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THE  
 M E T H O D  
 OF CULTIVATING  
 M A D D E R,

As it is now practised by the *Dutch* in *Zealand*:

(Where the best M A D D E R is produced)

With their MANNER of

*Drying, Stamping, and Manufacturing* it for Use.

Embellished with

D R A U G H T S of their B U I L D I N G S and  
K I L N S erected for that Purpose.

To which is added,

The Method of cultivating M A D D E R in *England*,  
from many Experiments made in the Course of Thirty  
Years on the Culture of that useful Plant.

---

By P H I L I P M I L L E R, F. R. S.  
 Member of the Academy at *Florence*, and Gardener to the Worshipful  
 Company of A P O T H E C A R I E S at *Chelfea*.

---

L O N D O N,

Printed for the A U T H O R;

And sold by J O H N R I V I N G T O N, at the *Bible and Crown*, in *St. Paul's Church-  
 Yard*; and J A M E S R I V I N G T O N and J A M E S F L E T C H E R, at the  
*Oxford Theatre*, in *Pater-noster Row*. M. DCC. LVIII.

To the Right Honourable

The LORD VISCOUNT  
F O L K E S T O N E,  
Baron of L O N G F O R D,  
AND  
PRESIDENT OF THE SOCIETY

For the ENCOURAGEMENT of

Arts, Manufactures, *and* Commerce,

T H I S T R E A T I S E,  
ON THE  
CULTURE and PREPARATION of M A D D E R,

Is humbly dedicated by

HIS LORDSHIP'S

*Most obedient humble Servant,*

Philip Miller.

## P R E F A C E.

*AS Madder is an Ingredient so very essential in Dyeing of Cloth and Staining of Linen, that neither of these Manufactories can be carried on without it; it is of the greatest Consequence to those Branches of Trade, to have a constant Supply of that Commodity, and at as low a Rate as possible; and not to depend on a neighbouring Country for it, since that will enable such Country, whenever it pleases, either to withhold it from us, or to exact a Price for it too great for our Manufacturers to afford their Goods so cheap to Foreigners, as our Neighbours can; the Consequences of which will be, the total Loss of those Branches of Trade, which at present amount to a considerable Sum in our Exports.*

*There can be no Doubt of the Utility of cultivating Madder in England, when it is known that the Dutch have received from hence for it, for many Years past upon an Average, more than one hundred and eighty thousand Pounds a Year. Besides, it is notorious, that as our Demands have increased for this Dye, our Neighbours have in Proportion raised their Prices, knowing we had no other Market to go to for a Supply. And this is not all, but they have of late Years adulterated the Commodity, by mixing of Dirt and Rubbish with it in such Quantity, as that in one Cask, an Allowance of twenty Pounds has been made to the Consumer for the Loss sustained by the Adulteration.*

*It will be easy to obviate all these Inconveniences for the future, and to secure to ourselves a constant Supply of this valuable Dye, by encouraging the Growth of Madder in England; for there can be no Doubt of its succeeding, since it is very certain, that formerly there was not only a sufficient Quantity of it raised here for the Supply of our own Manufactories, but likewise for Exportation to other Countries.*

*How this came to be so totally neglected by us for a great Number of Years, has been Matter of Surprise. The only Reason I have heard given, was, the many Disputes occasioned by the ascertaining the Tithes upon it; for as a great Part of the Madder which was then cultivated, was upon such Land as where the Impropration was in Lay Hands, the Persons who rented the Ground supposed they were not liable to be charged with Tithes for the Madder which grew on those Lands: But it being afterwards determined that Madder was titheable to the Vicar, and could not be comprehended under the Denomination of Great Tithes, it was such a Discouragement to the Planters, as occasioned their dropping the Culture of it: For where there was not a settled Modus for the Land, but the Vicar insisted upon having the Tithe in Kind, it became so difficult both to the Planters and the Collectors of the Tithes, as to give Room for constant Disputes: The rather, as the Vicar had the same Claim to the Tithe of the Offsets, or young Plants, as he had to the old Roots when fit for Use; so these could not be disposed of, or planted on other Ground, until the Tithing-man had been to receive his Quantity, or to see that a proper Quantity of young Plants were reserved to answer his Claim.*

*A farther*

*A farther Inconvenience resulted from the Nature of the Cultivation of this Plant, which requires that these Offsets should be planted as soon as possible after they are severed from the old Plants; else, if they are obliged to wait a Day or two for setting out the Tithe, the whole is liable to be lost; and the Trouble to Collectors of the Tithes were they to attend the Madder-Planters every Day during the Season for taking off the Plants, must be greater than could be compensated by the Value of their Tithes.*

*No Wonder then that these Litigations and Inconveniences put an End to the Cultivation of Madder in England; nor that our Neighbours the Dutch availed themselves of our Neglect. And, indeed, they soon appropriated all their Land which was proper for the Growth of Madder, to that Purpose; and finding so great Advantage arising from it, they afterwards extended it to other Lands which were little adapted to its Culture, and which were so subject to be overflowed in Winter, as to oblige them to raise the Ground in Ridges three Feet high, and to set their Plants on the Top of these Ridges, to prevent their Roots from rotting in Winter by too much Wet. This occasioned an extraordinary Expence in the Culture of it, and yet the Produce of these Lands was small when compared with that planted in their best Land, which generally produced a double Crop to that of the other; besides upon the wet Land, they are obliged to have an Interval of eight Years between each Crop, whereas in Zealand they allow but four; yet, under all these Disadvantages, they find by Experience, that even in this worst Land, the growing of Madder turns to better Account, than any other Crops they can get from it.*

*In*

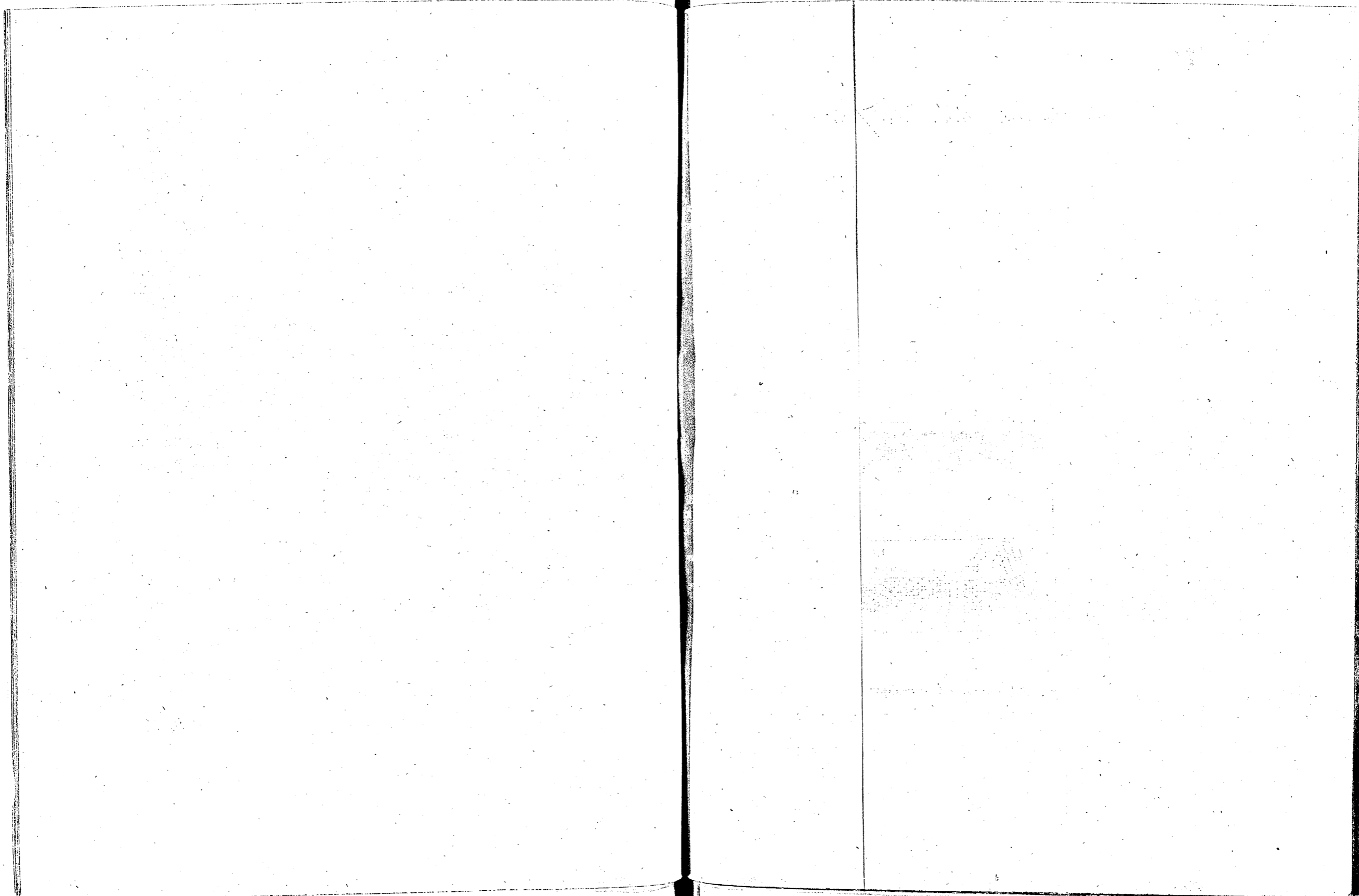
*In England we are not at a loss for Ground better adapted to the Growth of Madder, than the best Land they have in any Part of Holland: nor need we be any where at the extraordinary Expence of raising the Ground in Ridges, but may plant it in the level Surface; and as the Legislature hath been so well convinced of the national Utility of raising this Commodity among us, as to pass a Law to ascertain the Tithe of Madder for fourteen Years, it is presumed that this Encouragement will induce many to undertake it. And although this Term may by some be thought too short, yet it may be hoped, that before it expires, the great Advantages which may arise to the Publick by the planting of Madder here, will so clearly appear, as that the Term of Years will be prolonged, although the ascertaining of the Tithe should not be made perpetual, as possibly it may.*

*The restoring of this useful and beneficial Cultivation in England, will probably occasion much Land to be brought into Culture, from which neither the Proprietors of it, nor the Clergy, at present receive any Benefit: And this will also be an Employment for the Poor, at a Time of the Year when they most want it, which is from the End of Harvest till Spring; and that not only for labouring Men, but for Women and Children, who may be taught how to perform Part of the necessary Business, in picking out the Roots when they are dug up, and in taking up the Offsets for planting, &c. whereby many who are at present burdensome to their Parishes, may become useful to the Publick, and enabled to support themselves.*

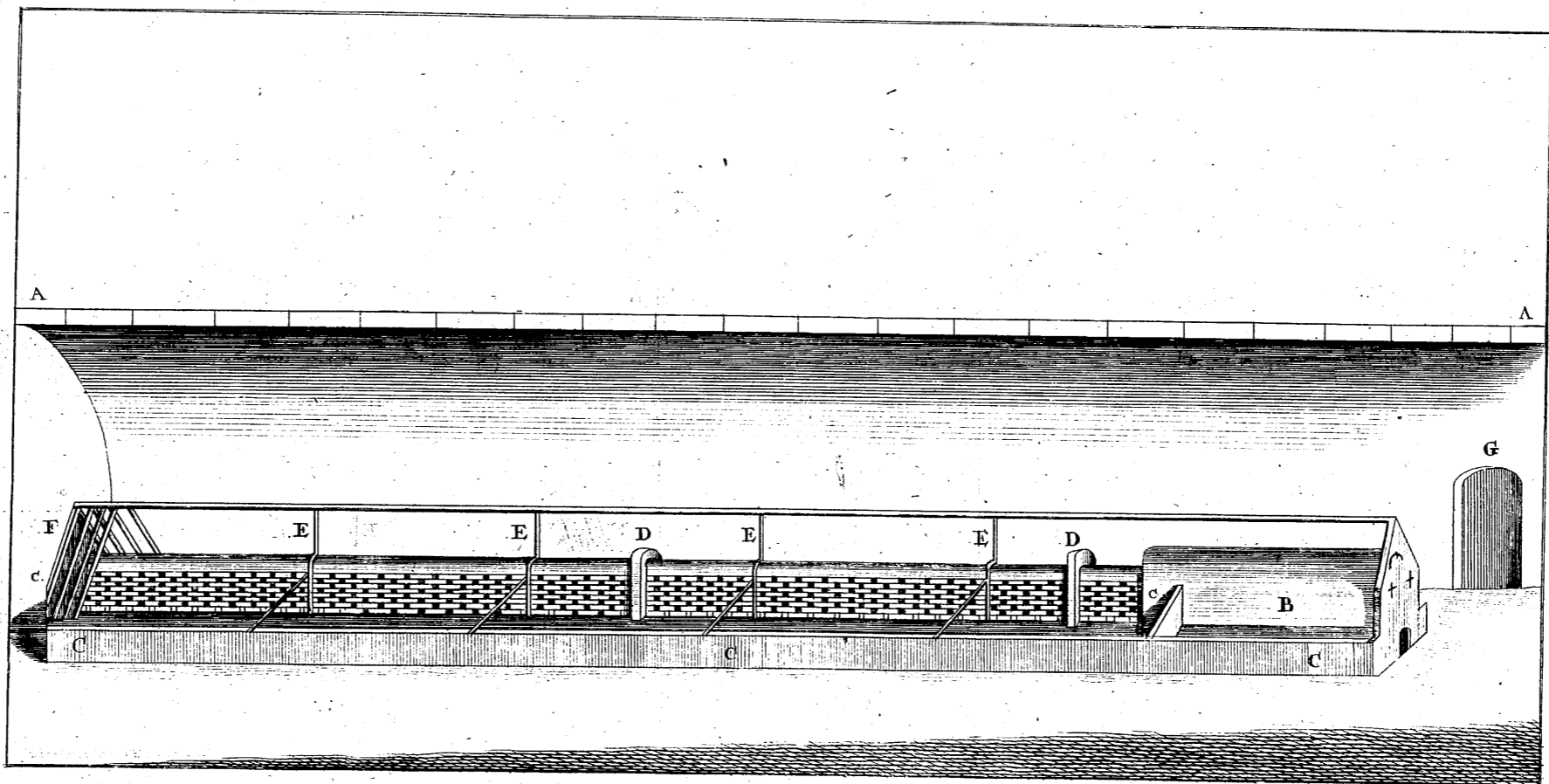
*But as the growing of Madder has been so long discontinued in England, as that there are very few Persons here who are*  
now

*now acquainted with its Culture, it must be owned, that proper Directions how to plant and manage it will be of publick Utility: this has induced the Author to publish an Account of the Experience he has had in the Culture of this useful Plant, for more than thirty Years past; and as he has procured, with no small Difficulty and Expence, a perfect Account of this Matter, with the Preparation of the Roots for Use from Zealand, where the best Dutch Madder is produced, together with Draughts of their Buildings, and all the necessary Apparatus for drying of the Roots and stamping and manufacturing them, he thought it would not be unacceptable to the Publick, if he gave the whole in the Manner in which he received it: for although the Buildings which are erected in Zealand for this Purpose, may be thought too expensve and unnecessary to be undertaken here, yet the exhibiting their Plans in the Manner they are contrived, may be of such Use to Persons of mechanical Geniuses, as may greatly lessen their Expence, and, perhaps, give them Hints to improve upon; our Countrymen being famous for their Talents at Improvement.*

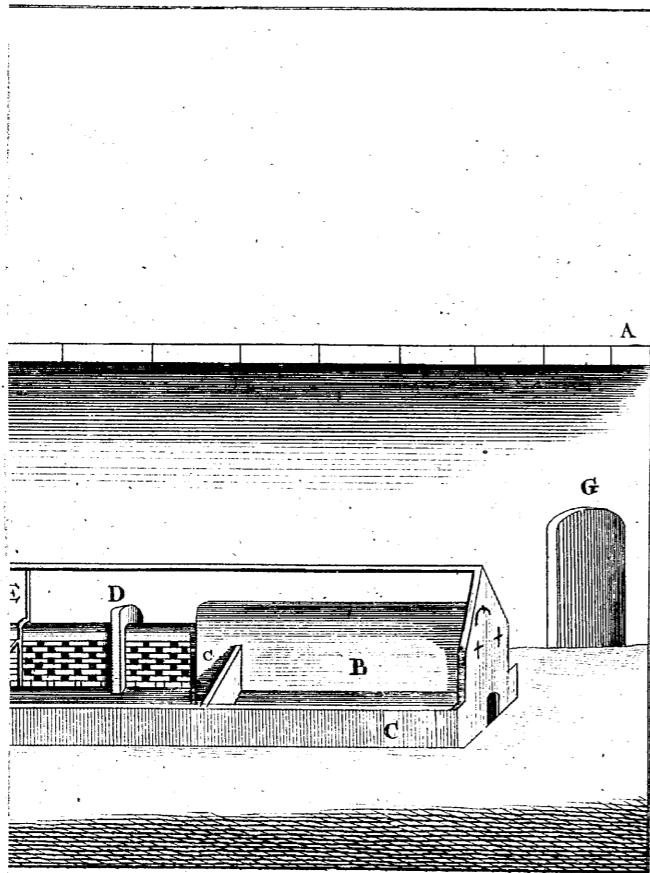
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*The Arched Room cut perpendicularly thro' the middle where the Kiln stands, with a representation of the Kiln.* Pl. 2.



Pl. 2.  
Kiln stands, with a representation of the Kiln.



A N  
A C C O U N T  
O F T H E  
M e t h o d o f C u l t i v a t i n g a n d P r e p a r i n g  
O F  
M A D D E R.

**M**ADDER is in *Latin* titled *Rubia tinctorum*, from the red Colour of its Roots, or from the Roots dying a red Colour: in *French* it is titled *Garance*, in *Dutch*, *Mee* or *Krappe-root*.

Before we proceed to the Culture of this Plant, or the Preparation of the Root, it will not be amiss to give a Botanical Description of the Plant, which is exhibited in the annexed Figure: and first we shall describe the Characters of the Genus, which are,

The Empalement of the Flower is small, cut into four Segments, and sits upon the Germen, as is represented at [a]: the Flower has one Bell-shaped Petal, without any Tube, which is cut into four or five acute Segments [b b]: it has four Awl-shaped Stamina, which are shorter than the Petals, terminated by single Summits; and a twin Germen situated under the Flower [c c], which supports a slender Style [f], crowned by



[ 2 ]

by two beaded Stigmas [g]: the Germen, after the Flower is past, becomes a twin Fruit [d], composed of two Berries [i i], which are covered with a smooth Skin, as is represented at [b], having a Hollow like a Navel at one End.

This Plant is ranged by Mr. Ray in his twelfth Class of Plants, which he titles *Herbæ stellatæ*, from their Leaves being disposed in Whorls round the Stalks, pointing like the Rays of a Star. Dr. Tournefort ranges it in the ninth Section of his first Class, which includes the *Herbs with a Bell-shaped Flower of one Petal, whose Empalement becomes a twin Fruit*; and Dr. Linnaeus, whose Method of classing Plants is now generally followed, ranges it in the first Section of his fourth Class, which contains those Plants *whose Flowers have four Stamina and one Style*.

The Root of the cultivated Madder is composed of many long Fibres larger than a Goose Quill; they are taper and much branched, of a brown Colour on the Outside, but clear, transparent, and of an Orange Colour within, having a tough slender Pith in the Middle, of a bright yellow Colour, of a sweetish Taste, mixed with a little Bitter; from these arise many four-cornered Stalks, which grow from four to six or seven Feet high, according to the Goodness of the Land; they are armed with short herbaceous Spines, and at each Joint are garnished with five or six Spear-shaped Leaves about three Inches long, and almost one broad in the Middle, drawing to a Point at each End; their upper Surfaces are smooth, but their Mid-rib on the under Side is armed with short crooked herbaceous Spines, which fasten to the Clothes of those who rub against them. The Leaves are placed in Whorls round the Stalks, spreading out every Way like the Points of a Star. From the Side of the Stalk, at each Joint, come out the Foot Stalks  
I which

[ 3 ]

which support the Flowers; they are opposite on each Side the Stalk, and branch into several Divisions, having a few small Leaves at Bottom, in Shape like the other; there are sometimes three of these at the same Joint, and at others but two. The Flowers are small, of a bright yellow Colour, and have but one Petal or Leaf, which is cut into four Parts, which spread open. These appear in *July*, and are sometimes succeeded by small, rough, burry Seeds, growing by Pairs, which never ripen in this Country. The Stalks or Haulm of this Plant decays in Autumn, and new Shoots arise in the Spring; the Roots send out many Side Fibres to a good Distance, and these also put out Shoots, whereby the Plants propagate greatly.

The Country where this Plant grows naturally, is supposed to be the *Levant*. I was informed by a Gentleman, who brought over several Specimens of the Plant to the late Sir Hans Sloane, that he gathered them between *Scanderoon* and *Aleppo*, where he saw the Plants growing wild without Culture.

There is another Sort of Madder which grows naturally in the South of *France* and in *Spain*, which the Botanists distinguish by the Title of *Rubia sylvestris aspera*, or rough wild Madder; the Roots of this Sort have been formerly brought to *England*, but were found to be much inferior to the cultivated Madder. Some of the Roots of this Sort were planted in *Holland*, but upon Trial the Roots, tho' larger than those of the true Kind, had much less Pith or Heart, and the Colour was not so good. The Leaves of this Sort are armed on both Sides with rough Spines, and at the lower Part of the Stalk there are seven ranged round it at each Joint, but toward the Top there are but four and sometimes only two placed opposite.

B 2

There

[ 4 ]

There is also a third Sort which grows naturally on *St. Vincents* Rock near *Bristol*, and also upon some Rocks near *Biddeford* in *Devonshire*, which is greatly different from the other two. The Stalks are much shorter; there are but four Leaves at each Joint, which are placed in Form of a Cross; these are rougher, and of a deep green Colour. The Roots are small, and not so well coloured as those of the true Madder, and these Differences are permanent, when the Plants are cultivated.

The Reason for my mentioning of the two last is because the Roots of the second Sort have been cultivated in *Holland*, and the Roots of it have been imported from *Spain*, and, being much inferior in Goodness, to caution curious Persons not to cultivate it; as also that they may not be blended together, and supposed to be but one Species, differing only by Culture, as has been affirmed by some who are wholly ignorant, and never have seen the different Sorts, but have upon the Authority of *Linnaeus* (who supposes the first and second Species were the same) asserted that the third, which grows naturally in *England*, was the same.

We shall now proceed to the Culture of this useful Plant, and as the *Dutch* have long had the Monopoly of this Commodity, we shall first exhibit the Method in which it is cultivated at *Zirkzee*, where this is best understood, and afterward make some Improvements on it, from the Experience I have had in cultivating it in small Quantities above thirty Years.

In all the *Netherlands* there is no where better Madder cultivated than in *Schowen*, one of the Islands of *Zealand*, which is performed in the following Manner:

The Land which is designed for Madder, if it is strong and heavy, is ploughed twice in Autumn, that the Frost in Winter may

[ 5 ]

may mellow it and break the Clods; then it is ploughed again in the Spring, just before the Time of planting the Madder; but if the Ground is light, then it is ploughed twice in the Spring; at the last Ploughing it is divided into Lands of three Feet broad, with Furrows between each Land, four or five Inches deep. Madder requires a loamy substantial Soil, not too stiff and heavy, nor over light and sandy; for although it may thrive tolerably well in the latter, yet such Land cannot have a second Crop of Madder planted upon it in less than eight or ten Years Interval; but in *Schowen*, where the Land is substantial, they need not stay longer than three or four Years, in which Interval the Ground is sown with Corn, or planted with any Kind of Pulse. It is granted, that the best Land for producing of Madder is in *Schowen*, where a *Gemet* of Land, which is three hundred square Rods of twelve Feet each, will yield from one thousand Pounds to three thousand Pounds Weight, according to the Goodness of the Land and the Favourableness of the Seasons; but in light Land, the Quantity is from five hundred to a thousand Pounds Weight.

The Time for planting of Madder begins toward the End of *April*, and continues all *May*, and sometimes in very backward Springs, there is some Madder planted the Beginning of *June*. The young Shoots from the Sides of the Root are taken off from the Mother Plant, with as much Root as possible; these are called *Kiemen*, and are planted with an Iron Dibble in Rows at one Foot asunder, and commonly four *Kiemen* in a Row.

The Quantity of these Slips, or *Kiemen*, as is required to plant one *Gemet* of Land, are sold at different Prices, according to the Price which Madder bears, or to the Demand for the Plants; they are often sold from sixteen to twenty Guilders, and sometimes they have been sold for ten or eleven Pounds *Flemish*,

[ 6 ]

*Flemish*, but the lowest Price is from fifteen Guilders to three Pounds *Flemish*.

The Expence of planting out a *Gemet* of Land with Slips, or *Kiemen*, costs, for Labour only, from sixteen to twenty Guilders, according as the Land is heavy or light: There are generally employed six Men to plant, two to rake the Ground, these earn each one Guilder a Day; and five or six Women or Boys, called Carpers or Pluckers of the Shoots or *Kiemen*, these earn twelve *Dutch* Pence a Day, or two Schillings.

The first Year the Madder is planted, it is customary to plant Cabbages or Dwarf Kidney Beans, in the Furrows or Intervals between the Beds, but there is always great Care taken to keep the Ground clean from Weeds; this is generally contracted for at two Pounds *Flemish* for each *Gemet* of Land.

In *September* or *October*, when the young Madder is cleaned for the last Time that Season, the green Haulm (or Stalks) of the Plants is carefully spread down over the Beds, without cutting any Part off, and in *November* the Haulm of the Madder is covered with three or four Inches of Earth.

This Covering of the Madder is performed either with the Plough or with the Spade; if it is done by the first, it costs two Guilders and a Half, or three Guilders in strong Land each *Gemet*, and over and above this, one Guilder and a Half to level the Tops of the Beds, and make them smooth; but it is better performed with the Spade, only it is more chargeable, for that costs from eight to ten Guilders each *Gemet*, but at the same Time the Clods are broken, and the Surface of the Beds is made smooth and even.

The second Year in the Beginning of *April*, which is about the Time the *Kiemen*, or young Shoots, are beginning to  
come

[ 7 ]

come out; the Earth on the Top of the Beds should be scuffed over and raked, to destroy the young Weeds, and make the Surface smooth and mellow, that the *Kiemen* may shoot out the easier above Ground; this Labour costs three Schillings each *Gemet*.

The second Summer there must be the same Care taken to keep the Madder clean as in the first, and then nothing is planted in the Furrows, or suffered to grow in the Intervals; at the last Time of cleaning the Ground, in *September* or *October*, the green Haulm is again spread down upon the Beds; and in *November* the Madder is again covered with Earth in the same Manner as the first Year.

By this Method of Culture, one can see how necessary it is to plant the Madder in Beds, or Rows, for thereby it is much easier covered with the Earth of the Furrows; and hereby the Earth of the Beds is every Time heightened, whereby the Madder Roots will be greatly lengthened, and the *Kiemen*, or young Shoots, will have longer Necks, and by being thus deeply earthed, will put out more Fibres and have much better Roots, without which they will not grow; and it is of equal Use to the mother Plants, for by this Method the Roots will be longer; and in this consists the Goodness and Beauty of the Madder, for those which have but few main Roots, are not so much esteemed as those which are well furnished with side Roots called *Tengels*; a Madder Plant, that has many of these Roots, is called a well bearded Madder Plant; therefore one must never cut off these side Roots, for by so doing, there will be a less Crop of Madder, and but few *Kiemen*, or young Shoots, can be produced: besides, by the Loss of Moisture, sometimes the Plants will droop and become weak; and there is great Profit in having a large Quantity

[ 8 ]

tity of *Kiemen* to draw in the Spring, which are in Plenty the second and third Years.

The Madder Roots are seldom dug up the second Year, but generally after it has grown three Summers, therefore the Culture of the third Year is the same as in the second, during the Spring and Summer.

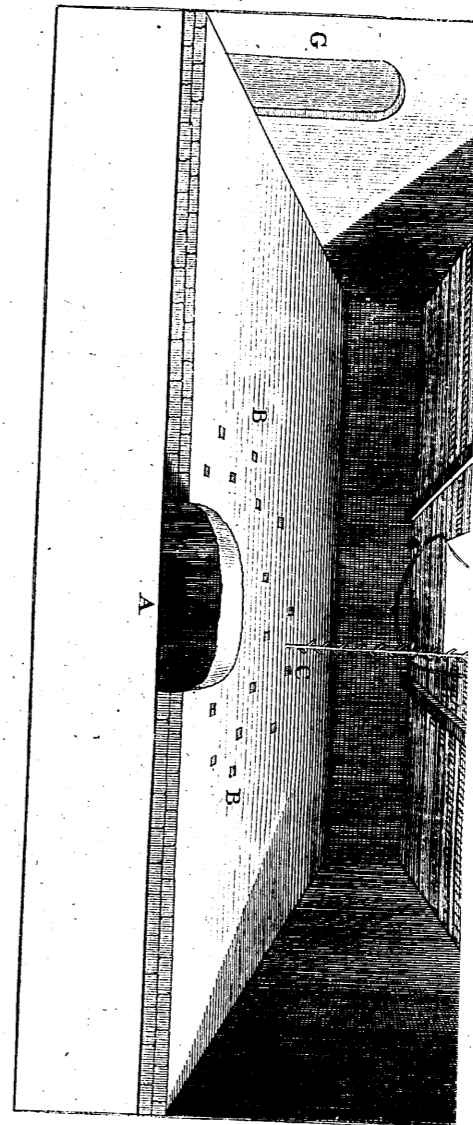
Before the first Day of *September*, it is forbidden to dig up any Madder in this Island; but on that Day early in the Morning, a Beginning is made, and the Person who carries the first Cart Load to the Stove has a Premium of a golden Rider, or three Ducats.

The digging up the Madder of a *Gemet* of Land, costs from thirty-six to one hundred Guilders, according to the Goodness of the Crop, and the Lightness or Stiffness of the Ground, but in light Land it costs from nine to ten Pounds *Flemish*; the Persons who are adroit in this Business are generally paid five Schillings *Flemish* per Day.

The Madder produces Flowers in the Middle of Summer, and sometimes a few Seeds, but they never ripen here; nor would they be of Use to cultivate the Plants, since it is so easily done by the *Kiemen*.

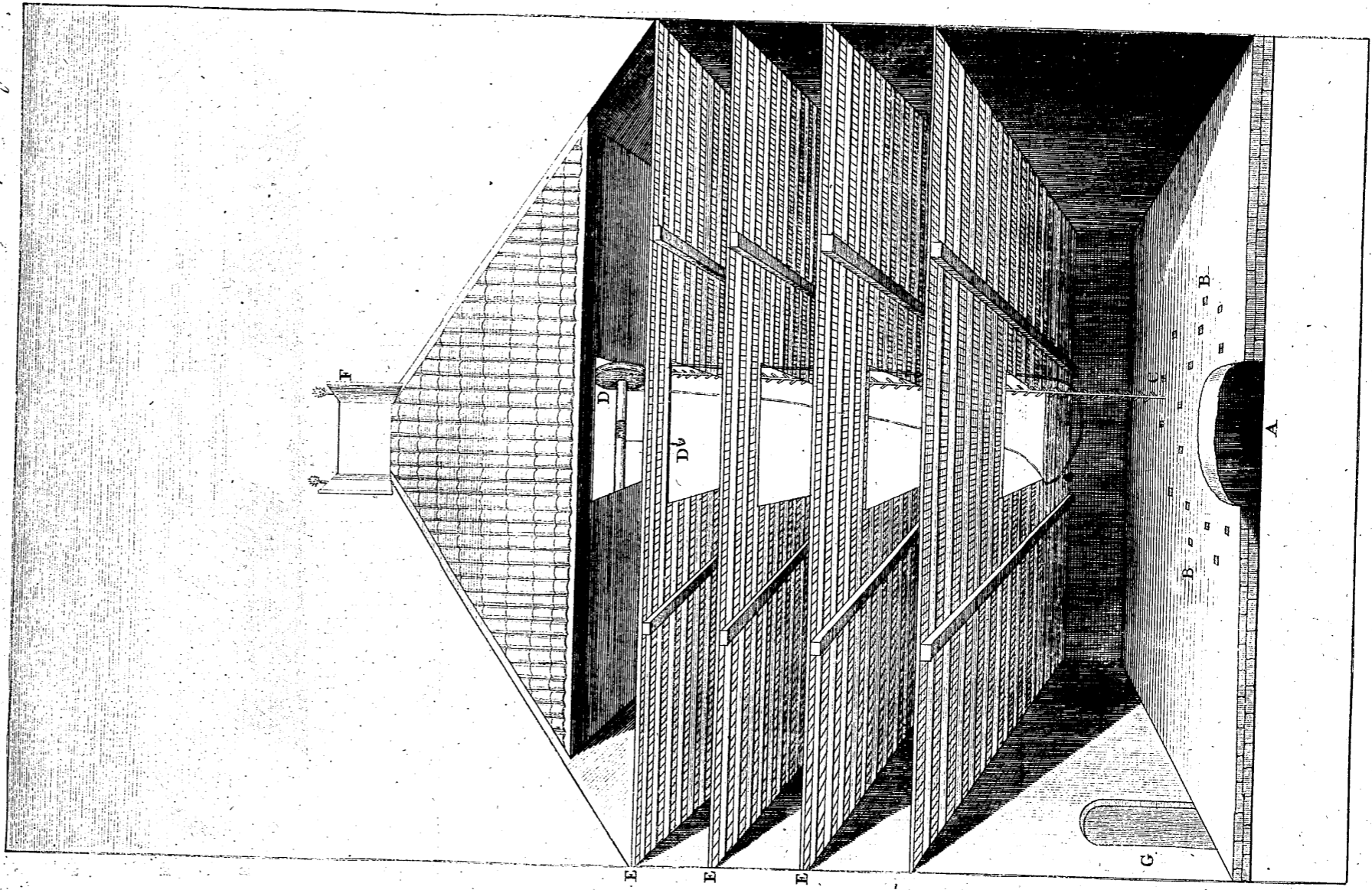
Some Years past they began to plant here the great wild Madder, which was called *French* Madder, but this was not esteemed so good for Use as the cultivated Madder, from which it differs much, so that was not continued. The more bitter of Taste the Roots of the Madder are, when taken out of the Ground before it is brought to the Stove, the less it will lose of its Weight in drying, and is the better afterwards for Use.

When the Madder is dug out of the Ground, it is carried to the Stove, and there laid in Heaps; in that which is called the cold Stove, and separated with Hurdles made of Wicker, and



PL. 3.

*Plan of the Tower where the Madder is first layed to dry.*



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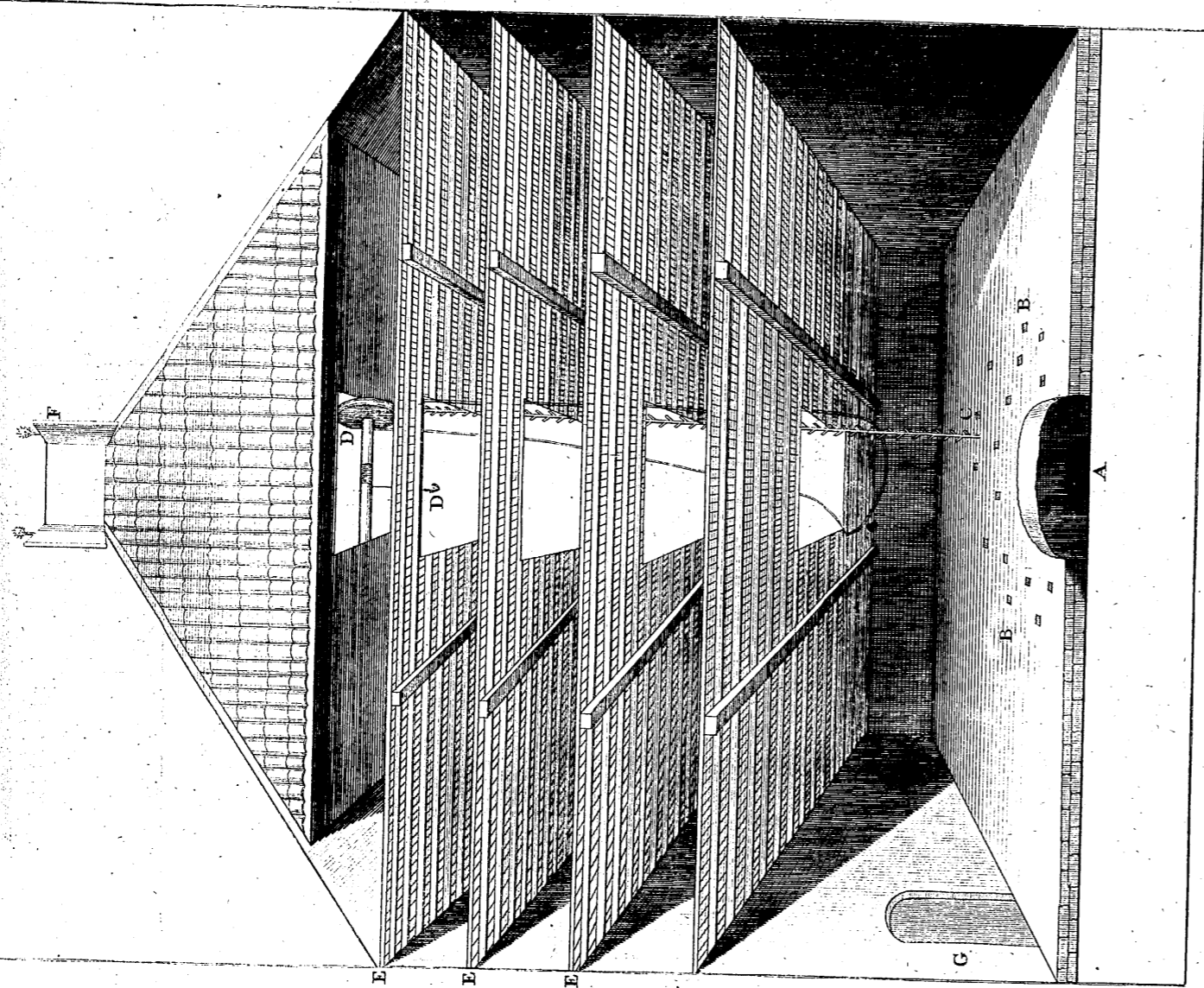
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and Memorandums kept of each Parcel, and to what Countryman it belongs, that each may be dried in their Turns, and prepared or manufactured, for which Turn generally Lots are cast beforehand. The Madder thus carried to the Stove is *Relzyn*.

This *Relzyn* is carried about six o'Clock in the Morning, into the Tower, or Steeple, hoisted in Baskets by Ropes to the Rooms, and divided or spread, where it remains till the next Day, two or three o'Clock in the Morning, about twenty or twenty-one Hours; then those Roots which have lain in the hottest Places are removed to cooler, and those in the cooler are removed to the hotter Places nearer the Oven. This is continued for four or five Days, according as there has been more or less carried there; but it is always the Goods of one Person, that every one may have his own, and of as equal Quality as possible, when it is delivered out.

When the Madder is sufficiently dried in the Tower, then it is threshed on the threshing Floor, which is made clean from Dirt or Filth, and then it is brought to the Kiln, and there spread on a Hair Cloth for about twenty Hours, during which Time the Kiln is made more or less hot, according as the Roots are more or less thick, or the Weather more or less cold.

From the Kiln the Madder is moved to the Pounding House, and is there pounded on an oaken Block made hollow, with six Stampers plated at the Bottom with Iron Bands; these Stampers are kept in Motion by a Mill very much resembling a Grist Mill, which is turned by three Horses; the Presence of the Pounding Master is here always required, to stir the Madder continually with a Shovel, to bring it under the Stampers. When the Madder is thus properly pounded, it is sifted over

C

a Tub

[ 10 ]

a Tub till there is enough to fill a Cask: This first Pounding, which chiefly consists of the thinnest and smallest Roots, and the outside Husks with some Earth, which by drying and threshing could not be separated, is called *Mor Mull*.

What remains in the Sieve is put on the Block again, and pounded a second Time, and when the Pounding Master guesses a third Part is pounded, then the Madder is taken out again, and sifted over another Tub, and put into a separate Cask, and this is called *Gor gemeens*; that which remains in this second Operation, not enough pounded in the Sieve, is for the third Time put on the Block, and pounded till it is all reduced to Powder, which is called *Kor krops*.

When the Madder is cleansed from the Dirt and *Mull*, and is entirely pounded at once, then it is called *Oor Onberooftde*, so that this *Onberooftde* actually consists of the *Gemeens* and *Krops* pounded together, and sifted without separating them from each other.

When there are two Thirds of *Krops*, and one Third *Gemeens*, which were separately prepared or manufactured, then they are called two and one, or marked  $\frac{2}{3}$ .

The Sweepings of the Mill, and every Part of the Pounding Place, are also gathered together, and put into a Cask; this is called *Den Beer*.

When the Madder is thus prepared and put into Casks, it is in *Zealand* examined by sworn Assayers, and tried if it is not faulty packed up; that is, whether in the preparing it is properly manufactured, or falsly packed up, and to see if every Part of the Cask is filled with Madder of equal Goodness and Quality, not burned in the drying, or mixed with Dirt; which the Assayers by certain Trials, and by weighing and washing of the Madder can know, if it is according to the Statutes of the Country.

There

[ 11 ]

There are sundry Statutes made and published by the States of *Zealand*, concerning the preparing of Madder; as one of the 28th of *July* 1662, one on the 29th of *September*, and 31st of *October* 1671, another on the 23d of *September* 1699, and the last on the 28th of *April* 1735: by which Statutes, among other Things, it is strictly forbidden, That no Person shall prepare *Krops*, in which there shall be more than two Pounds of Dirt in a hundred Weight; nor above eight Pounds in the like Weight of *Onberooftde*, or in *Gemeens* more than twelve Pounds in a hundred Weight.

If the Madder upon Trial is found good, the Arms of the City or Village, and the Sign of the Stove where the Madder was prepared, is painted on the Cask with black Paint. The Trial of the Madder is in no Place more exact, or more religiously observed, than in the City of *Zirkzee*, therefore the Merchants in *Germany*, who know this, always prefer the Madder of that Place to all others, and will not buy any which has not the Arms of *Zirkzee* painted upon the Casks, if they are to be had.

We before mentioned the Tower, the Kiln, &c. where the Madder is dried and prepared for Use, the Draughts of these are exhibited in the annexed Plans, with their Explanation; but that a better Judgement may be formed of their Use, we shall here take notice, that the Tower is the Place where the Madder is first dried. This Tower is heated by fifteen or sixteen Pipes or Flues of Brick-work, which run on each Side the Tower under the Floor, and are covered with low burnt Tiles, some of which are loose: so that by taking up these, the Heat is moderated, and conducted to any Part of the Tower, the Person who has the Care of drying the Madder pleases.

C 2

This



[ 12 ]

This Tower has four or five Lofts made of strong Laths, they are four or five Feet above each other, upon which the Madder is laid; these are heated by an Oven which is placed in the Room where the Work People live, and is by them called the *Glory*.

The Kiln is in a Room whose Length is equal to the Breadth of the Stove, and is entirely arched over at the Top; the Oven by which the Kiln is heated, is called the *Hog*; this is built upon a Stone Wall, which rises a Foot or two above Ground; and the small Arch, by which the Heat passes through every Part, has several square little Holes in the Brick Work, that the Heat may come out; over these Holes, on the Top of the Kiln, are laid wooden Laths the whole Length, and upon them a Hair Cloth, on which the Madder is laid to dry, before it is carried to the Pounding Place. In the Madder Stoves there is no other Fuel used but *Friezland* Turf, which gives an equal and moderate Heat.

In the Madder Stoves, the People work more by Night than Day; first, because, at the Time of Year when the Madder is brought into the Stoves, the Nights are much colder than the Days; and secondly, that the Master, who must be always attentive to his Work, may not be interrupted by Visitors; and thirdly, because they see less Dust; but principally, because the Madder which is pounded in the Night is of a much better Colour than that which is pounded in the Day.

In the Madder Stoves are always constant Workmen, one, who is the Dryer, has the Care of drying the Madder in the Tower and the Kiln; for the right Performance of this, Art and Experience are required, the Goodness of the Madder greatly depending on the right drying. This Person is a Sort of

[ 13 ]

of Foreman, and has the Direction of all the Workmen; his Pay is five Stivers, for every hundred Weight of Madder which is prepared in the Stove; he has one Person under him for his Assistant, to perform Part of the laborious Work, and to be always at hand; this Man is paid eighteen or nineteen Shillings *per Week Flemish*, which is the constant Wages.

The third Person is the Pounder, who is always present when the Madder is pounding, who, with a particular Shovel which is small, and fitted to the Cavity of the Pounding Block, stirs the Madder from time to time, to bring it under the Stampers; he is paid four Stivers for every hundred Weight of Madder.

The fourth is a Driver, who, with a Team of three Horses, causes the Mill to turn and pound the Madder; his Pay for himself and the three Horses, from eight to nine Stivers *per Hundred Weight*, according as he can bargain.

Besides these four, there are five other Assistants, who lay the Madder on and take it off; this is often performed by the Wives and Boys of the other Workmen; these five have fifty Stivers for every three thousand Pounds of Madder which is prepared, so they have each ten Stivers.

There are nineteen or twenty Madder Stoves in the Island of *Schowen*, which, at an Average, prepare in one Crop, that lasts from *September* to *February*, ten thousand Weight of Madder each, which, in the whole, amounts to two Million Pounds Weight; and if we suppose, that the Madder is sold at an Average for four Pounds *Flemish per Hundred Weight*, which is a moderate Price, one may soon reckon what Advantage the Culture of this dyeing Commodity produces to this one Island.

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[ 14. ]

The Countrymen pay to the Owners of the Madder Stoves, two Guilders for preparing every Hundred Weight of *Mull*, and for each Hundred Weight of Hard Madder; that is, of *Kraps*, *Gemeens*, or *Onberoofde*, three Guilders, according as they will have them prepared.

The building of a Madder Stove quite new from the Foundation, costs in the whole about twenty-four hundred Pounds *Flemish*, which is twelve hundred Pounds Sterling.

## P L A T E I.

An Explanation of the Plan of the Cold Stove.

- Fig. 1. Is the lower Band, whose Thickness is fourteen by sixteen Inches.
2. The upper Band, which is twelve by fourteen Inches.
  3. The Cap and Band, which are ten by twelve Inches.
  4. The upper Cap, which is six by seven Inches.
  5. The two main Jaumbs, which are thirteen by fifteen Inches of Stone.
  6. The half Bands and Posts of nine by seven Inches.
  7. The uppermost half Band, which is small, six by eight Inches.

P L A T E

[ 15. ]

## P L A T E II.

A Plan of the arched Room cut through perpendicularly in the Middle where the Kiln stands, with a Representation of the Kiln.

- A A Is the Cut of the Arch.
- B The Oven of the Kiln which is called the *Hog*; this has no Chimney; when the Fire is first kindled either with Turf or other Fuel, the Smoke is let out through a small Window.
- CCC A Stone Foundation on which the Oven and Kiln is built.
- CC Is properly the Kiln itself, which must be observed in what Manner it is built, with little Holes to let out the Heat.
- DD Stone Bands made for the greater Firmness, about the Kiln.
- EEEE Iron Bars placed to strengthen the Kiln, and also to lay the upper long Laths upon.
- F Small cross Laths over the Kiln, which lie from one End C to the other End C upon the Kiln, but there are few of these represented, that the small Holes of the Kiln may better appear.
- G The Door of the Entrance.

P L A T E

[ 16 ]

## P L A T E III.

A Plan of the Tower where the Madder is first laid to dry.

A Is the Oven of the Tower.

BB The Pipes whereby the Heat spreads itself, is here shewn by the Openings where the Tyles are taken off.

C A Sort of Stairs by which they climb.

DD The Windlafs with its Rope and Hook, to hoist the Madder to the Lofts.

EEEE The four Lofts of the Lath of the Oven.

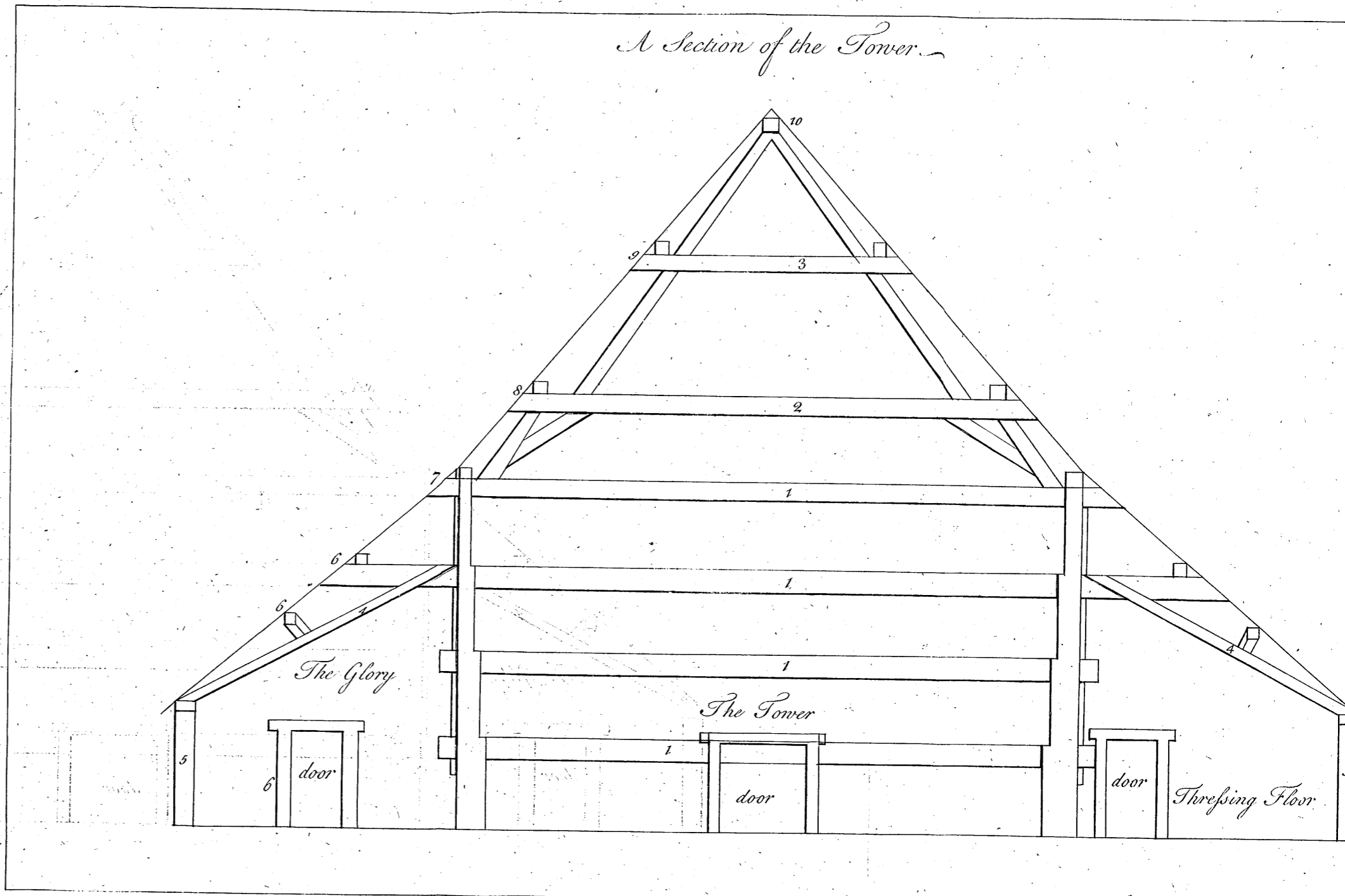
F The Chimney above the Roof.

G The Door by which they enter.

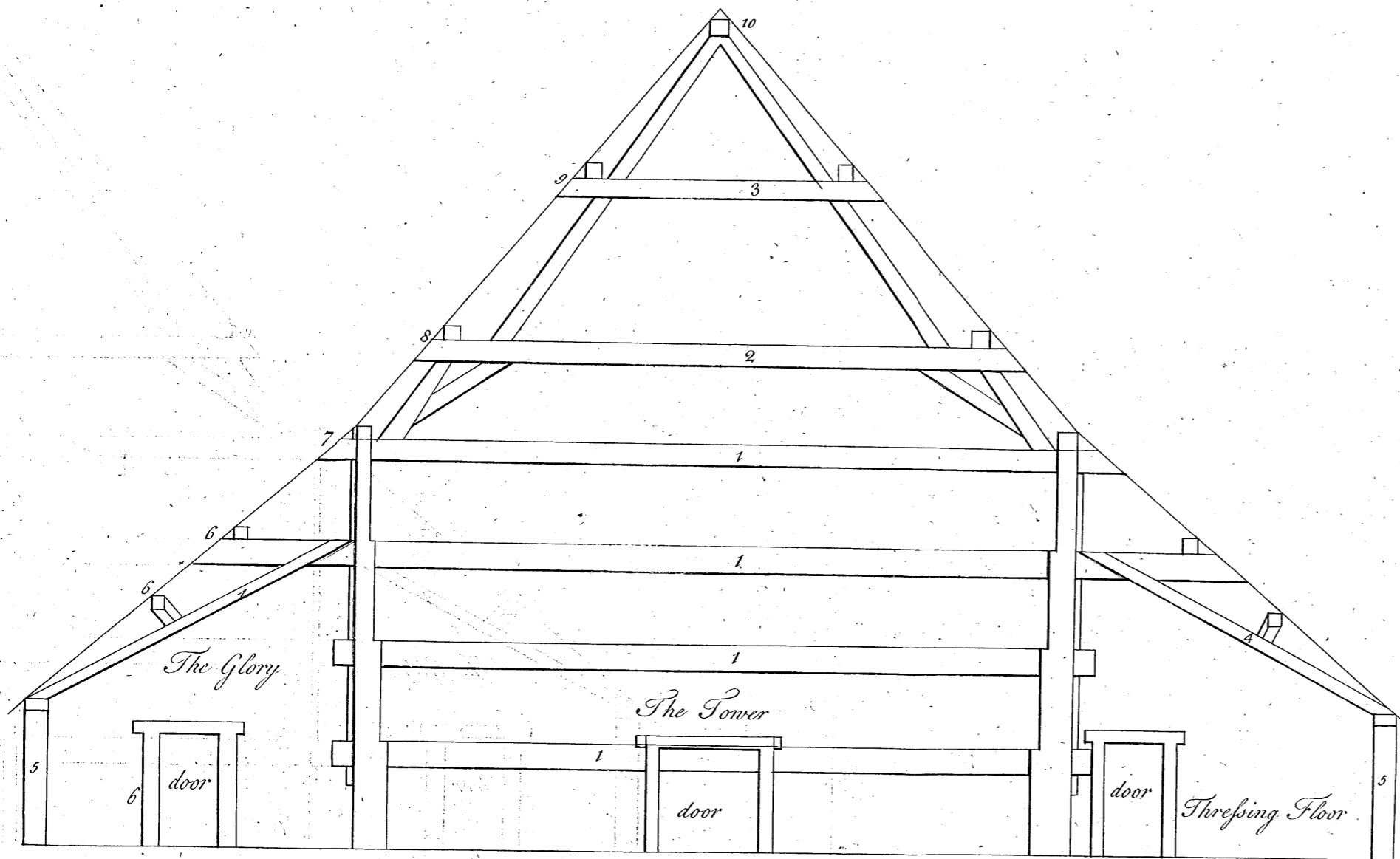
P L A T E

Pl. 4.

*A Section of the Tower*



*A Section of the Tower*



P L A T E IV.

An Explanation of the Plan of the Section

- Fig. 1. 1. 1. 1. The four Bands of the Tower  
 teen Inches square.  
 2. The Cap Band ten by twelve  
 3. The springing Band six by eight  
 4. The Interstice to the Tower  
 Inches.  
 5. The Spaning Plate five by seven  
 6. 6. The lower and second Girder  
 Inches.  
 7. The third Girder seven by nine  
 8. The fourth Girder six by eight  
 9. The fifth Girder six by seven  
 10. The Crown Piece of the Tower  
 Inches.

The Ribs in the Tower must be laid four  
 der from Middle to Middle Cornerways, and  
 tween an Inch and a Half distant.

[ 16 ]

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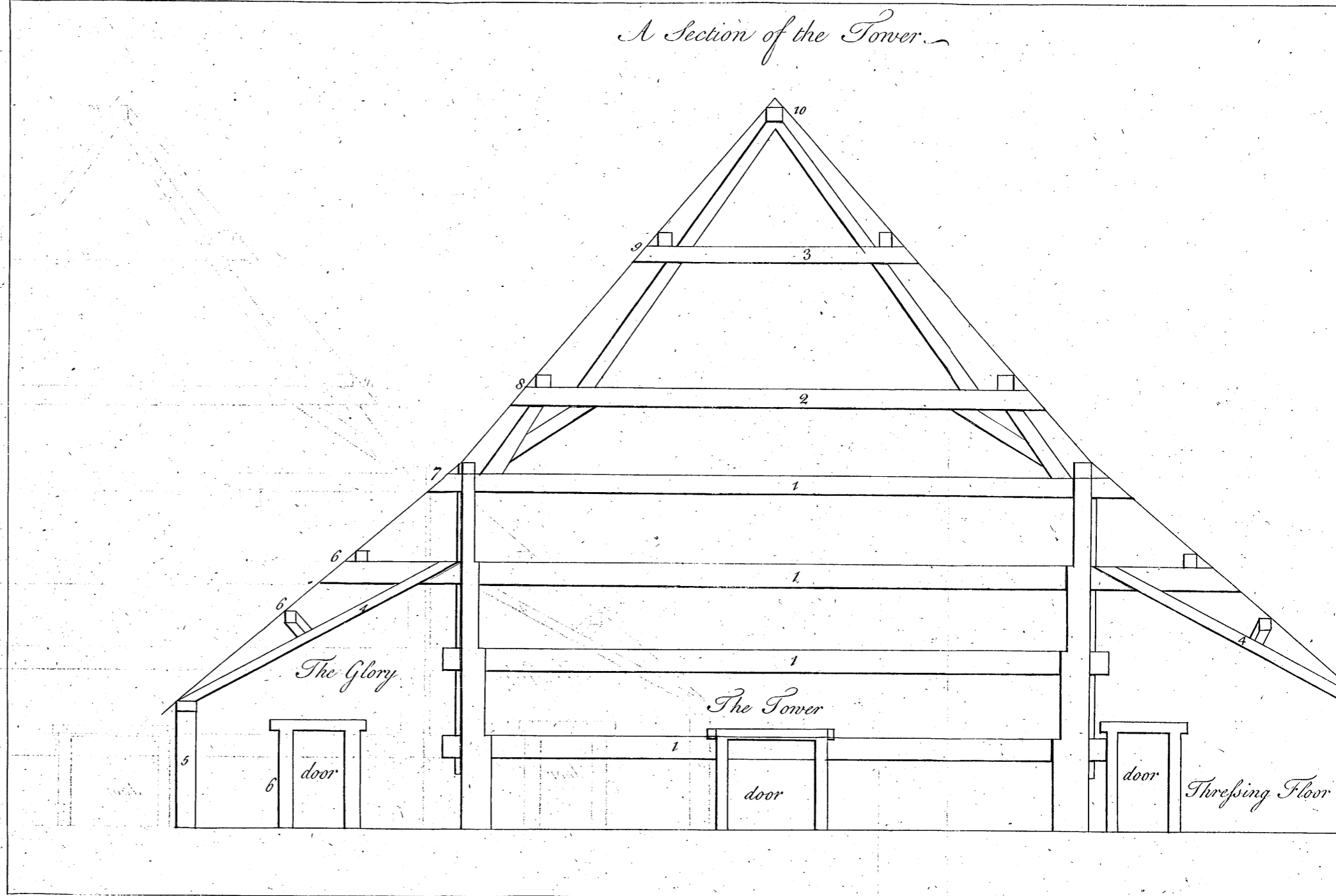
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P L A T E

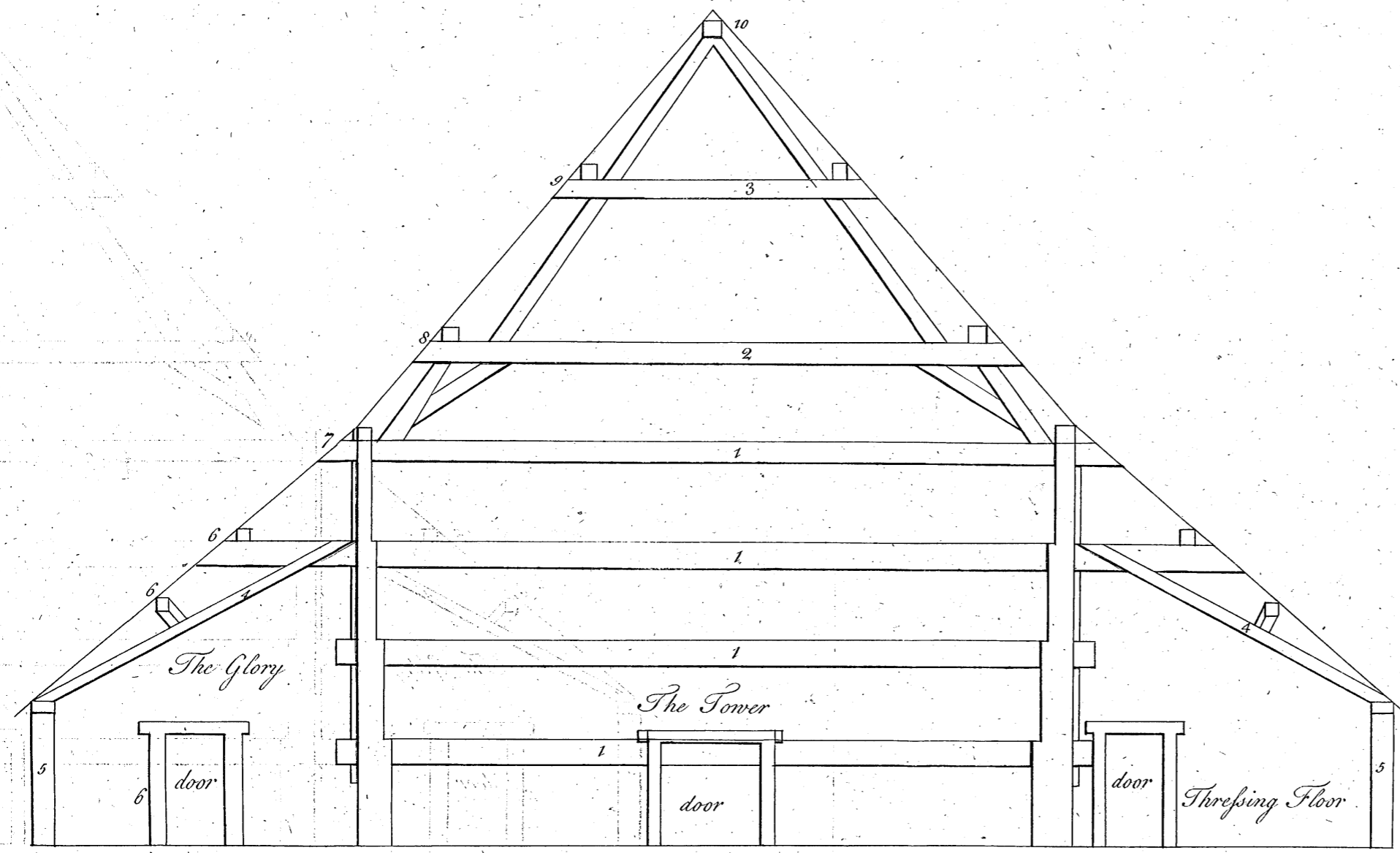
Pl. 4.

*A Section of the Tower*



pl. 4.

*A Section of the Tower*



P L A T E I V

An Explanation of the Plan of the Section

- Fig. 1. 1. 1. 1. The four Bands of the  
 teen Inches square.  
 2. The Cap Band ten by t  
 3. The springing Band fix  
 4. The Interfice to the  
 Inches.  
 5. The Spaning Plate five  
 6. 6. The lower and second  
 Inches.  
 7. The third Girder seven  
 8. The fourth Girder fix b  
 9. The fifth Girder fix by  
 10. The Crown Piece of t  
 Inches.

The Ribs in the Tower must be laid  
 der from Middle to Middle Cornerways  
 tween an Inch and a Half distant.

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## P L A T E IV.

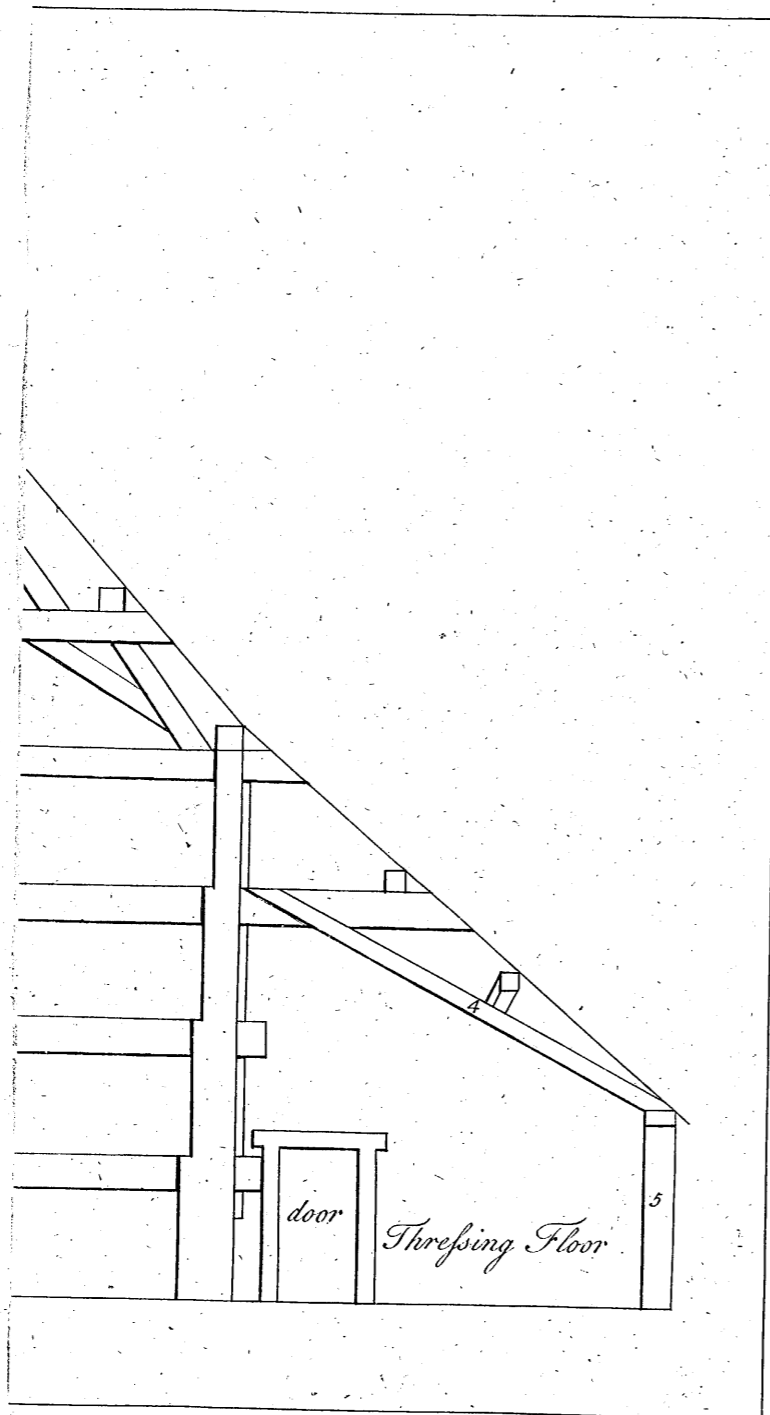
An Explanation of the Plan of the Section of the Tower.

- Fig. 1. 1. 1. 1. The four Bands of the Tower which are sixteen Inches square.
2. The Cap Band ten by twelve Inches.
  3. The springing Band six by eight Inches.
  4. The Interstice to the Tower six by seven Inches.
  5. The Spaning Plate five by seven Inches.
  6. 6. The lower and second Girder six by seven Inches.
  7. The third Girder seven by nine Inches.
  8. The fourth Girder six by eight Inches.
  9. The fifth Girder six by seven Inches.
  10. The Crown Piece of the Tower five by six Inches.

The Ribs in the Tower must be laid fourteen Inches asunder from Middle to Middle Cornerways, and the Laths between an Inch and a Half distant.

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P L A T E



[ 18 ]

## P L A T E V.

A Plan of the Pounding House, in which is shewn at A, the Driver, who with his three Horses causes the Mill to turn, which works the Stampers: At B is shewn the Pounder, who with his Shovel continually brings the Madder under the Stampers.

- Fig. 1. Is the Beam which supports the Axletree, which is fourteen by fifteen Inches.
2. The hollow Oaken Block or Trough, twenty-seven by twenty-nine Inches.
  3. The King Post eighteen Inches square.
  4. The upper Band six by seven Inches.
  5. The cross Bands five by seven Inches.
  6. The cross Arms six by ten Inches.
  7. The Swarden six by ten Inches.
  8. The Axis from six to eight Inches.
  9. The Feller six by eight Inches of Elm Wood.
  10. The King Beam eleven by thirteen Inches of Fir Wood.
  11. The Drawers under the Mill five by six Inches.
  12. The Plate for the runing of the Truckle three by sixteen Inches.
  13. The wooden Knobs to the Wheel of Ash.
  14. The Staves made of Box Wood.
  15. The six Stampers six Inches square of Ash.

P L A T E

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## P L A T E VI.

An Explanation of the Section of the Pounding House.

- Fig. 1. The under Band sixteen Inches square.
2. The upper Band twelve by fourteen Inches.
  3. The Band of the Cap Post ten by twelve Inches.
  4. The Springing Band six by seven Inches.
  5. The Spaning Plate five by seven Inches.
  6. The first Girder six by seven Inches.
  7. The second Girder nine by eleven Inches.
  8. The third Girder six by eight Inches.
  9. The uppermost Girder six by seven Inches.
  10. The Top or Cap four by five Inches.

The above Account is the Method of cultivating Madder in *Zealand*, where the best Madder is now produced; to this I shall add, what I have observed of the growing of Madder in other Parts of *Holland*, as also the Experience I have had of the Growth of Madder in *England*, with an Account of the Method of planting it here.

To which I shall add a much easier Method of drying and preparing the Roots for Use, than what is now practised in *Holland*; and as there are Numbers of Kilns for drying of Malt and Hops, erected in many Parts of *England*, the same may be applied to this Use, with a little Alteration, whereby the Expence of erecting new Buildings for this Purpose will be saved; for if it was absolutely necessary to lay out so much Money in erecting proper Buildings for drying the Madder, as is done in *Holland*; it would deter many Per-

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sons

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sons from engaging in the Culture of this useful Commodity, which the present Performance is intended to promote: but as the Author had collected the Materials from the Spot where the best Madder in *Holland* is cultivated and manufactured, so he was unwilling to suppress any Part of it, lest it might be thought imperfect without it.

In the Year 1727, I observed a great Quantity of this Plant cultivated in *Holland*, between *Helvoetsluys* and the *Brill*; and it being the first Time I had ever seen any considerable Parcel of it, I was tempted to make some Enquiries about its Culture, and take some Minutes of it down upon the Spot, which I shall here insert for the Use of such as may have Curiosity to attempt the Culture of it.

In Autumn they plough the Land, where they intend to plant Madder in the Spring, and lay it in high Ridges, that the Frost may mellow it; in *March* they plough it again, and at this Season they work it very deep, laying it up in Ridges eighteen Inches asunder, and about a Foot high; then about the Beginning of *April* they plough it again, and lay it in Ridges three Feet asunder, and two Feet high; at this Time the Madder will begin to shoot out of the Ground, then they open the Earth about their old Roots, and take off all the side Shoots which frequently extend themselves horizontally, just under the Surface of the Ground, preserving as much Root to them as possible; these they transplant immediately upon the Tops of the new Ridges, at about a Foot apart, observing always to do this when there are some Showers, because then the Plants will take Root in a few Days, and will require no Water.

When the Plants are growing, they carefully keep the Ground hoed, to prevent the Weeds from coming up between  
I  
them:

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them; for if they are smothered by Weeds, especially when young, it will either destroy or weaken them so much, that they seldom do well after. In these Ridges they let the Plants remain two and sometimes three Seasons, during which Time they keep the Ground very clean; and after the Plants have grown the intended Time, at *Michaelmas*, when the Tops of the Plants are decayed, they take up the Roots and dry them for Sale. This is what I could learn of their Method of cultivating this Plant, to which I will now subjoin a few Observations of my own, which I have since made upon the Culture of Madder in *England*.

As the growing of Madder in large Quantities for Use, has been for several Years discontinued in *England*, there are some Persons who doubt of its succeeding here; but whoever will be at the Trouble to peruse some of the old Writers on Botany, may be convinced of its having been formerly cultivated here in Plenty, and so lately as in Mr. Ray's Time, whose Words are, *In agris seritur ad usum tinctorum*; and there are some Persons yet living, who remember Madder being cultivated in the Fields near *Godalmin* in *Surry*, so there need be no Doubt of its succeeding here.

The Land upon which I have found Madder thrive best, is a soft sandy Loam, and if it has been in Tillage some Years, it will be better than that which is fresh broken up. This should have at least a Depth of two Feet and a Half, or three Feet of good Earth, that the Roots may run down without Obstruction, and must be quite clear from Couch, or the Roots of any bad Weeds; for as the Roots of Madder should remain three Years in the Ground, so where there are any of those Weeds which spread and multiply at their Roots, they will intermix with the Madder Roots, and in three Years will have  
taken

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taken such Possession of the Ground, as to greatly weaken the Madder, and render it very troublesome to separate when the Madder is taken up.

The Ground should be ploughed deep before Winter, and laid in very high rough Ridges to mellow; and if it is not too strong, there will be no Necessity for ploughing it again, till just before the Time of planting the Madder, when the Land should be ploughed as deep as the Beam of the Plough will admit; and there should be Men following the Plough in the Furrows, who should dig a full Spit below the Bottom of the Furrow, and turn it up on the Top; by preparing the Ground of this Depth, the Roots of the Madder will strike down and be of greater Length, in which the Goodness of the Crop chiefly consists. The Land being thus prepared and made level, will be fit to receive the Plants. The best Time for planting the Madder, is about the Middle, or latter End of *April*, according as the Season is more or less forward, which must be determined by the young Shoots; for when these are about an Inch and a Half or two Inches above Ground, they are in the best State for planting. When the Shoots are longer, they are very apt to droop upon being moved, especially if the Season should prove warm and dry, and if their Tops wither and decay, the Roots will be greatly weakened.

In the taking up of these Shoots for planting, the Ground should be opened with a Spade, that they may be separated from the Mother Plants with as much Root as possible; for if the Roots are broken off, they will not succeed: These Plants should be drawn up no faster than they are planted, for if they lie long above Ground, they will shrink and their Tops wither, and then they often miscarry; therefore if they are brought from a distant Place, the Slips should be taken off

as

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as soon as they begin to shoot, for the less Top they have the better they will bear Carriage; there should be great Care taken in the packing of them up for Carriage; especial Regard should be had not to pack them so close, or in so great Quantity, as to cause them to heat, for that will soon spoil them; but if they are a little withered by lying out of the Ground, their Roots should be set upright in Water for a few Hours before they are planted, which will stiffen and recover them again.

In the planting of Madder, there are some who make the Rows but one Foot asunder, others one Foot and a Half, some two Feet, and others who allow them three Feet Distance, I have made Trial of the three last Distances, and have found when the Roots have been left three Years in the Ground, that three Feet Distance Row from Row is the best; but if it is taken up in two Years, two Feet asunder may do very well; and the Distance in the Rows, Plant from Plant, should be one Foot, if to stand two Years, or a Foot and a Half if to stand three.

If there is no Danger of the Ground being too wet in Winter, the Plants may be planted on the level Ground; but if, on the contrary, the Ground should be raised in Ridges where each Row of Plants is to be set, that their Roots may not reach the Water in Winter, for if they do, it will stop their downright Growth; and this is the Reason why the *Dutch*, who plant Madder in the *Low Countries*, between *Helvoetsluys* and the *Brill*, raise their Ridges so high as two or three Feet, but in *Zealand*, where the Ground is drier, they do not raise the Beds more than four or five Inches above the Intervals, that the Wet may drain off from the Beds where the Madder is planted.

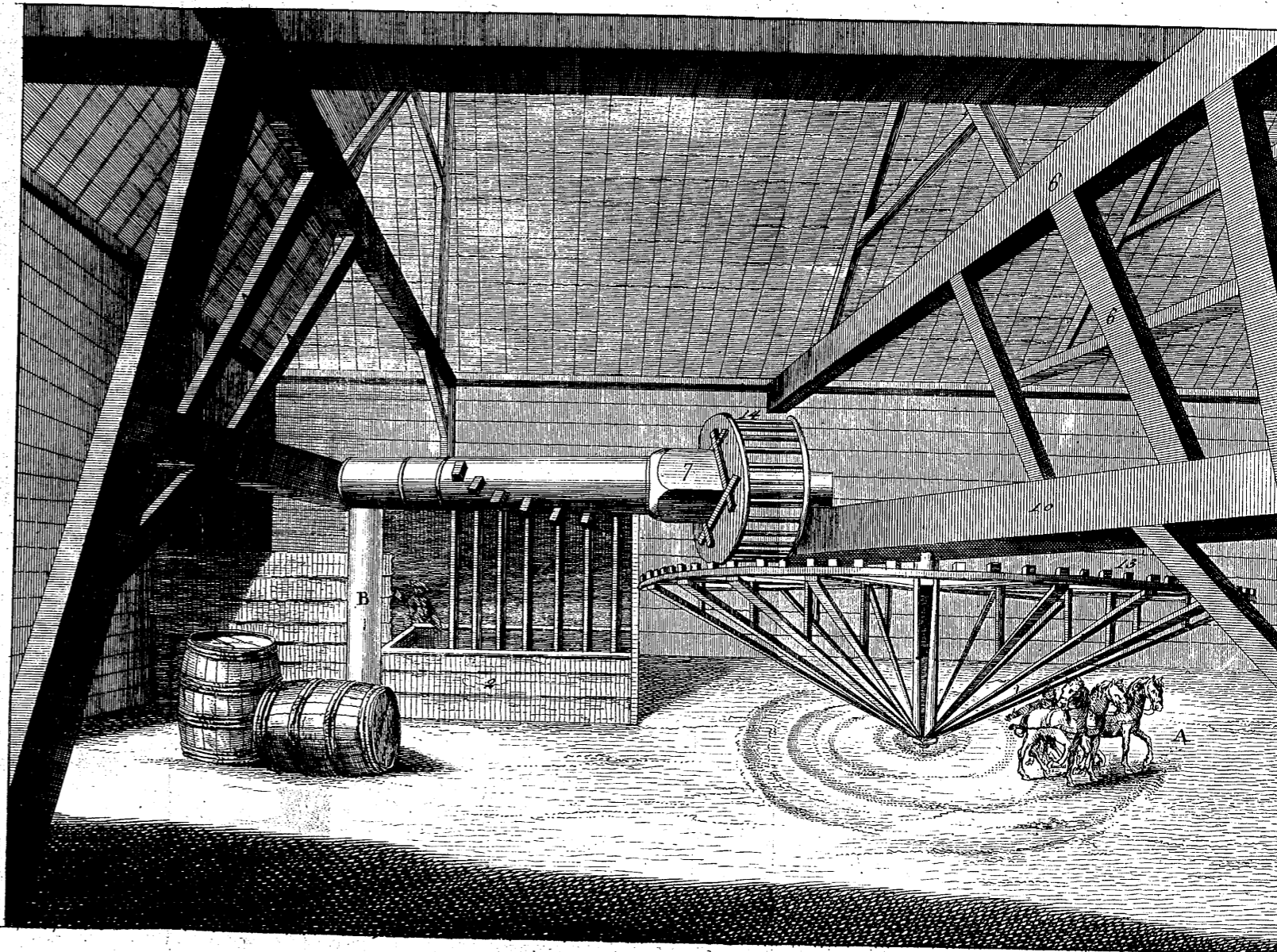
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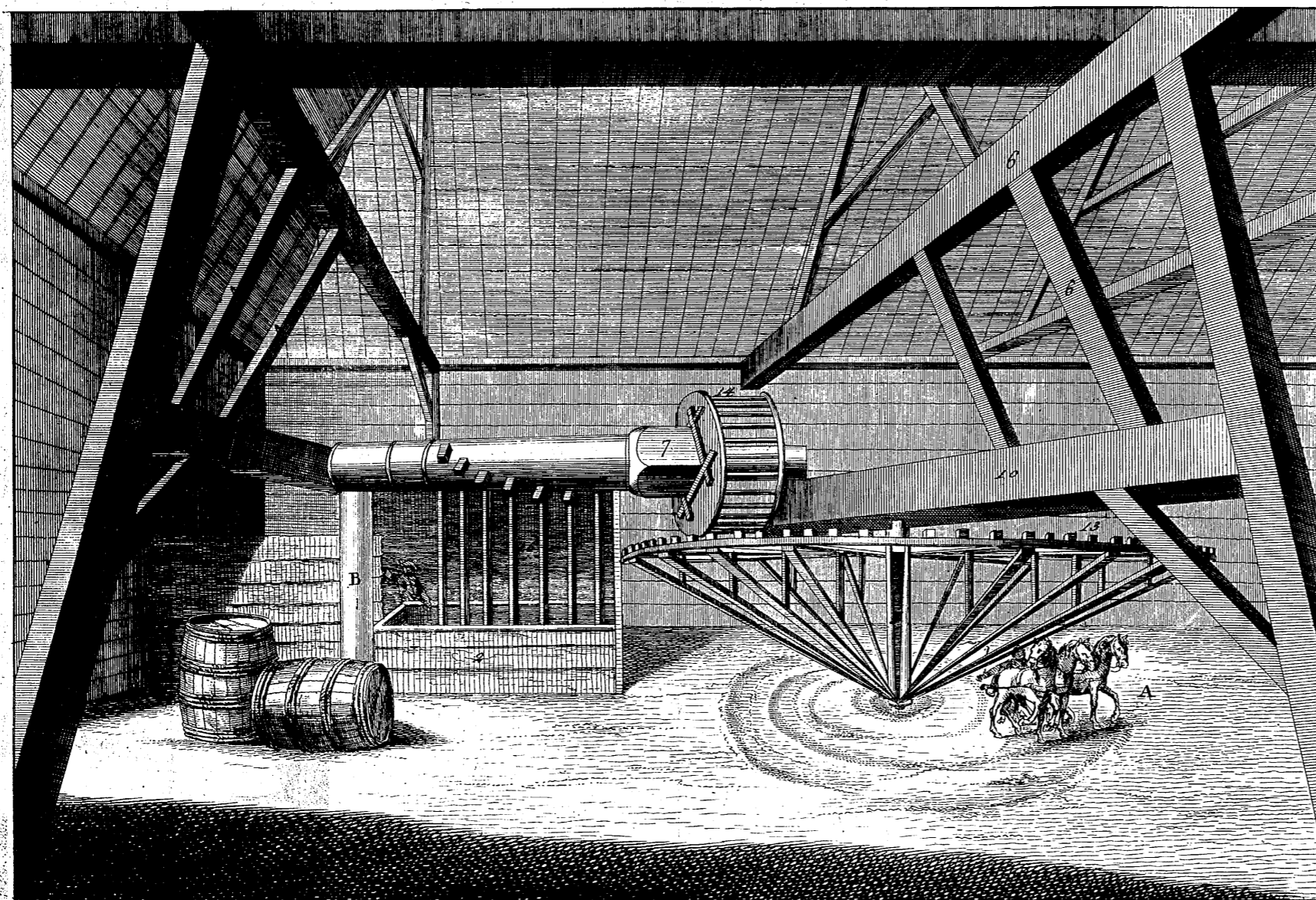
The Method of planting the Madder on level Ground is as follows: *viz.* The Ground being made smooth, a Line is drawn cross it to mark out the Rows, that they may be straight for the more convenient Cleaning, and for the better digging or ploughing the Ground between the Rows; then with an Iron-shod Dibble, Holes are made, at the Distance which the Plants are to stand from each other. The Depth of the Holes must be in Proportion to the Length of the Roots of the Plants, which must be planted the same Depth in the Ground which they had been while they were upon the Mother Plants, for if any Part of the Root is left above Ground, the Sun and Winds will dry it, which will retard the Growth of the Plants; and, should any Part of the Green be buried in the Ground, it will not be so well, though, of the two, the latter will be less prejudicial, especially if there be not too much of the Green buried. When the Plants are put into the Holes, the Earth should be pressed close to them to secure them from being drawn out of the Ground, for Crows and Rooks frequently draw the young Plants out of the Ground, before they get new Roots, where there is not this Care taken; so that in two or three Days I have known half the Plants on a large Piece of Land destroyed by these Birds.

If there happens to be some Showers of Rain fall in a Day or two after the Plants are planted, it will be of great Service to them, for they will presently put out new Roots, and become strong, so that, if dry Weather should afterward happen, they will not be in so much Danger of suffering thereby, as those which are later planted. There are some who, from a covetous Temper of making most Use of the Ground, plant a Row of Dwarf Peas, or Kidney Beans between each Row of Madder, and pretend that hereby the Land is kept cleaner

*A Plan of the Pounding House.*



*A Plan of the Pounding House.*

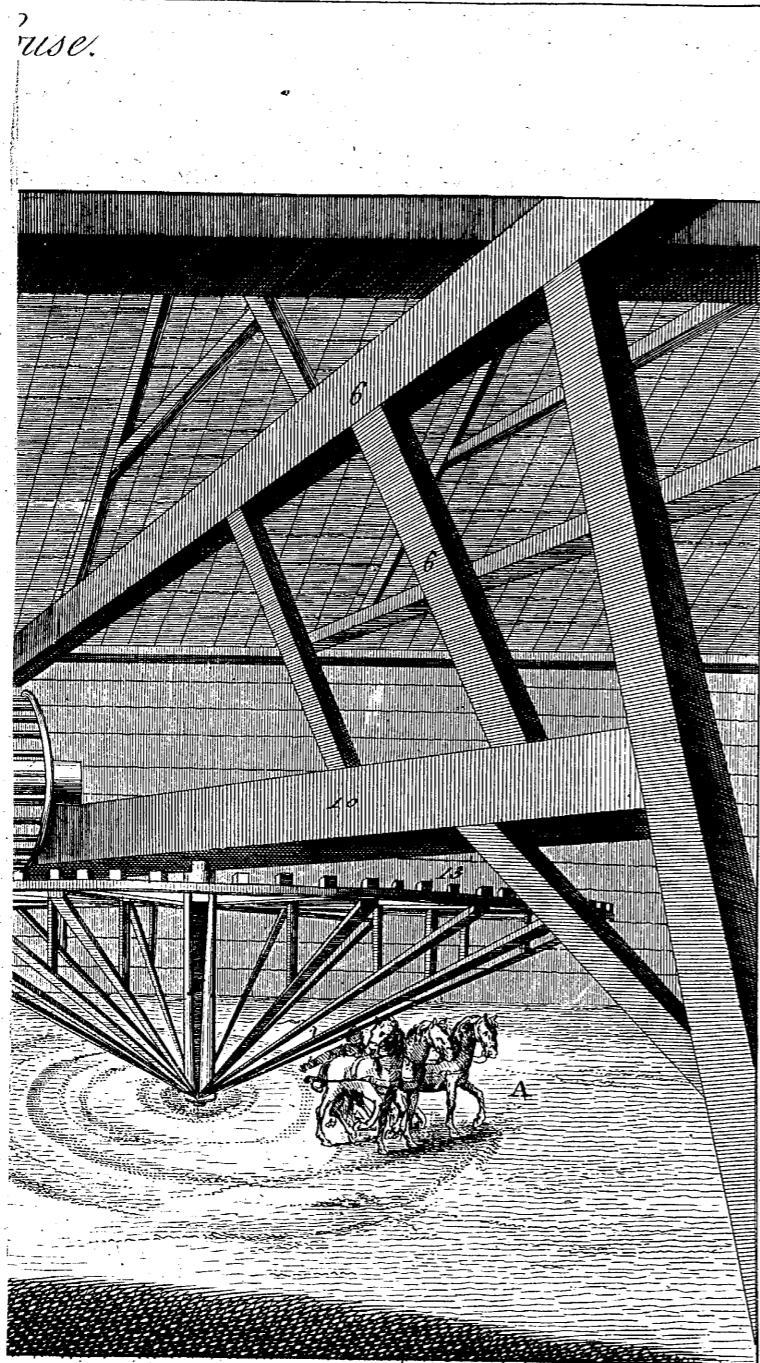


cleaner from Weeds, but I am very certain  
der is injured thereby much more than t  
Things which grow between the Rows, as I  
therefore I advise those Persons, who plant  
fow or plant any Thing between the Rows  
Madder quite clean from Weeds, or any oth  
table.

In order to keep the Ground thus clean,  
fled over with a *Dutch Hoe*, as soon as the  
pear in the Spring. When a Man can perf  
of this Work in a Day, and if it is done in  
Weeds will die as fast as they are cut down  
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are not so soon destroyed, and the Expen  
Ground then will be more than treble wha  
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of cutting down some of the weaker Plants  
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Madder, to begin this Work early in the S  
peat it as often as the Weeds render it neces  
ing the Ground thus constantly clean, the M  
the better, and the Expen in the whole  
for when Weeds are suffered to grow large,  
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During the first Summer, the only Cul  
Madder requires, is that of keeping it clean  
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decay in Autumn, it should be raked off th  
the Intervals between the Rows should be c  
Spade, or ploughed with a hoeing Plough

Pl. 5.



cleaner from Weeds, but I am very certain the Crop of Mad-  
 der is injured thereby much more than the Value of those  
 Things which grow between the Rows, as I have experienced;  
 therefore I advise those Persons, who plant Madder, never to  
 sow or plant any Thing between the Rows, but to keep the  
 Madder quite clean from Weeds, or any other Kind of Vege-  
 table.

In order to keep the Ground thus clean, it should be scuf-  
 fled over with a *Dutch Hoe*, as soon as the young Weeds ap-  
 pear in the Spring. When a Man can perform a great Deal  
 of this Work in a Day, and if it is done in dry Weather, the  
 Weeds will die as fast as they are cut down; whereas, when  
 the Weeds are left to grow, so long as to get Strength, they  
 are not so soon destroyed, and the Expence of hoeing the  
 Ground then will be more than treble what it might be per-  
 formed for early in the Season; besides, there will be Danger  
 of cutting down some of the weaker Plants with the Weeds,  
 if the Persons employed to perform this Work are not very  
 careful, therefore it is much cheaper, as also better for the  
 Madder, to begin this Work early in the Spring, and to re-  
 peat it as often as the Weeds render it necessary, for by keep-  
 ing the Ground thus constantly clean, the Madder will thrive  
 the better, and the Expence in the whole Year will be less,  
 for when Weeds are suffered to grow large, they are not easily  
 subdued.

During the first Summer, the only Culture, which the  
 Madder requires, is that of keeping it clean in the Manner be-  
 fore directed, and, when the Shoots or Haulm of the Plants  
 decay in Autumn, it should be raked off the Ground; then  
 the Intervals between the Rows should be either dug with a  
 Spade, or ploughed with a hoeing Plough, laying up the  
 E Earth



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Earth over the Heads of the Plants in a roundish Ridge, which will be of great Service to the Roots. The *Dutch* cover the Haulm of their Madder with Earth, leaving it to rot upon the Ground; this perhaps may be necessary in their Country to keep the Frost out of the Ground, but, as I have never found that the severest Winters have ever injured the Madder Roots in *England*, so there is not the same Necessity for that Practice here.

The following Spring, before the Madder begins to shoot, the Ground should be raked over smooth, that the young Shoots may have no Obstruction, and, if there should be any young Weeds appearing on the Ground, it should be first scuffled over to destroy the Weeds, and then raked over smooth; after this the same Care must be taken in the following Summer as in the former to keep the Ground clean from Weeds, and, if it is performed by the Hoe Plough, the Earth of the Intervals should be thrown up against one Side of the Ridges, which will earth up the Roots, and greatly increase their Strength; but, before the Ground of one Interval is so hoed, the Haulm of the Plants should be turned over to the next adjoining Interval, and, if they are permitted so to lie for a Fortnight or three Weeks, and then turned back again on those Intervals which were hoed, observing first to scuffle the Ground to destroy any young Weeds, which may have appeared since the stirring of the Ground, then the alternate Intervals should be ploughed in like Manner, turning the Earth up against the opposite Sides of the Roots; by this Method the Intervals will be alternately ploughed, and the Plants earthed up, whereby the Ground will be kept clean and stirred, which will greatly promote the Growth of the Roots, and by this Method the superficial Shoots will be sub-

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dued, and the principal Roots greatly strengthened. The following Autumn the Ground should be cleared of the Haulm and Weeds, and the Earth raised in Ridges over the Roots, as in the foregoing Year.

The third Spring the Roots will furnish a great Supply of young Plants, but, before these appear, the Ground should be cleaned and raked smooth, that the Shoots may have no Obstruction to their coming up; and, when the young Plants are fit to take off, it should be performed with great Care, always taking off those which are produced at the greatest Distance from the Crown of the Mother Plants, first, because those are what rob them most of their Nourishment, and the Wounds made by separating them from the old Roots are not near so hurtful as those near the Crown, for the stripping off too many of the Shoots there, will retard the Growth of the Plants.

The Culture of the Madder in the third Summer must be the same as the second, but, as the Roots will then be much stronger, the Earth should be laid up a little higher to them at the Times when the Ground is cleaned and ploughed, and, if all the distant superficial Shoots, which come up in the Intervals are hoed or ploughed off, it will be of Service to strengthen the larger downright Roots, and, as the Haulm will now be very strong and thick, the frequent turning it over from one Interval to another will prevent its rotting, for if it lies long in the same Position, the Shoots, which are near the Ground, where there will be always more or less Damp; and being covered with the upper Shoots, the Air will be excluded from them, which will cause them to rot, for the Shoots of Madder are naturally disposed to climb upon any neighbouring Support, and in Places where they have been

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supported,

supported, I have seen them more than ten Feet high, but the Expencc of staking the Plants to support their Shoots would be much too great to be practised in general, therefore the other Method of turning the Haulm over from one Interval to the other will be found of great Use, for hereby it is kept from decaying, and by so doing the Sun is alternately admitted to each Side of the Roots, which is of more Consequence to the Growth of the Madder than most People conceive, and from many repeated Trials I have found, that where the Haulm has decayed or roted in Summer, it has greatly retarded the Growth of the Roots. There have been some ignorant Pretenders who have advised the cutting off the Haulm in Summer, in order to strengthen the Roots, but whoever practises this, will find to their Cost the Absurdity of this Method, for I have fully tried this many Years ago, and have always found that every other Root, upon which this was practised, was at least a third Part smaller than the intermediate Roots, whose Haulm was left entire. The Occasion of my first making this Experiment was, because the Plants had been set too near each other, and the Season proving moist had increased the Number and Strength of the Shoots, so that they became so thick, as that many of them began to rot; to prevent which, I cut off the Shoots of every other Plant to give Room for spreading the others thinner, but soon after this was done, the Plants produced a greater Number of Shoots than before, but they were weaker, and the Effect it had upon the Roots was as before related, and since then I have frequently repeated the Experiment on a few Roots, and have always found the Effect the same.

As soon as the Haulm of the Madder begins to decay in Autumn, the Roots may be taken up for Use, because then the

the Roots have done growing for that Season, and will then be plumper and less liable to shrink than if they are dug up when the Plants are growing, for I have always found that the Roots of every Kind of Plant, which are taken out of the Ground during the Time of their Growth, are very apt to shrink, and lose much of their Weight in a short Time.

When the Season for digging up the Madder Roots is come, it should be done in the following Manner; *viz.* A deep Trench should be dug out at one Side of the Ground next to the first Row of Madder to make a sufficient Opening to receive the Earth which must be laid therein in digging up the Row of Roots, so that it should be at least two Feet broad, and two Spits and two Shovelings deep, and should be made as close as possible to the Roots, without breaking or cutting them in doing it; then the Row of Roots must be carefully dug up, turning the Earth into the Trench before mentioned. In the doing of this there should be to every Person who digs, two or three Persons to take out the Roots, that none may be lost, and as much of the Earth should be shaken out of the Roots as possible, and after the principal Roots are taken up, there will be many of the long Fibres remaining below, therefore, in order to get the Roots as clean as possible, the whole Spot of Ground should be dug of the same Depth as the first Trench, and the Pickers must follow the Diggers to get them all out to the Bottom. As the digging of the Land to this Depth is necessary, in order to take up the Roots with as little Loss as possible, it is a fine Preparation for any succeeding Crop, and I have always found that the Ground, where Madder has grown, produced better Crops of all Kinds than Land of equal Goodness, which had not the like Culture.

After

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After the Roots are taken up, the sooner they are carried to the Place of drying, the finer will be their Colour, for if they lie in Heaps, they are apt to heat, which will discolour them, or if Rain should happen to wet them much, it will have the same Effect, therefore no more Roots should be taken up than can be carried under Shelter the same Day.

The first Place, in which the Roots should be laid to dry, must be open on the Sides to admit the Air, but covered on the Top to keep out the Wet. If a Building is to be erected new, such as the Tanners have for drying their Skins, will be as proper as any, for these have Weather Boards from Top to Bottom at equal Distances to keep out the driving Rain, but the Spaces between being open, admit the Air freely; and if instead of Plank Floors or Stages above each other, they are laid with Hurdles or Basket Work, upon which the Roots are laid to dry, the Air will have freer Passage to the under Side of the Roots, which will dry them more equally.

In this Place they may remain three or four Days, but the Roots should be turned over once or twice, that every Part may dry equally, by which Time the Earth, which adhered to the Roots, will be so dry as easily to rub off, which should be done before the Roots are removed to the cold Stove, for the slower the Roots are dried, the less they will shrink, and the better will be the Colour of the Madder, and the cleaner the Roots are from Earth, the better the Commodity will be for Use when prepared.

Where-ever there are any large Barns, or other Buildings, whose Sides are open to admit the Air, there will be no Occasion for erecting Buildings for this Purpose; because these will answer full as well; but if there are different Stages of Hurdles erected in these Buildings, at three or four Feet above each

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each other, to lay the Roots upon them, the Hurdles being open, will admit the Air to the under Side of the Roots, whereby they will dry more equally than when they are spread on a close Floor; and hereby a much greater Quantity of Roots may be dried under the same Roof. During the Time they remain here, the Doors and all other Apertures of the Building should be kept constantly open, for the greater Quantity of free Air is admitted to the Roots, the better they will dry; and the slower they dry at first, the less of their Weight will be diminished, and the Colour will be the better; but they must be guarded from Wet, which will be very prejudicial to the Colour. When the Roots have lain in this Place so long as to dry their Outsides sufficiently to rub off the Dirt which adhered to them, then they should be carried to the Kiln to be farther dried; and as there are in most Parts of *England* Kilns already built for drying of *Malt* and *Hops*, they may be used for drying of Madder; but if there were Ventilators fixed to these Kilns, for blowing a sufficient Quantity of Air through the Rooms where the Madder Roots are drying, in the Manner directed by the Rev. Dr. *Hales* for drying of *Malt* and *Hops*, it will be found a much better Method than that which is practised by the *Dutch*, and will save a great Expence of Fuel. As the Method of placing and using of these Ventilators, is fully described in the Doctor's Book on the *Uses of Ventilators*, I need not repeat it here, but refer the Reader to that useful Book.

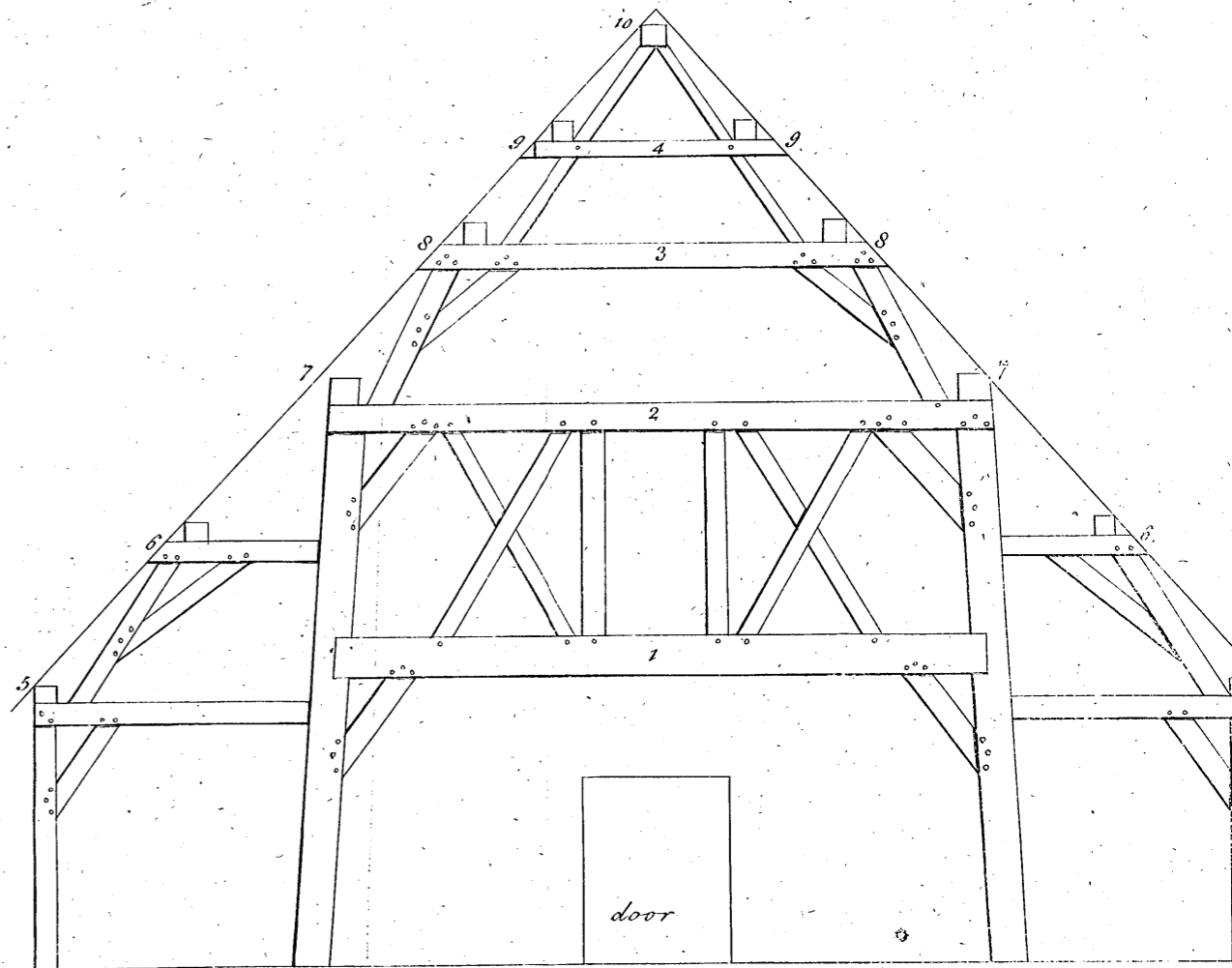
When the Outside of the Roots have been sufficiently dried in this cold Stove or Kiln, they should be removed to the threshing Floor, which may be the same as in a common Barn where Corn is threshed. The Floor of this should be swept, and made as clean as possible; then the Roots should be thresh-

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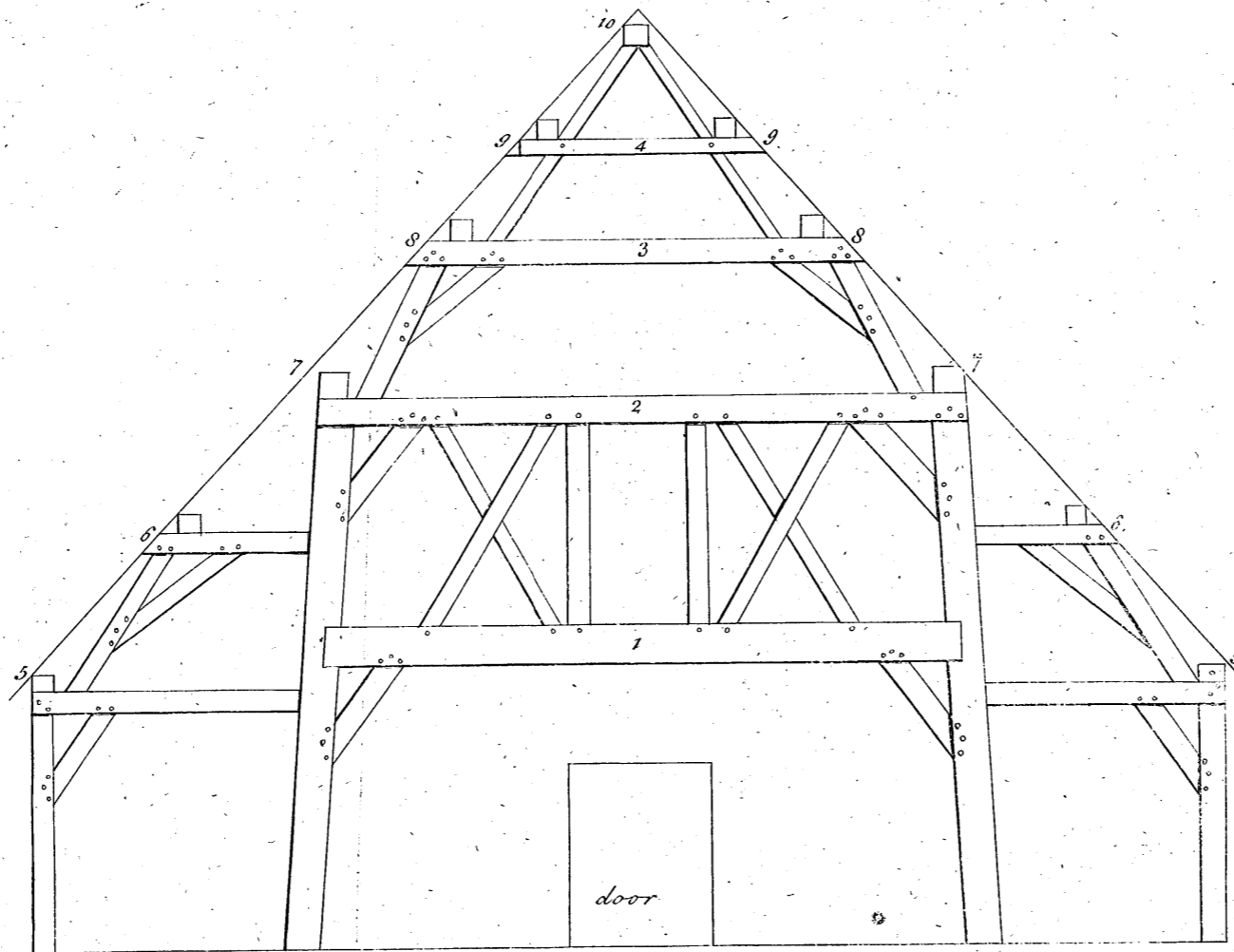
ed. to beat off their Skins or outside Coverings; this is the Part which is prepared separately from the inner Part of the Root, and is called *Mull*, which is sold at a very low Price, being the worst Sort of Madder, so cannot be used where the Permanency or Beauty of the Colours are regarded; these Husks are separated from the Roots, pounded by themselves, and are afterwards packed up in separate Casks, and sold by the Title of *Mull*. If this is well prepared, and not mixed with Dirt, it may be sold for about fifteen Shillings *per* Hundred Weight, at the Price which Madder now bears, and this, as is supposed, will defray the whole Expence of drying the Crop.

After the *Mull* is separated from the Roots, they must then be removed to the Kiln again, which must now have a greater Heat than before, where they must be dried with Care, for if the Heat is too great, the Roots will dry too fast, whereby they will lose much in Weight, and the Colour of the Madder will not be near so bright; to avoid which, the Roots should be frequently turned, while they remain in this Stove, and the Fires must be properly regulated, and a sufficient Quantity of fresh Air blown through the Kiln, which will drive out the foul Air occasioned by the Perspiration of the Roots, which will be found very useful in preserving their Colour. If some Trials are made by fixing a good Thermometer in the Room, the necessary Heat may be better ascertained than can be done any other Way, but this will require to be greater at some Times than at others, according as the Roots are more or less succulent, or the Weather more or less cold or damp, but it will always be better to have the Heat rather less than over-hot, for, though the Roots may require a longer Time to dry with a slow Heat, yet the Colour will be better.

*A Section of the Bounding House.*



*A Section of the Pounding House.*



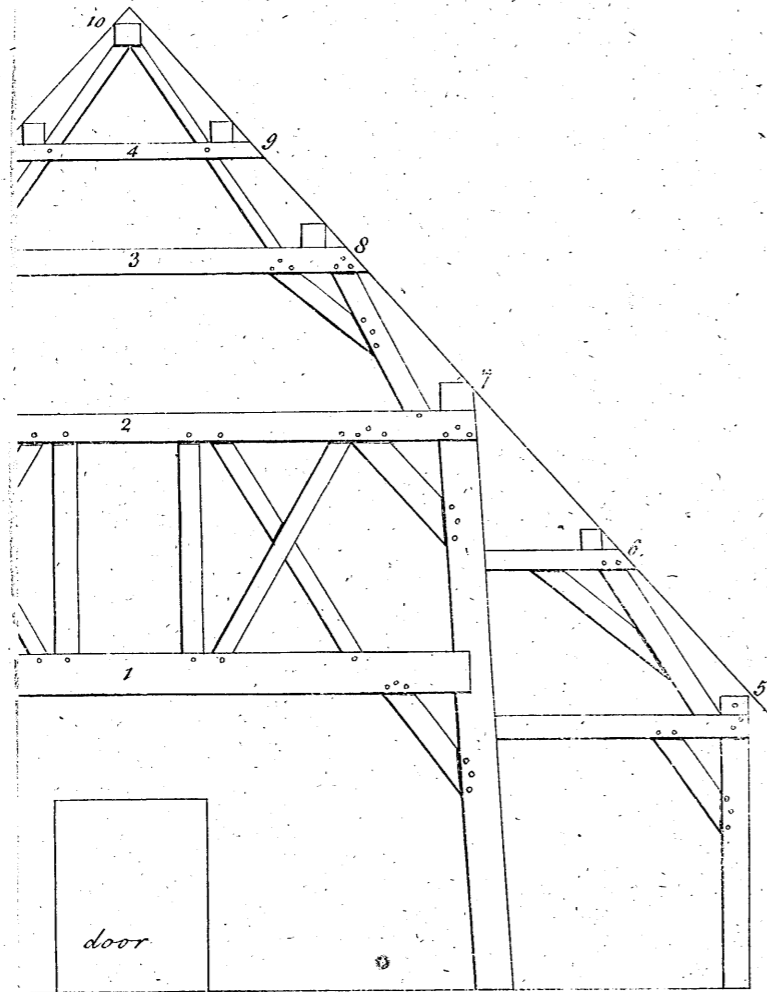
When the Roots are properly dried in be carried to the Pounding Houfe, wh reduced to Powder in the Manner before is necessary to separate the *Kraps* from practised by the *Dutch*, the Consumers ter Judges than myself.

The Expence in erecting of the Pou land is very great, so need not be built Building will serve for this Purpose, whe up the Apparatus for pounding the I this Purpose should be like those already used in *Holland*, as should also be the bound round at Bottom with thick Iron the Points of a Star; for if the Surface smooth and even, the Madder will adhere as to render it impossible to pulverise. The Stampers may be so contrived as to where there is Conveniency, or perhaps done by Horses as in *Holland*, there ne paratus, for no Doubt many of our Me the *Dutch* Plans, can make great Impr

There has been some Objections of introducing or rather retrieving the *England*, which it may not be improper, lest they should have so much Weight Persons from engaging in it. The first nerally started is, that the Land in this adapted for growing Madder, as that i can with Truth affirm, that there are v much better adapted for producing Ma in *Zealand*, where the best Madder r

Pl. 6.

House.



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When the Roots are properly dried in this Stove, they must be carried to the Pounding House, where they must be reduced to Powder in the Manner before related, but whether it is necessary to separate the *Kraps* from the *Gemeens* as is now practised by the *Dutch*, the Consumers of Madder will be better Judges than myself.

The Expence in erecting of the Pounding Houses in *Holland* is very great, so need not be built here, for any common Building will serve for this Purpose, where there is Room to fix up the Apparatus for pounding the Roots; the Blocks for this Purpose should be like those already mentioned, as are used in *Holland*, as should also be the Stampers, which are bound round at Bottom with thick Iron Bands, framed like the Points of a Star; for if the Surface of the Stampers are smooth and even, the Madder will adhere to them so closely, as to render it impossible to pulverise the Roots properly. The Stampers may be so contrived as to be worked by Water, where there is Conveniency, or perhaps by Wind, but if it is done by Horses as in *Holland*, there need not so great an Apparatus, for no Doubt many of our Mechanics, when they see the *Dutch* Plans, can make great Improvements to them.

There has been some Objections of late mentioned to the introducing or rather retrieving the Culture of Madder in *England*, which it may not be improper here to take Notice of, lest they should have so much Weight as to prevent many Persons from engaging in it. The first which has been generally started is, that the Land in this Country is not so well adapted for growing Madder, as that in *Holland*; to which I can with Truth affirm, that there are vast Tracts of Land here much better adapted for producing Madder than the best Land in *Zealand*, where the best Madder now is cultivated, and

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from the Experience, which I have had of its Growth, will produce a greater Crop.

Another Objection which I have heard was the Labour in *Holland* being cheaper than in *England*. The *Dutch* will always undersell us, so consequently will maintain this Branch of Trade, but this is certainly a great Mistake, for, though the Labourers employed in cultivating Madder may not earn so great Wages as is generally paid in *England*, yet sure I am that the Difference between an expert *English* Labourer, and that of the best *Dutchman*, in the ploughing, hoeing, planting, &c. of Madder, is much greater than that of their Pay, for I am sure a good *English* Gardener or Ploughman will do more Business, and perform it better, in four Days, than the best Workman in *Holland* can do in six. What I now say is greatly within Compass from my own Knowledge of these Things, so that, supposing we were to proceed in the same Manner now practised by the *Dutch*, it will be found on Trial, that the Expence will not be greater here than in *Holland*, so this could be no Objection to the cultivating of Madder, but we shall soon find Ways of performing the most laborious Part, at much less Expence, by Means of the hoeing Plough, which, when once introduced, and the practising of it is become more familiar, may be used to great Advantage in the Cultivation of Madder, whereby the Expence will be much lessened, and, when once this is well established in *England*, there can be no Doubt but that great Improvements will be made both in the Culture and Method of preparing the Commodity for Use.

There have been Objections made against farther Trials of growing Madder, because some, who have engaged in it, have not succeeded; but in Answer to this, it must be observed, that

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that their ill Success was owing to a Want of Skill. Some of them continued to plant repeated Crops of Madder on the same Spot of Ground, till the Roots became so small, as scarce to pay the Expence of digging up, and here it is proper to observe, that Madder should not be planted on the same Land, till after an Interval of seven or eight Years; during which Interval, the Ground may be sown with any Sort of Grain, or Kitchen Vegetables, which it will produce to great Advantage after Madder, because the Land will be wrought so deep as to make it fit to receive and nourish any other Crop which shall be put upon it. The *Dutch* always sow Grain upon their Madder Ground in the Intervals of four Years, and have great Crops from it, and they are obliged, from the Scarcity of Land fit for this Purpose, to plant the same Ground after an Interval of four Years on their best Land, and eight if the Ground is not so well adapted for it; but, as we are not under the same Necessity, it will be much better to stay eight Years; for the Roots of Madder are very similar to those of *Asparagus*, and draw much the same Nourishment from the Ground, and it is well known to every skilful Gardener that, when *Asparagus* Roots are dug up, which have been growing three Years, and the same Ground is planted with *Asparagus* again in a few Years, it will not thrive equal to that which is planted on Ground, upon which *Asparagus* has not grown for several Years; and this is always found to be the Case even in Kitchen Gardens near *London*, where, by the well working, and frequent dunging the Ground, it may be supposed changed in three or four Years, more than the Fields can possibly be in eight or ten.

It has also been said by some who are wholly unskilled in this Matter, that where Madder is once planted, the Ground



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be exhausted thereby, and rendered unfit to produce other Crops; which is so far from being true, that it has always been found, that such Land without dressing, has produced better Crops of Grain, than Ground of equal Goodness, where Mad-der has not grown, which has been occasioned by the deep Stiring of the Land. In *Zealand* they have always the best Crops on the Madder Ground: and in those Countries where *Woad* is cultivated, the Farmers have much better Crops on that Land where *Woad* has grown, than on any of the adjoining Land.

Madder should not be planted in very rich dunged Land, for in such there will be a very large Haulm, but the Roots will not be in Proportion; and, where there is much Dung or Sea-coal Ashes, the Madder Roots will be of a darker Colour, as it also will, where it is cultivated in the Smoak of *London*; which is likewise the Case with Liquorice, for that, which grows in a sandy Loam at a Distance from *London*, is always much brighter and clearer than that which grows in the rich Lands in the Neighbourhood of *London*.

If the Cultivation of Madder is carried on properly in *Eng-land*, it will employ a great Number of Hands from the Time Harvest is over, till the Spring of the Year, which is generally a dead Time for Labourers, and hereby the Parishes may be eased of the Poor's Rate, which is a Consideration worthy of publick Attention.

The Legislature having passed two Laws in the last Session of Parliament, to encourage the Growth of Madder in *Eng-land*, by ascertaining the Tithe thereof, we refer our Readers to them; contenting ourselves to subjoin in this Place, the following short Abstract of them.

In

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In the first, it is enacted, " That from and after the first  
 " Day of *August*, One Thousand Seven Hundred and Fifty-  
 " eight, all Persons, who shall plant, or cultivate, any Mad-  
 " der within that Part of *Great Britain* called *England*, shall  
 " pay to the Parson, Vicar, Curate, or Impropiator of the  
 " Parish or Place, five Shillings, and no more, yearly, for  
 " each Acre thereof, and so proportionably for more or less  
 " Ground so planted or cultivated, in Lieu of all Manner of  
 " Tithe of Madder; for the Recovery whereof, the Parson,  
 " &c. shall have the common and usual Remedy allowed of  
 " by the Laws of this Realm.

" It is also enacted, That no Madder shall be carried off  
 " the Ground on which it grows, before the Tithe thereof  
 " be paid.

" This Act is not to extend to charge any Lands discharged  
 " by any *Modus Decimandi*, ancient Composition, or other  
 " Discharge of Tithes by Law.

" The Act is to continue in Force for the Space of fourteen  
 " Years, and from thence to the End of the then next Session  
 " of Parliament, and no longer."

In the second, it is farther enacted,

" That if any Person shall steal, or wilfully or malici-  
 " ously pull up, or destroy, any Madder Roots growing, or  
 " being in the Lands or Grounds of any Person; and shall  
 " be thereof convicted before any Justice of the Peace of the  
 " County, or Place, where the Offence shall be committed,  
 " either by Self Confession of the Party offending, or by the  
 " Oath of any credible Witnesses (which Oath such Justice or  
 " Justices is and are thereby authorized and impowered to ad-  
 " minister) he shall, for the first Offence, pay to the Owner  
 " of

“ of the Madder Roots such Satisfaction for his Damage, and  
 “ within such Time, as the said Justice shall appoint: And  
 “ shall moreover pay down unto the Overseers of the Poor of  
 “ the Parish, for the Use of the said Poor, such Sum not ex-  
 “ ceeding Ten Shillings, as the Justice shall think proper;  
 “ and in Default thereof shall be committed to the House of  
 “ Correction, for any Time not exceeding one Month; or  
 “ shall be whiped by the Constable, or other Officer, at the  
 “ Discretion of the Justice: And being convicted of the like  
 “ Offence the second Time, he shall be committed to the  
 “ House of Correction for three Months.  
 “ But all Prosecutions for any such Offence, are to be be-  
 “ gun within thirty Days after the Offence committed.”

*F I N I S.*