards will make the Bats so much the larger than the others, a Person will brake or scribble more Wool in one Day with a Pair of these Cards than in four or five Days with the other Sort, and will do it much better. A Pair of these Cards will cost about five Shillings Sterling, and I think well worth every Person's sending for, that has a large Quantity of Wool to manufacture.

If you have a Mind for a Piece of mixed (or what is called medley) Cloth, that is, to mix two or more Colours together, put as much of each Colour on the Card as you would have it show in the Cloth; then Card it into Bats, and mix it as before mentioned. The oftener you repeat the Operation, the evener and more regular the Colours will appear throughout the whole Piece of Cloth. When your Wool is well broke, or your Colours well mixed together, you must then with a Pair of common Wool Cards, card and make it into Rolls to spin.

As to the spinning your Wool, it will be proper to have your Warp spun by one Person only, as it will likely be nearer of a Size, and twisted nearer alike, than if spun by different Hands. The Warp should be twisted middling hard, and spun with a straight Band in the common Way, as even as possible. The Filling or Shoot should be spun by one Person only, for the Reasons before mentioned; for the Evenness of the Cloth depends more upon the even spinning of the Filling than the Warp. The Filling should be spun with a cross Band, to twist the Thread the contrary Way to the Warp, which will occasion the Warp and Filling to mill the closer and tighter together, and not show the Threads so plain as if both twisted the same Way. The Filling should be spun a Size coarser than the Warp, and not so hard

twisted, but not so slightly as to want Strength to be shot in the Cloth.

Woollen Cloth to be milled ought to be wove at least five Quarters of a Yard wide, for in milling it shrinks in Width as well as Length; and if wove but Yard wide will be too narrow for Mens Clothing, if well milled: Therefore, whoever intends to weave Cloth to be milled should provide themselves with a Loom, and proper Slays and Harness for that Purpose; the thicker the Cloth is wove, the thicker it will be when milled.

If you are scarce of Wool, and have Cotton plenty, you may spin a Warp of Cotton, to run five or five Yards and a Half to the Pound, suitable to a Slay Ell wide; for it will shrink as much in the Width of the Cloth as if it was all Wool, therefore it ought to be wove as wide. Then spin Wool to fill in two or two Yards and a Half to the Pound, and weave it in the Kersey or Serge Way, or any double Woof, and have it milled, and it will appear very well until the Wool wears off, and then the Cotton will show somewhat lighter, unless you die the Cotton of the Colour you want the Cloth before it is wove, for the Cotton will not take the Die so easy as the Wool, and that is the Reason it will show lighter when much worn. This Kind of Cloth will wear exceeding well, and makes very good Clothing for Boys or House Servants.

There is another Kind of outside Clothing for Winter Wear, called German Serge, which is entirely made of Wool, but is a Mixture of Worsted and Yarn. The Method of making it is to pick out a Parcel of Wool suitable to be combed for Worsted, and have it combed; take the long Wool which is drawn out of the Combs, and spin it into Worsted for the Warp; spin it to run about five Yards to the Pound, suitable to a seven Hundred Slay that is Ell wide; then take what is called the Backing, that is, the short Wool that remains in the Combs, and mix it as first directed; then with a Pair of common Wool Cards card it into Rolls, and spin it to fill in about three Yards to the Pound, and have it wove in the same Manner as German Serge; and it will be equally as good as any from the old Countries.

As I have given the Readers some Information how to manufacture Wool, to make good Cloth for the outside Clothing for the Winter Season, I think it necessary and my Duty to inform them in the best Manner I can how to make the Linings, and the Worsted Summer Wear; which I am convinced, by what I have had done myself, and what I have seen at Mr. *John Sutton's* in *Caroline* County (who is my near Neighbour, and Partner in a Fulling Mill) that it may be brought to great Perfection: For I have seen at Mr. *Sutton's* great Quantities of Wool combed for Worsted (for his own

Use, and some for the Neighbours) some of which has been knit for Stockings, which I think far exceeds those from Europe on Account of Service, and some of it applied for the Warp of what we call German Serge, Camelot, Taminiés, Duroys, &c. Patterns of which may be seen at the aforesaid Mill, where any Person may have Cloths dressed as well as any Where in *America*, and Worsted combed and died of any Colour they choose.

It requires the longest and finest Wool to make good Worsted; and to prepare it for spinning you should have a Pair of Worsted Combs (which will cost about 35*l.* Sterling) but I look upon the combing of Worsted to be so great a Difficulty that I believe no Person can do it to Perfection unless they have served an Apprenticeship to it, or could a Person acquainted with it stand by and direct them, therefore have omitted how the Operation or Process is performed. But if you can light on a Person acquainted with the Business, and will comb your Wool fit for spinning, you may spin it on a Flax Wheel, as hereafter directed, or on a large Wheel, as Cotton or Wool; only, with this Difference, the Worsted when combed is made into a large Bat, Fleece, or Sliver, and not into Rolls. And to spin it you are to take for the Bat about as much as would make a Roll, and give it a Turn round the fourth Finger of your left Hand; then join it to a Thread on the Spindle, and, turning the Wheel with your

right Hand, draw out the Worsted to what Size you think proper. A good Spinner of Worsted will spin Half a Pound a Day, that will warp between 6 and 7 Yards to the Pound, and in 10 Days a good Spinner will spin sufficient to warp 30 Yards suitable for Shalloon, Taminies, Duroys, or any Worsted Stuffs that are but three Quarters of a Yard wide. The German Serge requires more Warp, because of its Width; and Camelot, on Account of its being doubled and twisted.

The Method to make with Wool what is called Camelot (though it often hath Silk or Hair in it) is to have the Wool combed, and take the longest of it and spin it into Worsted, then double and twist two Threads hard together for both Warp and Filling. It is in common wove in the plain Way, but should be slayed as thick as possible, and drove as close together as it can be with the Slay, &c. These plain Camelots after they are wove are put in a hot Press, to give them a glossy Stiffening, and close the Thread. The watered Camelots are those which after weaving receive a certain Preparation with Water, and are after passed under a hot Press, which gives them a Smoothness and Lustre.

Duroys, Taminies, and many other Worsted Stuffs, are wove in the plain Way; and after weaving are passed under a hot Press, to give them a Gloss and Lustre.

Shalloon, Sagathy, Calimanco, Plaids, and many other Worsted Stuffs, are made of raw Worsted, but are double wove; and the Difference in them is performed by the different Methods the Weavers have of putting the Warp in the Harness, and by working it with a larger Number of Treadles than they make Use of in the weaving plain Cloth.

To oblige some of the worthy Gentlemen who are pleased to favour me with their Names to my Subscription Paper, for the Encouragement of the publishing this Pamphlet, I shall here give some Account of the Methods for milling, dying, shearing, and pressing Cloths, though I thought to have concluded the Woollen Manufacture of the Worsted Stuffs; for I am of Opinion these Processes concerning the Woollen Cloth will be but of little Use to the Publick in general, as it will be only serviceable to those who erect a Fulling Mill for that Purpose. And whoever undertakes to carry on the Business must provide themselves with People that are acquainted with every Branch of the Business, or they cannot carry it on to Perfection; and it is a very great Difficulty to find one Man acquainted with the whole Processes, for I am credibly informed that in the Mother Countries the Milling of Cloth is a Branch of the Woollen Manufacture by itself, the Dying another, the Shearing another, and the Pressing another, and that each of these a Man is to serve a regular

Apprenticeship to before he is permitted to set up any of those Branches of the Business.

When the Cloth is wove, the next Thing to be performed in common is the Milling (though sometimes it is died first) which I think is the best, as the Cloth then being thin and open the Dies will strike through it the better. But the best Method of dying is in the Grain, for the Cloth to retain the Die. What is meant by dying it in the Grain, is dying the Wool of the Colour you want the Cloth, which stands to Reason it will hold the Colour better; for as the Wool is all loose and open, the Dies have the freer Access to the Wool.

For the milling of Cloth, you should have what is called a Fulling Mill. There are several Methods of building them, though they are all worked by a Water Wheel, which is in common 10 or 12 Feet diameter, and is either over or under shot; or what is called a Breast Mill. This last the Water is delivered near the Centre of the Wheel, and is turned the same Way as the under shot. They have all a large Stock of Timber, about 30 Inches square, and about 8 Feet long, which is called the Bed, to which there is an upright Post or Stock of Timber of the same Dimensions fixed, by letting them into each other, and fastening them by dovetailed Keys; and in the front Side of the Post that is next the Shaft of the Water Wheel, there is to be a large Hole or Cavity made, at the Bottom

of which there is another Piece fixed, and a Piece on each Side the Post to enlarge the Cavity, or what is more properly called the Cup of the Mill. In this the Cloth is put when it is to be milled, and there to be beaten with two large Mallets, which are raised or lifted by two Arms which go through the Shaft of the Water Wheel. In the Top of the upright or main Post there should be two Mortices or Places cut for what is called the Leavers; these are Pieces which are morticed through the Mallets, and extended so far through as for the Arms before mentioned to take Hold enough of them to raise the Mallets to a proper Height to fall with a good Force on the Cloth; the other Ends of the Leavers are fixed to Rollers, which work or turn in a Hollow, made suitable to the Size of the Rollers, in the back Side of the Post at the upper End. The Mallets are about 4 Feet long, and almost in the Shape of the upper Beak or Bill of a Hawk; they are about 6 Inches thick, 24 Inches wide at Top, and 6 at Bottom, so that the Foot which strikes on the Cloth is 6 Inches square; the Back of the Mallets should be cut with a Sweep suitable to the Cup in which the Cloth is laid to be milled. There are three other Pieces, called Fenders, which are cut in the Inside by the same Sweep as the back Part of the Mallets; one End of each of them is fixed to the Piece at the Bottom of the Cup; they have a Piece morticed on the Top of them, and from that Top Piece there are three other Pieces fixed to the main Post and the said Top Piece,

to keep the Fenders steady. The Use of the Fenders are to keep and guide the Mallets from striking against the Sides of the Cup. The Fenders are planed straight on both Sides; one of them stands between the two Leavers, and one on each Side.

I have here given an Account of the principal Parts of a Fulling Mill, and shall now proceed to give some Account of the Method of milling of Cloth. First wet it with warm Soap Suds or Chamber Lie, then lay the Cloth in the Cup of the Mill, and set the Mill to work. The Cloth should be kept moistened with warm Soap Suds, Chamber Lie, Rye Meal, or Fullers Earth, mixed with warm Water, to make and keep the Cloth slippery, that it may turn a little at every Stroke the Mallets give it; for if you see the Cloth remain in the same Position for several Strokes together, you may depend the Mill, or Cloth, is not in proper Order. The Cloth should always have a moderate Warmth in it, first raised by the warm Liquid it is moistened with, which Heat is afterwards to be kept up by the hard and quick Strokes of the Mallets, which are ordered or regulated by the Quantity of Water delivered on the Wheel once in 5 or 6 Hours. The Cloth should be taken out of the Mill, and overhauled, beginning at one End and examining it through, to see if it is not united or milled together in Places that ought not to be, which will sometimes happen if the Mill continues working too

long at a Time without examining. When the Cloth is thickened or milled enough, it should be scoured, to cleanse it of the Grease, Soap, or other Ingredients made Use of in milling the Cloth. To scour it, lay it in the Cup of the Mill, and have a small Trough to convey a small Quantity of Water into the Cup amongst the Cloth, and set the Mill to work, and as she keeps going the Water will dash out as fast as it runs in; this Method will cleanse the Cloth of all Filth, and make it in Order to receive the Die.

To die Cloth you should have a large Copper fixed in Brick, in the same Manner as a Still is set up, having a wooden Frame on the Top with two upright Posts about 18 Inches high; on the Top of these Posts the Axletree of a Reel should turn to receive or take up the Cloth out of the Liquid it is dying in, and to let it into the Copper of Liquid again, that by shifting, changing, and running it through the Die, it may be all of one Colour, which it would not if thrown into the Copper, and let lie without being moved.

As to my pretending to give a full Account of the Die Stuffs made Use of in every particular Colour, I must ingenuously confess I am not so well acquainted with the Business as to give a proper Account of dying, as I was not brought up to it, but will endeavour to satisfy

the Reader's Curiosity, as far as lies In my Power, what Dies are in common made Use of, and the Colours they die.

There are several Ingredients made Use of in dying, some of them only to prepare Stuffs for better taking the Die and to heighten the Lustre of the Colours, some to colour it, and others to fix or set the Colours.

The Ingredients commonly made Use of in dying Scarlet are a Decoction of Alum, Aquafortis, and Cochineal; a Pewter Vat is the best to die this Colour in.

For dying common Reds, Purples, &c. Alum, Redwood, Brazil, Madder, &c.

For dying Yellow, Alum, Woad, Fustick, &c.

For dying light Colours, Alum, Copperas, Galls, and several Kinds of Barks.

For dying dark Browns, Snuff Colours, &c. Alum, Copperas, Logwood, Madder, Walnut Hulls, Sumach, Alder, Galls, &c.

For dying Black, Copperas, Galls, Sumach, Alder, &c.

For dying Blue, Indigo and Woad, with which a Decoction is made, should be fermented

in a Lead Vat fixed in a Brick Furnace; the Vat should be in Resemblance of a Sugar Loaf, or Mill Hopper, the small End set a little Way in the Earth, the Bricks not to close to the Side until they rise near the Top, that the Fire may have free Access to the Side of the Vat to keep it with a moderate Heat. Lime Water or Pot-Ash are sometimes used in working of blue Vats; the over-heating a blue Vat will spoil its Process.

All the other Colours I have mentioned, except the Scarlet, may be died in a Copper in boiling Liquid which the Drugs are boiled in; any of the Colours are to be heightened or lowered according to the Proportion of the Ingredients put into the Liquid, which must be left to the Knowledge and Skill of the Dier.

To die Green, first die it a good Yellow, then put it into a blue Vat, and if the Blue is good it will be a good Green; but if either the Yellow or Blue be of a bad Colour, it will not make a good Green.

As soon as Cloth is taken out of the Die it should be rinsed in clean Water, to wash off the loose Dregs of die; and whilst it is wet it should be carded with a Pair of what is called Clothiers Cards, to make a Grain on the Cloth, and to lay the Wool all one Way. The Method of carding the Cloth is to hang one End of the Cloth over a small Bar fixed to the Joists

of a House, or supported by two Posts; then take a Card in each Hand, and as the Cloth hangs over the Bar reach up as high as you can with the Cards; bear them hard against each other, and pull them down the Cloth the Side you purpose for the Outside. When you have the End carded as high as you can reach, then pull it down to your right Hand, and so proceed until you have laid the Wool all one Way; which is necessary, that the Garments which are made of it may shed the Water off better when taken in Rain. This you may observe by stroking your Hand on any of the fine Cloth imported here, for it will feel much smoother and finer one Way than the other. As soon as the Cloth is finished carding, before it gets dry it should be stretched on the Tenter Bars to dry, to make it smooth, and free from Wrinkles, that it may be in the better Order for shearing.

To erect a Set of Tenter Bars, you should get as many Posts as are necessary for the Distance you purpose to set up the Bars; the Posts should be set about 10 Feet apart, to have a Tenant at the Top for the Top Rail or Bar to have a long Mortice for the Bottom Bar to work up and down in, to stretch the Cloth according to its Width; the lower Bars to have a double Tenant, one to be in the Mortice, the other to be in the front Side of the Post; the Tenter Hooks are square, and have two Points, one to be drove into the Bars, the other to hang the Cloth on; those drove in the upper Bars should

have their Points standing upright, and the Points of those in the Bottom Bars should be downwards. To stretch out the Cloth, begin at one End, and hang one Selvage on the Hooks in the upper Bars, and the other Selvage to the lower Bars; then squeeze them down, and confine them so until the Cloth is dried.

When the Cloth is thorough dry it is in Order for shearing; and to perform this Branch of the Manufacture, you should provide a Pair of Clothiers Shears, and have a Shear Board made suitable to the Shears. To make a Shear Board, or Bench, get a Piece of Timber about 5 Feet long, 2 Feet wide, and 4 or 5 Inches thick; fix 4 good strong Legs to it, to keep it steady; the Top of the Bench to be about the Height of a Man's Waistband that is to work at it; the Top of the Bench should be made rounding, exactly to fit the Hollow of the Blade of the Shears; then fold up a Piece of Cloth, and lay it on the Bench; then lay a Piece of brown Linen, or good Rolls, over the Cloth, and draw it over the Cloth, and as tight as possible to the under Side of the Bench, to make a good firm Cushion to shear the Cloth on; then you should have 6 small Iron Hooks about 4 Inches long, Half an Inch wide in the Middle, and small at each End, with a Hook to each End, one to hook in the Selvage of the Cloth, the other in the Cover of the Cushion, to stretch the Cloth to be sheared so tight on the Cushion as to make it free from any Puckers or Wrinkles.

A Pair of Shears will weigh about 40 lbs. notwithstanding there is very often 15 or 20 lbs. of Lead fixed on the under Blade of the Shears, to make them clip the Wool the closer to the Threads; they are made chiefly of Steel, and have a large Bow of well tempered Steel, near as large as a small Man's Wrist, which is so stiff, as they are obliged to be worked by a Purchase with a Handle, and a Cord to draw the Edges together when working with them.

When you have your Shears and Shear Bench fixed as before mentioned, fold up your Cloth, and lay it at the Backside of your Shear Bench; then take the End of the Cloth which the Wool is laid towards, that you are going to shear, and with the Tenter Hooks stretch the Cloth tight on the Cushion, and with a Pair of Tweezers made for that Purpose pick off all the Knots, and with a Clothier's Card, or a Set of Teasels, card the Cloth towards you, and then lay on the Shears, and begin to work close at one Selvage, and so work across the Cloth to the other; then make your Tenter Hooks loose, and take over some more of the Cloth, and so proceed until you have sheared the whole Piece of Cloth.

The next after shearing is the pressing. To perform it there must be a Press erected, a Press Hearth, Press Boards, and Press Papers. A Press is made with two large Posts 12 Feet

long, 16 Inches wide, and 12 thick; two other Pieces, of the same Width and Thickness of the Posts, to be 8 Feet long; one is for a Bottom, and the other a Top Piece. These Pieces are to be tenanted through the Posts, with a double Tenant to each End. The Posts should be 4 Feet apart in the clear. The Inside of them, and the Edges, should be smooth and straight, that the Foot Board, or Follower, may slide up and down between them without Interruption. The Bottom and Top Piece to be 5 Feet apart in the clear, and then there will be sufficient Timber at each End of the Posts to prevent the Tenants tearing out. There should be Keys in the Tenants at the Backside of the Posts, to keep them in Place. There must be a Hole cut through the Top Piece in the Centre, between the Posts, just sufficient for the Screw to work through the Piece. Then fix the Box or Nut of the Screw to the under Side of the Top Piece, so that the Screw may work exactly perpendicular through the Hole in the Top Piece. When the Posts are set upright, the lower Ends of the Posts may be set in the Earth even with the Bottom of the Bottom Piece; then a Floor of Bricks to be raised on each Side the said Piece, even with the Top of it; then have some Pieces of Plank 3 Inches thick and 5 Feet long, and lay them across the Bottom Piece, from one Post to the other; the Ends of the Plank to lie on the Brick Floor which is raised on each Side the said Piece; then make a Brick Hearth on the said Planks, and

run up a Pillar of Brick, close to the Inside of each Post, a Foot high, and one Pillar in the Middle; on these Pillars the Press Plate, or Hearth, is laid; it is a Plate of cast Iron, about 3 Feet 10 Inches long, 2 Feet 8 Inches wide, and 2 Inches thick; then get a Piece of Timber for the Foot Board, or Follower, 5 Inches thick, 4 Feet 8 Inches long, and 2 Feet 8 Inches wide; then from within 3 Inches of the Centre adze it away bevelling to each End, to be about 2 Inches and a Half thick at the Ends; then cut again, or guide in each End of it, exactly to fit in between the Posts, and leaving an equal Part at each Corner to guide it to slip up and down the Posts; then fix the Foot or Step exactly in the Centre of the Follower. What is called the Step or Foot is a Piece of Iron, which with large Nails is fixed on the Top of the Follower, by which the Follower is raised or forced down to press the Cloth, the Step having a Hollow in the Centre of it for the Point of the Screw to work in; and by turning the Screw one Way it takes up the Follower, and turning it the other forces it down on the Cloth. Then have some Press Boards made of white Oak Plank, Inch thick; they should be about 3 Feet long and 2 Feet and a Half wide, with Ledges to the Ends of them, to keep them together; they should be planed smooth on both Sides; 6 or 7 of them will be sufficient for a common Press. Then have a sufficient Number of Blocks, 2 Feet and a Half long, tied up 6 Inches square, to lay between the

Follower and the Pressing Board that is over the Cloth to be pressed.

When you have a Press fixed as here mentioned to press Woollen Cloths or Stuffs, make a small Fire in the Stoves underneath the Iron Plate, or have a large Quantity of good hot Coals to put in the Stoves, to make the Press Plate as hot as you can endure your Hand on it for a small Space of Time; and it should be supplied with fresh Coals, to keep with a moderate Heat as long as there are any Cloths in the Press. To fold up the Cloth to put in the Press, there should be a large Table to lay the Cloth and Pressing Papers on; then begin at one End of a Piece of Cloth, and lay on a Paper; then turn the Cloth over that Paper; then lay another Paper on the Cloth, and bring the Cloth back again over the second Paper; and so proceed until the whole Piece of Cloth is folded up, with a Paper between every Fold; then lay two or three of the sory Papers on the Hearth or Press Plate, and the Cloth that is papered on them; then lay a Press Board upon the Cloth, and give it a Squeeze with the Screw, and let it lie until it is warmed; then take it off the Plate, and lay another Piece, papered in the same Manner, on the Plate, and a Pressing Board on it; then lay the first Piece on the Board, and another Board on that, and so proceed until the Press is full of Cloth, or until you have all in that you have ready for the

Prefs; observing always to put the fresh Pieces next the Papers on the Plate, and to have a Prefs Board between every Piece of Cloth, if large, but if small two or three Pieces may be between two Boards. Every large Piece of Cloth you put in Prefs, or two or three small Ones, you should take a good hard Set on it, with an Iron Crow Bar, which is to have one End made suitable to the Holes in the Screw to turn it by. In the Prefs, Shalloons, Taminiacs, Duroys, and many other Worsted Stuffs, have a Paper put in only every other Fold, to make a Gloss only on one Side of the Stuffs; but the Worsted requires a harder Set with the Screw than Cloth. There are some Kinds of Stuffs which are watered when put in the Prefs, which will show a long Time after being worn.

On the Cultivation and Manufacture of F L A X.

FL A X thrives the best, and grows to the greatest Perfection, in moist Lands, that have a fine rich mellow Soil; but it will sometimes grow to great Perfection on high Land, that has a fine Soil, if well manured, especially if the Season of its growing should prove moist, in which Case it will probably be as good as any on the low Lands. I am of Opinion the Ground that will bring good Tobacco will bring good Flax; for I this Year sowed about two Acres of Ground in Flax, which had been tended

fifteen Years successively, without any Kind of Manure the whole Time of its being cleared and tended : Therefore I think no Person need doubt of making it, as Ground so long tended would bring it to Perfection.

To prepare your Land for Flax, tend it the Year before in Tobacco (if you choose to make any) or in any Thing else that will clean the Ground of Weeds and Grass Seeds ; for if a great Quantity of either comes up with the Flax it will be very hurtful to it, unless picked out, which is very troublesome, as it is to be done by Hand, in the same Manner as you weed Tobacco Plants. You should plow the Ground in the Month of *March*, two or three Times over, until you have well broken the Clods ; then go over it with a Tooth Harrow, until you have laid it as level, and made it as fine, as possible.

The proper Time to sow Flax Seed is between the Middle of *March* and Middle of *April*, though it will sometimes come to good Perfection if sowed at any Time before the Middle of *July* ; but if sowed after the Time first mentioned it is liable to be hurt by the Weeds or Grass, if the Ground throw out a large Quantity of either, or the Summer Drowth will be apt to hurt it, if on high Land.

Flax should be sowed promiscuously (as Wheat or Oats, &c.) but somewhat thicker.

Though the Seed is much smaller than Wheat, it will take a Bushel and a Half to sow one Acre of Land to make it fit for Linen or Thread. The thicker it is sowed in Reason the better, for the smaller the Stalk is the thinner the Bark will be (which the Thread and Linen is made of) and it stands to Reason the Fibres of the Bark are the smaller, and therefore can be separated the finer, and made fit for the finest Linen or Thread; but if you want to get a larger Quantity of Seed, according to the Seed sowed, sow a Bushel to the Acre, and it will bring very good Flax for common Use; but as the Stalk is larger than that which is thick sowed, the Bark will be thicker, the Fibres larger, and therefore cannot be separated and made so fine as the thin barked. As soon as the Seed is sowed, go over the Ground with a Tooth Harrow, or a larger Quantity of scragged Brush dragged after a Horse or Ox, to cover or mix the Seed with the Earth.

Flax sowed at the Time first mentioned will be fit to gather about the first or Middle of *July*, and I have known two Crops in one Year off the same Piece of Ground, by cleaning of the Grass and Weeds as soon as the first Crop is off, and sowing it over again. The second Crop will sometimes be as good Flax as the first, but not common; and it seldom brings so good Seed, or so much as the first Crop, therefore shall not advise any One to attempt it until they are well stocked with Seed.

To know when your Flax is fit to gather, you must observe the Leaves turning yellow, and the lower Ones dropping off the Stalks, hardening and beginning to dry, and the Seed ripening, which may be known by its Colour.

The Method to gather your Flax is to pull it up by the Roots with one Hand, and deliver it into the other until you have as much as you can grasp, holding it near the Middle, and observing to put all the Roots one Way and the Tops the other; then lay that Handful behind you, and so proceed through the whole Patch. If the Seed is not full ripe, as it seldom all ripens together, you may let it lie in the Field two or three Days, to dry and ripen the Seed that is not full ripe. As soon as the Seed is dried gather up the Handfuls, and carry them to some clean hard Yard or Floor, to get off the Seed.

The best Method to get off the Seed is with what is called a Rippling Comb, which is made as followeth: Get a Piece of Plank about eighteen Inches long, three broad, and one thick; then have fourteen or fifteen Teeth made of Iron or Steel, about six Inches long, in the Shape of a flooring Brad; then bore as many Holes lengthwise in the Plank as you have Teeth to put in it, letting the Teeth stand about a Quarter of an Inch apart; then nail the Comb to some heavy Timber or other, to keep it

steady whilst working with it; then take a Handful and strike it on the Teeth, and draw it through; repeat it until you have the Seed clean of the Handful, and so proceed until you have cleaned all the Flax. Some People whip out the Seed on a small Cask, or thresh it off with a Flail; but I like the Comb best, for this Reason, that it lays the Soughs all straight, by drawing them through the Comb, and prevents it being entangled when it is spreading out to dry after being watered; and the other Methods break and entangle the Flax, and make it troublesome to spread it to dry, or to be dew-rotted. As chief or many of the Pods or Bolls will come off whole, and not shed the Seed out of them, it will be proper to spread them out in the Sun on a Cloth, which will cause many of them to burst open as they dry; and when they are thorough dry, put them in a Mortar, Cask, or Trough, and beat them slightly with a wooden Pestle, then wind the Seed, and run it through a suitable Sieve for the Purpose, by which Means you will get the Remainder of the Pods or Bolls together; then beat them again, and so proceed until you have got the Seed clean, and fit to sow or sell to the Oil Manufactures.

Flax is in some Respects of the Quality of Hemp, having a gummy glutinous Substance, or Sap, which occasions the Bark to cling and stick to the Stalk, and must be soaked out of it by lying in Water, or being exposed to the Rains and Dews, spread thin on the Grass:

Therefore, as you ripple off the Seed tie it up in Sheaves, about the Size of a Sheaf of Wheat, ready to be watered, or carried to a convenient Place to be dew-rotted. If you thresh off the Seed it should be tied in Sheaves before you thresh it, or it will be greatly entangled, and occasion great Loss in the Flax. That which is to be water-rotted should be tied with some good strong Bark, or Withe, for fear of its breaking loose in the Water.

On the Manufacture of FLAX.

THE watering or rotting Flax is looked upon to be the most mysterious and difficult Part of the whole Manufacture, but I am of Opinion if those that go upon making Flax will observe and be guided by the following Directions they will find it not so great a Difficulty as they may imagine; though it is out of the Power of any Man to tell the exact Number of Days it will take to water or dew-rot Flax, yet it may be performed with great Safety by the following Observations: To water your Flax, take the Sheaves before mentioned and put them in Water, and confine them down so that no Part of them appear above the Water; and go to it once or twice a Day, and draw out a few Stalks from about the Middle of a Sheaf, and break them; and if the Stalk and Bark both break very short, and appear very rotten and tender, it is likely to be rotted enough. But

for further Trial, take a few Stalks and dry them ; then take four or five, or more of them, and snap them, holding your Hands about an Inch apart ; repeat snapping them, and giving them little Rubs together, until you have broke them for six or eight Inches ; then give them small Twitches with your Hands, and if the Flax is properly watered you will see the woody Part called the hard separate and fall from the Bark, which will remain strong and good if not over-watered, but if over-watered the Bark when dry will break short and tender ; and if this Misfortune should happen there is no Remedy to restore it to its proper Strength, and the chiefest Part of it will make nothing but Tow ; and if the Flax is not watered enough the woody Part of the Stalk will stick to the Bark, and occasion the Linen Thread to be harsh and full of Hards.

Some People choose standing Water to soak or rot their Flax in, and others to dew-rot it ; but I should choose a Stream of fresh running Water, for these Reasons : The Motion and running of the Water through the Flax will the better cleanse it of the gummy Substance which causes the Bark to stick to the Stalk, and the running Water being cooler than Pond Water it will not rot it so soon, and therefore it is not so liable to be over-watered ; and to prevent this Misfortune I would advise you to take it out of the Water before it gets hurt, for you may then have it sufficiently rotted by the same

Method as those who never water it at all, but do it entirely by exposing it to the Rains and Dews, spread on a grassy Place. When you find or believe your Flax to be watered enough, take it out and carry it to a grassy Place (where no Stock can walk amongst it to tangle it) and there untie the Sheaves and spread it in straight Rows, as thin as possible; for if it is sufficiently watered, the sooner it gets thorough dry the better; and as soon as you find it so take it off the Grass and tie it up in Sheaves again, and put it in a House where it may be kept dry, in Order for breaking.

The Method to dew-rot your Flax is after the Seed is cleaned off: Whenever it suits you carry it to a grassy Place, where the Grass is rank (for the rank Grass is best for dew-rotting, as it will the longer retain the Moisture of the Rains and Dews among the Flax) and there spread it in straight Rows, so that you may pass between them to turn it over once in four or five Days, that it may all rot alike; this need not be spread so thin as that which had been watered, and required drying soon. To know when it is rotted enough, and fit to take off the Grass and put in a House, make Use of the same Methods as before mentioned in the water-rotting, by breaking and trying a few Stalks when dry.

As I before mentioned it is out of the Power of any Man to inform the Publick what Number

of Days, or Length of Time, it will take to water or dew-rot Flax, or Hemp, to a proper Medium (for in the water-rotting the Length of Time depends chiefly on the Water it is soaked in, and the Heat of the Weather, if it is in a Pond of Water, and the Weather hot, two or three Days will be sufficient, but in a Stream of running Water it will take about a Day or two longer) I must advise those who are not in immediate Want of their Flax to water it about the first of *October*, as the Weather then being moderate there will not be so great Danger of its being over-watered. Salt Water will not answer for watering Flax, for the Salt will occasion it to give in moist Weather, and may cause it to mildew, funk, and spoil in the House.

And in dew-rooting Flax the Length of Time depends chiefly on the Heat and Wetness of the Weather, and the Month of *August* is accounted a very proper Time for dew-rotting. You must always observe to have your Flax entirely dry when you take it out of the Field, and bind it up in Sheaves, and put it up in a House, or it will heat and spoil.

I hope what I have said, in Regard to rotting Flax, will be sufficient for any Person to manage it without spoiling; and if the Readers are doubtful of my Directions not answering, they are under no Obligation of watering their whole Crop at once, as it takes so little Time to do it,

but may do it at different Times, to try the Experiment, and for their better Information.

The next Operation is the breaking your Flax, to perform which there are two Methods, one with a wooden Machine called a Brake, the other is with a Hand-Mall called Beatles. A Brake is made as follows, with a good stiff four-legged Bench about five Feet long, with an upright Post near each End of it, the Posts to be about five Inches one Way and three the other, the Tops of the Posts to be near the Height of the Person's Waistband as he stands by it to work; in the Tops of these Posts let in four or five Pieces of white Oak, three Quarters of an Inch thick and three Inches broad, to stand up edgewise in the said Posts; then get three or four more Pieces, according to the Number of the under Ones, and of the same Dimensions as the others; then get a Piece about a Foot long, and of the same Size of the Post in the Bench, and bore a large Hole through the Middle of it, and put a Pin in it about a Foot long, for a Handle to lift the Fall or upper Jaw of the Brake by; then make a Mortice or Place in one End of it, to fasten the other three or four Pieces of white Oak in, in the same Manner as those in the upright Posts, and pin them fast; the upper Pieces must be about a Foot shorter than the under Ones; then you must put the Ends of the upper Pieces between the others, and bore a Hole through them all, and put in a slack Pin with a Head

at one End, and a Nail through the other, to prevent its working out; the upper Pieces should work or slip easily between the others which are fixed in the upright Posts, and the Edges of all these Pieces should be made Half round, or they will be apt to chop or break the Bark of the Flax too short; if they have sharp or square Edges, these Pieces should lock about one Inch near the Head of the Brake; when there is no Flax between the Jaws, the Head should strike on the Top of the foremost Post.

When you have a Brake thus fixed, untie one of your Sheaves and take out as much as you can grasp in your left Hand; then raise the upper Jaw of the Brake with your right Hand, and lay one End of the Handful of Flax you have in your Hand on the lower Slats or under Jaw of the Brake, and strike on it with the upper Ones, or Fall; these Strokes should be repeated very quick, and at every Stroke turn or move the Flax a little; and when you have well broke one End of the Handful about two Thirds of the Length of the Flax, turn the other Ends, and use them in the like Manner, by which Means great Part of the woody Part of the Stalk will separate and fall from the Bark through the lower Jaws or Slats of the Brake. When you think it is sufficiently broke, make it up into Twists, about the size of a large Twist of Tobacco, to be scuchened, or swungled.

To break your Flax with what the *Irish* call Beatles you must have Hand Malls made, the

Mall Part to be about six or seven Inches long and three or four Inches through, according to the Strength of the Person that works with them; then untie a Sheaf, and let a Person take as much as he can confine down with his left Hand and lay it on some smooth solid Timber or Stone, and then take the Mall or Beate in the right Hand, and begin at one End of the Handful and beat and turn it over until it is well mashed or broken better than Half Way; then turn the other Ends, and use them in like Manner, until it is all well mashed or broken; then lay by that Handful to be scuchened, as the *English* and *Dutch* call it, or swingled, as the *Irish* call it.

A Brake is the most expeditious Method for breaking Flax, and it is the easier swingled, as great Part of the hard is beaten out in breaking; but it is apter to make a larger Quantity of Tow, for the Beatles only mash and split the Stalk and Bark: Therefore the Bark is likely to be longer than that which is done in a Brake, unless it is a very good One; but that which is done with Beatles requires to have the Hards snapped and rubbed out by Hand, and will take a longer Time in the swingling than that which is done with a Brake.

The next Operation is the swingling your Flax, to perform which there are two Methods; one is performed by a Wheel, the other with a wooden Knife, which is the common Method,

and to be performed as followeth: Get a Piece of Plank about 5 or 6 Inches wide, 1 Inch thick, and 3 Feet long; plane one Side of it a little ovalling, tenant one End of it in a Block about 14 Inches long and 10 wide, so that the said Plank may stand upright; then within 3 Inches of the Top saw it within one Inch of being through, then split off the sawed Part for the Flax to lodge on, and leave the other Part as a Guard to keep you from striking your Hand with the Knife, which should be made of the hardest and heaviest Wood you can get; the Knife should be made almost in the Shape of a Dagger, the Blade to be about 16 or 17 Inches long, 2 and a Half broad, and 3 Quarters of an Inch thick on the Back. When you are thus fixed with a Swingling Board and Knife, take one of the Twists before mentioned, or a Handful of beaten Flax, in your left Hand, and give it a Stroke or two, to open and loosen it; then lodge it on the Top of the Swingling Board, and let about two Thirds of the Length of the Flax hang down the planed Side of it; then take the Knife in your right Hand, and strike the Flax just where it hangs over the Board with the Edge of the Knife, letting the Side of the Knife slide down the Flax with a quick Motion, and the Edge a little inclining towards the Flax; you should grasp it hard, to prevent its beating out amongst the Hards. As soon as you have one End cleansed of the Hards, turn the other, and use it in the like Manner. You will still find some Hards remaining in the

Middle of the Twist or Handful; then hold it up by one Hand, and draw out that which seems the longest with the other Hand, and put it together again; repeat this, and the swingling it, until you have well cleansed it of the Hards and made it soft and pliable, which is the Intent of the swingling; then make it up into Twists again, about the Size of a large Twist of Tobacco, and lay it by for heckling.

As a Swingling Wheel will be somewhat expensive, and I suppose but small Quantities of Flax made for some Years, I have omitted a Description of one; though one would greatly expedite the Operation, and would be very serviceable where there is a large Quantity of Flax or Hemp to be manufactured.

When your Flax is scuchened, the next Thing to be done is the heckling, to perform which you should have a Set of Heckles, to make the finest of Linen or Thread; but many People have only one, of a middle Size, which will cost about 20*s*. Sterling, though I think they be made as cheap here, therefore shall give the following Directions how to make one of a middle Size. First, it will take 176 Teeth, to be made of Steel about 4 Inches long, and at the But End to be square about one Inch, and to be about the Size of an Eightpeny Nail, and from thence to be made round, and to be brought with a gradual Taper to as fine a Point as possible, and neatly polished; then get a Piece of

Plank of some Wood that will be hard to split, and plane it to one Inch thick; let the Plank be 12 Inches long, and 7 Inches wide; then with a Moving Gage make a Schrike lengthwise, the Piece one Inch from the Edge; then move your Gage, and make another Schrike Half an Inch and Half a Quarter from the first; and so proceed making Schrikes at the same Distances until you have made seven; then one Inch and a Half from one End, with a Square, make a Schrike crosswise; then with your Compasses make a Prick Half an Inch and Half a Quarter from the Schrike; and so proceed, and make them at the same Distances until you have made 14. Then make Schrikes across at every Prick; and where these and the other Schrikes intercept or cross each other, bore Holes of a proper Size to hold the Teeth fast when drove into them; then with your Moving Gage make other Schrikes lengthwise, exactly between all them you made first, and likewise make other Schrikes exactly between them you first made crosswise; and where these last Schrikes intercept or cross each other, bore other Holes of the same Size as the first; then drive in your Teeth, and bore a Hole in each Corner, to nail it to a heavy Block or Bench to keep it steady whilst working with it.

You must observe that a coarser Heckle will require longer and larger Teeth, and to be set at a little further Distance from each other; and a finer Heckle should have smaller Teeth, and be set closer together.

When you have your Heckle thus fixed to a Block, or Bench, take one of the Twists which has been scuchened and untwist it; then hold it up by one End, and give it a Shake or two, to loosen or open it; then wrap one End of it round the fourth and middle Finger of your right Hand, and sling the other Ends of the Flax on the Points of the Heckle Teeth, and bear your Hand a little downwards and draw the Flax through the Teeth; these Strokes should be repeated very quick, and observe to hold the Back of your left Hand against the Side of the Heckle Teeth, as a Guide to prevent your striking your Hand that holds the Flax against the Points of the Heckle Teeth; and when you have one End of the Twist cleansed of the Hards and short tangled Flax, which is called Tow, turn the other End, and use it in like Manner. You will still find both Hards and Tow remaining in the Middle of the Twist; you should then endeavour to turn it inside out, and rub it a little between your Hands, to loosen the Hards; you must continue heckling, until you have it clean of Hards; you should draw out the longest of the Flax that hangs on the Side of the Heckle next to you, and heckle it again, and may add it to the long Flax which remained in your Hand, as it will make very good Thread, or may lay it by itself, to be twisted up and spun by itself; then take that which remains in the Teeth of the Heckle, which is called Tow, and

throw it altogether, to make coarse Linen, which I shall say more of hereafter.

The Intent of the Heckles is to cleanse the Flax of the Hards and Tow, and to split and separate the Bark, and make it as fine as possible; and as soon as you have it in that Order, lay by that Handful and heckle another in the same Manner, until you have sufficient to make a Twist, as before mentioned; then twist it up, and lay it by for spinning, or Sale.

To spin your Flax you should provide yourself with a Wheel for that Purpose, which is worked with the Foot; the Band must go twice round the Wheel Ream, and cross at the under Part; one is to be in the Whirl, which is one Part of the Spool or Quill, which receives the Thread from the Fliers; and the other Part of the Band is to run in the Whirl, which is fixed on the Spindle with a Screw.

When you have a Wheel thus fixed, take one or Part of the Twists before mentioned and untwist it, and open and spread it on a Table about two Feet long and one wide; then take the Distaff from the Head of the Wheel, and lay it on one End of the Flax you have spread on the Table, and roll it up in the Middle of the Flax; then tie a Fillet to the Top of the Distaff, and wind it slightly round the Flax on the Distaff, until you get it near the Bottom, and there tuck it in so as to keep the Flax from drawing out too fast whilst you are spinning it; then fix

your Distaff to the Head of your Wheel again, and take a Piece of Thread of any Kind, tie one End round the Spool or Quill, and put the other End through the Eye of the Spindle, and carry it up to the Flax on the Distaff, and lodge the Thread on one of the Wires in the Fliers; then hold the Thread in your left Hand up to the loose Flax which hangs at the Bottom of the Distaff, ready to join it; then turn the Whirl with your right Hand, and keep it in a Motion with your Foot on the Treadle or Foot of the Wheel; as soon as your Thread twists and joins to the Flax, draw it out to what Size you choose, and so proceed until you have spun all on the Distaff. You should often turn round the Distaff, to bring the Flax suitable to your Hand; and should often move the Thread to different Teeth of the Flier, to fill the Quill or Spool equally alike.

The Tow which I before mentioned is what they make coarse Linen of, and it answers, and will wear exceeding well, if spun and filled in with a Warp of Cotton, for common Sheets or Table Linen, or any other Use that coarse Linen is applied to.

And to prepare it for spinning you must provide a Pair of Tow Cards, and card it in them a few Strokes; then lay one Card on the other, with the Handles both one Way, and hold them fast in your Lap with one Hand and draw out the longest of it from between the Cards with your other Hand; this Kind of Tow will

make good coarse Linen, and that which still remains in the Cards may be carded to fill in coarse brown Linen or Rolls; when you have got a sufficient Quantity carded and spread on a Table, as before mentioned, you must roll it round your Distaff, and set your Wheel to work in the same Manner as with the long Flax.

Shoe Thread is spun in a different Manner from sewing Thread, or that for Linen: For to spin your Shoe Thread take the longest Flax you have, and open one of the Twists and give it a shake or two, to separate the Fibres from each other; then tie it to the Top of your Distaff, and let the Flax hang straight down it; then set your Wheel to Work, and join the Thread to the Fibres which hang down the Distaff, so that you may draw it out lengthwise, that the Shoemaker may have fine long Fibres to fasten on his Bristles with; and it should be twisted as much as it will bear without kinking.

The Thread you spin for Linen should be hanked, for which Purpose you ought to provide yourself with a Jack to hold your Spool, and what is called a Clock Reel that will strike at being twined 120 Times, so that you may know when you have 120 Threads on your Reel, which is called a Cut. These Cuts, or Skeines, should be tied separate from each other, so that you may know, by counting the Cuts, exactly what Number of Threads is in each Hank, and if your Reel is exactly two Yards round, which

is a proper Size. You will then have 240 Yards of Thread in each Cut; 15 of these Cuts is a Day's Work for a good Spinner, so that in 12 Days she will spin as much Thread as will warp 30 Yards suitable to a 720 Slay, and in 12 Days more she will spin the Filling, so that you may have Thread spun for 30 Yards of Cloth in 24 Days. To calculate it, for Example:

1 Cut contains	120 Threads
1 Thread	2 Yards long
	<hr style="width: 50%; margin: 0 auto;"/>
	240 Yards
1 Day's work	15 Cuts
	<hr style="width: 50%; margin: 0 auto;"/>
	1200
	240
Contains	<hr style="width: 50%; margin: 0 auto;"/>
	3600 Yards.
	12
Contains	<hr style="width: 50%; margin: 0 auto;"/>
	43,200 Yards,

which, divided by 1440, the Number of Threads in a 720 Slay is 30, the Number of Yards, it will warp.

$$\begin{array}{r} \text{Threads in the Slay } 1440 \overline{) 43200} (30 \text{ Yards of Warp.} \\ \underline{4320} \\ 0000 \end{array}$$

By these Methods, when you have a Quantity of Thread spun and hanked, and know what Slay will suit it, you may know what Quantity of Yards to warp it to, so as not to have any Loss. You should hank your Filling as well as the Warp, for it should all be boiled in Water and Ashes, to make it soft and pliable, that it may weave the closer and tighter together. You should boil it until you see it begin to lint, that is, when you see a Lint or Fuzz rise on the Thread.

Thread for sewing must be wound together on a Ball, then twisted and hanked; and if it is only for coarse Work, it will answer by boiling in Ashes and Water two or three Times, and being well rubbed with your Hands when cooled a little, or being beaten on a smooth solid Timber or Stone with a smooth heavy Stick made in the Shape of a Butter Stick (it is properly called a Bat Staff) which is to make the Thread soft and pliable; but if it is fine Thread, and you want it whitened or bleached, observe the Processes hereafter given for bleaching of Linen.

The weaving Linen I suppose I need say little about, as it is wove in the plain Way, but must inform those who are not acquainted with weaving it that it requires good strong Stays, made of Steel or Cane; for as the Thread is so hard and wiry, it requires harder striking and driving together with the Slay than Cotton or Woollen Cloth, and therefore our common Reed Slays will answer the Purpose.

After your Linen is wove, the next thing to be performed is the bleaching. This Process I must confess I never saw performed, but have taken great Pains to collect the easiest and best Methods how to manage it in every Particular, from Persons who have been employed in the Manufactures at home; and according to the Information I have had, I shall here give as plain and short an Account of the Processes as possible, which I expect will be sufficient for

any private Family ; though at home they have calendering Mills, which I suppose we shall be many Years without, unless some Gentlemen would set up a Factory for that Purpose.

To bleach your Linen first put it in warm Water, and soak it thirty six or forty eight Hours ; then rinse it, and dry it ; then make a strong Lie, and mix it with soft Cow Dung, and stir them well together ; then put in Linen, and let it lie about 48 Hours ; then carry it to your Bleach-Yard, where you should have a fine green Grass Plat to stretch it out, and you should have several Loops at the Ends made with the Thrums, and Loops put along the Sides, within two or three Yards of each other, to stretch it tight, with small Sticks drove in the Earth, so that the Linen may scarcely touch the Grass in any Part. You should keep it stretched out in this Manner 4 Days, and to be kept always wet. As soon as you perceive it begin to dry sprinkle it again with clean Water, so as to keep it always moist ; and at the End of 4 Days and Nights take it off the Grass and wash it clean of the Cow Dung ; and whilst it is wet lay it in a Heap on a smooth Stone or Timber that lies solid, and there beat it with large Bat Staffs for two or three Hours, and frequently turn it over, and keep it wet with warm Lie ; then put in boiling Lie, and let it lie 24 Hours ; then take it out, wash it and stretch it out again 24 Hours, and keep it watered as before mentioned ; then beat it again with the Bat Staffs, and wet it with Lie as before directed. Con-

time this Method of steeping it 24 Hours in Lie, then washing it out and stretching it 24 Hours; and when you take it up wet it every Time with warm Lie, and beat it with the Bat Staffs. This Method is to be followed for 8 or 10 Days; then lay it in sour Milk, or Butter Milk, one or two Nights; then take it out, wash it, and beat it again; then stretch it out, and water it a Day or two; then steep it in the Sourcing again; and so proceed for about a Week, or until you have bleached or whitened it to your Satisfaction.

A Bat Staff should be about 3 Feet and a Half long, 2 Inches thick, and the Blade about 5 Inches wide and 18 long, the Sides a little ovalling; the Edges to be rounded off, to prevent their cutting the Linen; the Handle to be of a proper Size, for a Person to hold it to work with.

To make a proper Lie for bleaching they make Use of Potash at home, but the common Lie will do.

And if you have not a sufficient Quantity of Butter-Milk, or sour Milk, mix some Wheat Bran and warm Water together, and let it stand a few Days, until it begins to sour; then throw in what Butter-Milk or sour Milk you have, and it will make a very good Sourcing for that Purpose.