
MECHANICK EXERCISES:
Or, the Doctrine of
Handy-works.
Applied to the ART of
Mold-Making, Sinking the Matrices,
Casting and Dressing of
Printing-Letters.

§. 15. ¶. 1. *Of making the Mold.*

THE *Steel Punches* being thus finish'd, as afore was shewed, they are to be sunk or struck into pieces of *Copper*, about an Inch and an half long, and one quarter of an Inch deep; but the thickness not assignable, because of the different thicknesses in Letters, as was shewed in §. 2. and shall further be shewed, when I come to the sinking and justifying

stifying of *Matrices*. But before these *Punches* are sunk into *Copper*, the *Letter-Founder* must provide a *Mold* to justify the *Matrices* by: And therefore it is proper that I describe this *Mold* to you before I proceed any farther.

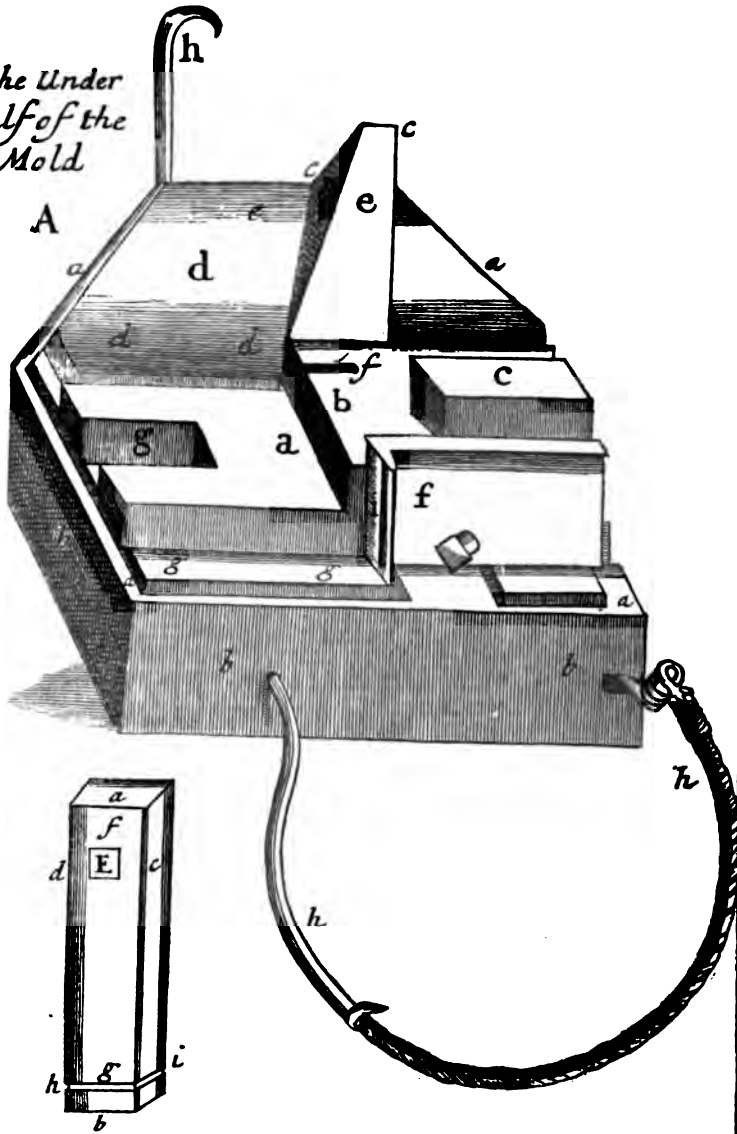
I have given you in Plate 18. at A, the Draft of one side or half of the *Mold*; and in Plate 19. at B, its Match, or other half, which I shall in general thus describe.

Every *Mold* is made of two parts, an under, and an upper Part; the under part is delineated at A, in Plate 18, the upper part is marked B, in Plate 19, and is in all respects made like the under part, excepting the *Stool* behind, and the *Bow*, or *Spring* also behind; and excepting a small roundish *Wyer* between the *Body* and *Carriage*, near the *Break*, where the under part hath a small rounding *Groove* made in the *Body*. This *Wyer*, or rather *Half-Wyer* in the upper part makes the *Nick* in the *Shank* of the Letter, when part of it is received into the *Grove* in the under part.

These two parts are so exactly fitted and gaged into one another, (*viz.* the *Male Gage*, marked C in Plate 19, into the *Female-Gage* marked g, in Plate 18.) that when the upper part of the *Mold* is properly placed on, and in the under part of the *Mold* both together, makes the entire *Mold*, and may be slid backwards for Use so far, till the Edge of either of the *Bodies* on the middle of either *Carriage* comes just to the Edge of the *Female-Gages*, cut in each *Carriage*: And they may be slid forwards so far, till the *Bodies* on either *Carriage* touch each other. And the sliding of these two parts of the *Mold* backwards,
makes

Plate 18

The Under
half of the
Mold



makes the *Shank* of the Letter thicker, because the Bodies in each part stand wider asunder; and the sliding them forwards makes the *Shank* of the Letter thinner, because the Bodies on each part of the *Mold* stand closer together.

This is a general Description of the *Mold*; I come now to a more particular Description of its parts.

a The *Carriage*.

b The *Body*.

c The *Male-Gage*.

d e The *Mouth-Piece*.

f i The *Register*.

g The *Female-Gage*.

h The *Hag*.

a a a a The *Bottom Plate*.

b b b The *Wood* the *Bottom Plate* lies on.

c c e The *Mouth*.

d d The *Throat*.

e d d The *Pallat*.

f The *Nick*.

g g The *Stool*.

h h g The *Spring* or *Bow*.

I have here given you only the Names of the parts of the *Mold*, because at present I purpose no other Use of it, than what relates to the sinking the *Punches* into the *Matrices*: And when I come to the casting of Letters, You will find the Use and Necessity of all these Parts.

¶ 2. Of

¶ 2. *Of the Bottom-Plate.*

The *Bottom Plate* is made of *Iron*, about two Inches and three quarters long, and about the same breadth; its thickness about a *Brevier*: It is planisht exactly flat and streight: It hath two of its *Fore-Angles*, as a cut off either straight or rounding, according to the pleasure of the Work-man.

About the place where the middle of the *Carriage* lies, is made a Hole about a *Great Primmer* square, into which is rivetted on the upper side a Pin with a Sholder to it, which reaches about half an Inch through the under side of the *Bottom Plate*. This Pin on the under side the *Bottom Plate* is round, and hath a *Male-Screw* on its end. This Pin is let through a Hole made in the Wood of the *Mold* to fit it; so that when a square *Nut*, with a *Female-Screw* in it, is turned on the *Male-Screw*, it may draw and fasten the *Half Mold* firm to the Wood.

The Hind side of the *Carriage* lies on this *Bottom-Plate*, parallel to the Hind side of it, and about a *Two-Lin'd-English* within the Hind Edge of it; and so much of this *Bottom-Plate* as is between the *Register* and the left hand end of the *Carriage* (as it is posited in the Figure) is called the *Stool*, as *g g* in the under half of the *Mold*, because on it the lower end of the *Matrice* rests; but on the upper half of the *Mold* is made a square Notch behind in the *Bottom-Plate*, rather within than without the Edge of the *Carriage*, to reach from the *Register*, and half an Inch towards the left hand (as it is posited in the Figure) that

that the upper part of the fore-side of the *Matrice* may stand close to the *Carriage* and *Body*.

¶ 3. *Of the Carriage.*

On the *Bottom-Plate* is fitted a *Carriage*, (as *a*) This *Carriage* is almost the length of the *Bottom-Plate*, and about a *Double Pica* thick, and its Breadth the length of the Shank of the Letter to be cast.

This *Carriage* is made of *Iron*, and hath its upper side, and its two narrow sides filed and rubed upon the using *File*, exactly straight, square and smooth, and the two opposite narrow sides exactly parallel to each other.

On one end of the *Carriage*, as at *g*, is made a long *Notch* or *Slit*, which I call the *Female-Gage*: It is about a *Double Pica* wide, and is made for the *Male-Gage* of the other part of the *Mold* to fit into, and to slide forwards or backwards as the thickness of the Letter to be cast may require.

¶ 4. *Of the Body.*

Upon the *Carriage* is fitted the *Body*, as at *b*. This *Body* is also made of *Iron*, and is half the length of the *Carriage*, and the exact breadth of the *Carriage*; but its thickness is alterable, and particularly made for every intended *Body*.

About the middle of this *Body* is made a square Hole, about a *Great Primmer*, or *Double Pica* square; and directly under it is made through the *Carriage* such another Hole exactly of the same size.

¶ 5. *Of*

¶ 5. *Of the Male-Gage.*

Through thefe two Holes, *viz.* That in the *Body*, and that in the *Carriage*, is fitted a square *Iron Shank* with a *Male-Screw* on one End, and on the other End an Head turning fquare from the fquare *Shanck* to the farther end of the *Body*, as is defcribed at c; but is more particularly defcribed apart at B in the fame Plate, where B may be called the *Male-Gage*: For I know no diftinct Name that *Founders* have for it, and do therefore coyn this:

a The *square Shanck.*

b The *Male-Screw.*

This *square Shanck* is juft fo long within half a *Sca-board* thick as to reach through the *Body*, *Carriage*, and another fquare Hole made through the *Bottom-Plate*, that fo when a *square Nut* with a *Female-Screw* in it is turned on that *Pin*, the *Nut* fhall draw and faften the *Body* and *Carriage* down to the *Bottom-Plate*.

The Office of the *Male-Gage* is to fit into, and flide along the *Female-Gage*.

¶ 6. *Of the Mouth-Piece.*

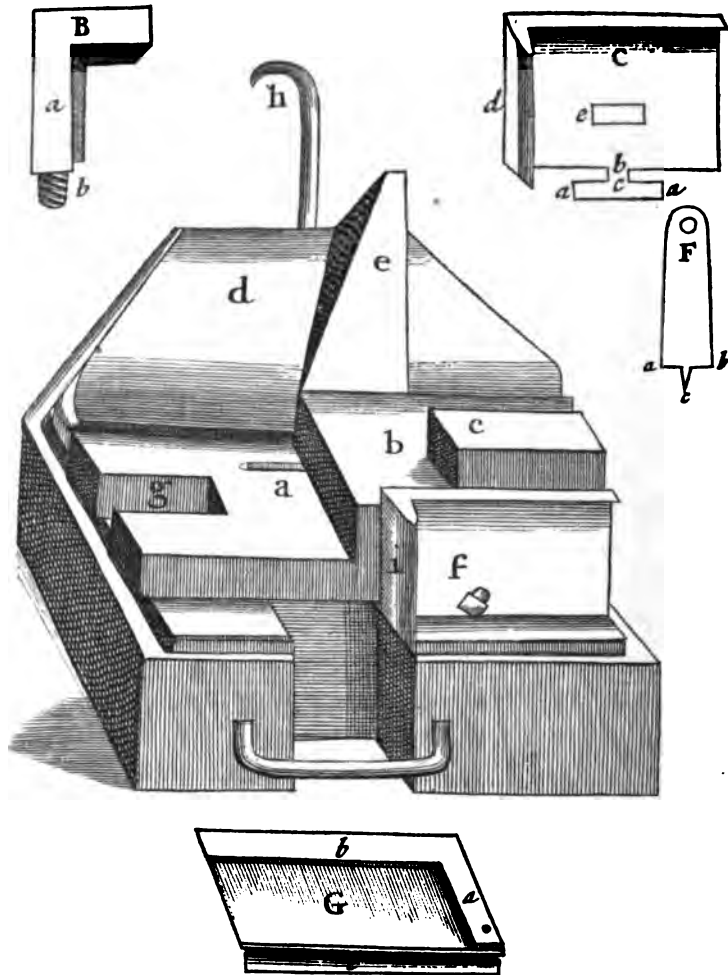
Clofe to the *Carriage* and *Body* is fitted a *Mouth-Piece* marked d e. *Letter-Founders* call this altogether a *Mouth-Piece*: But that I may be the better understood in this prefent purpofe, I muft more nicely diftinguifh its parts, and take the Freedom to elect Terms for them, as firft,

c c e The *Mouth.*

d The

Plato 19.

The Upper half of the Mold



d The *Palate*.

c c e d The *Jaws*.

d d The *Throat*.

Altogether (as aforesaid) the *Mouth-Piece*.

The *Mouth-Piece* hath its *Side* returning from the *Throat* filed and rubb'd on the *Ufing File* exactly straight and square to its *Bottom-side*, because it is to joyn close to the *Side* of the *Carriage* and *Body*; but its upper *Side*, viz. the *Palate* is not parallel to the *Bottom*, but from the *Side d d*, viz. the *Throat* falls away to the *Mouth e*, making an *Angle* greater or smaller, as the *Body* that the *Mold* is made for is bigger or less: For small *Bodies* require but a small *Mouth*, because small *Ladles* will hold Metal enough for small Letters; and the smaller the *Ladle*, the finer the *Geat* of the *Ladle* is; and fine *Geats* will easier hit the *Mouth* (in a Train of Work) than the course *Geats* of Great *Ladles*: Therefore it is that the *Mouth* must be made to such a convenient Width, that the *Ladle* to be used and its *Geat*, may readily, and without flabbering, receive the Metal thrown into the *Mold*.

But again, if the *Mouth-Piece* be made too wide, viz. the *Jaws* too deep at the *Mouth*, though the *Geat* of the *Ladle* does the readier find it, yet the *Body* of the *Break* of the *Letter* will be so great, that first it heats the *Mold* a great deal faster and hotter; and secondly, it empties the *Pan* a great deal sooner of its Metal, and subjects the Workman sometime to stand still while other Metal is melted and hot: Therefore Judgment is to be used in the width of the *Mouth*; and though there be no Rule for the width of it; yet this in general for such *Molds* as I
make

make, I observe that the *Orifice* of the *Throat* may be about one quarter of the *Body* for small *Bodies*; but for great *Bodies* less, according to *Discretion*, and the *Palate* about an *Inch* and a quarter long from the *Body* and *Carriage*. The reason that the *Orifice* of the *Throat* is so small, is, because the *Substance* at the end of the *Shanck* of the *Letter* ought also to be small, that the *Break* may easier break from the *Shanck* of the *Letter*, and the less subject the *Shanck* to bowing; for the bowing of a *Letter* spoils it; and the reason why the *Palate* is so long, is, that the *Break* being long, may be the easier finger'd and manag'd in the breaking.

If it be objected, that since the smallness of the *Break* at the end of the *Shanck* of the *Letter* is so approvable and necessary for the reason aforesaid, then whymay not the *Break* be made much more smaller yet? The Answer will be, No; because if it be much smaller than one quarter of the *Body*, *Metal* enough will not pass through the *Throat*, to fill both the *Face* and *Shanck* of the *Letter*, especially if the *Letter* to be cast prove thin.

Near the *Throat* and *Jaw* is made straight down through the *Palate* a square *Hole* (as at *k*.) This square *Hole* hath all its *Sides* on the *Upper-Plain* of the *Palate* opened to a *Bevel* of about 45 *Degrees*, and about the depth of a thick *Scaboard*. Into this square *Hole* is fitted a square *Pin* to reach through it; and within half a *Scaboard* through a square *Hole*, made just under it in the *Bottom-Plate* which the *Mouth-Piece* lies upon. On the upper end of this square *Pin* is made a square *Sholder*, whose under sides are filed *Bevil* away, so as the

to comply and fall just into the *Bevil* made on the *Palate* aforefaid, and on the under end of the *Pin* is made a *Male-screw* long enough to contain a square *Nut*, with a *Female-screw* in it about a *Pica* or *Englilh* thick, which *Nut* being twisted about the *Pin* of the *Male-screw*, draws and fastens the *Mouth-piece* close down to the *Bottom-Plate*, and also close to the *Carriage* and *Body* of the *Mold*.

Note, that the square *Hole* made in the *Bottom-Plate* to receive the square *Shanck* of the *Pin*, must be made a little wider than just to fit the square *Shanck* of the *Pin*, because the *Mouth-piece* must be so placed, that the end of the *Jaw* next the *Throat* must lie just even with the *Body* it is to be joyned to; and also that the *Throat* of the *Mouth-piece* may be thrust perfectly close to the Sides of the *Carriage* and *Body*: And when Occasion requires the *Shanck* of the Letter to be lengthened, it may be set farther off the *Carriage*, that an *Afidue*, or sometimes a thin *Plate* of *Brass* may be fitted in between the *Carriage* and the *Throat* of the *Mouth-piece*, as shall farther be shewed when I come to justify the *Mold*.

¶ 7. Of the Register.

Behind the *Mold* is placed the *Register*, as at *f i h*, which I have also placed apart in the aforefaid Plate, as at *C*, that it may the more perspicuously be discerned, and a more particular account of its parts be given, which are as follows:

C a a b c d e The Register.

a a The *Sholders*.

b c The

b c The Neck.

d The *Cheek* returning square from the Plate of the Register, and is about an *English* thick.

e The Screw Hole.

It is made of an *Iron* Plate about a *Brevier* thick; its upper Side is straight, but its under Side is not: For at *a a* projects downwards a small piece of the same Plate, which we may call the *Sholders*, of the Form you see in the Figure. These *Sholders* have two small *Notches* (as at *b c*) filed in them below the *Range* on the under side of the Register, which we will call the *Neck*, and is just so wide as the *Bottom-Plate* is thick. This *Neck* is set into a square *Notch*, filed so far into the *Bottom-Plate*, that the flat inside of the Register may stand close against the hind side of the *Carriage* and *Body*; and this *Notch* is filed so wide on the left Hand, that when the side *b* of the *Neck* stands close against the left-hand Side of this *Notch* (as it is posited in the Figure) the *Cheek* of the Register stands just even with the Edge of the *Body*. And this *Notch* is also filed so wide on the right-Hand Side, that when the *Neck* at *c* stands close against the right-hand Side of the *Notch*, the *Cheek* of the Register may remove an *m*, or an *m* and an *n* from the edge of the *Body* towards the right hand: And the *Sholders a a* are made so long, that when either Side of the *Neck* is thrust close against its corresponding side in the *Notch* of the *Bottom-Plate*, the upper Edge of the opposite *Sholder* shall hook or bear against the under side of the *Bottom-Plate*, and keep the whole Register steady, and directly upright to the Surface of the *Bottom-Plate*.

In

In the Plate of the *Register*, is made a long square Hole, as at *e*, just wide enough to receive the *Pin* of a *Male-screw*, with a *Sholder* to it, which is to fit into a *Female-screw*, made in the Edge of the *Carriage*, that when the *Male-screw* is turned about in the *Female-screw* in the *Carriage*, it shall draw the *Sholder* of the said *Male-screw* hard against the upper and under Sides of the square Hole in the Plate of the *Register*, close to the side of the *Carriage* and *Body*.

The reason why the Hole in the Plate of the *Register* is made so long, is that the *Check* of the *Register* may be slid forwards or backwards as occasion requires; as shall be shewn when I come to justifying the *Mold*.

¶ 8. Of the Nick.

In the upper half of the *Mold*, at about a *Pica* distance from the *Throat*, is fitted into the under side of the *Body* the *Nick*: It is made of a piece of *Wyer* filed flat a little more than half away. This *Nick* is bigger or less, as the *Body* the *Mold* is made for is bigger or less; but its length is about two *m*'s. It is with round *Sculptors* let exactly into the under side of the *Body*.

In the under half of the *Mold*, is made at the same distance from the *Throat*, on the upper side of the *Body*, a round *Groove*, just fit to receive the *Nick* in the upper half.

¶ 9 Of

¶ 9. *Of the Bow or Spring.*

This is a long piece of hard *Iron Wyer*, whose Diameter is about a *Brevier* thick, and hath one end fastned into the Wood of the under half of the *Mold*, as at *h*; but it is so fastned, that it may turn about in the Hole of the Wood it is put into: For the end of it being batter'd flat, a small Hole is drilled through it, into which small Hole the end of fine *Lute-string Wyer*, or somewhat bigger is put, and fastned by twisting about half an Inch of the end of the *Lute-string* to the rest of the *Lute-string*: For then a considerable Bundle of that *Wyer*, of about the Size of a Doublet Button, being wound behind the Hole, about the end of the *Spring*, will become a *Sholder* to it, and keep the end of the *Spring* from slipping through the Hole in the Wood: But this *Button* or *Sholder* must also be kept on by thrusting another piece of *Wyer* stiff into the Hole made on the end of the *Spring*, and crooking that *Wyer* into the Form of an S, that it slip not out of the Hole.

The manner how the *Spring* is bowed, you may see in the Figure: But just without the Wood is twisted upon another *Wyer* about an *English* thick five or six turns of the *Wyer* of the *Spring*, to make the whole *Spring* bear the stronger at its point: For the Office of the *Spring* is with its Point at *g*, to thrust the *Matrice* close against the *Carriage* and *Body*.

¶ 10. *Of*

¶ 10. *Of the Hooks, or Hagg.*

These are *Iron Wyers* about a *Long Primmer* thick: Their Shape you may see in the Figure: They are so fastned into the Wood of the *Mold*, that they may not hinder the *Ladle* hitting the *Mouth*. Their Office is to pick and draw with their Points the *Break* and *Letter* out of the *Mold* when they may chance to stick.

¶ 11. *Of the Woods of the Mold.*

All the *Iron Work* aforesaid of the *Mold* is fitted and fastned on two Woods, *viz.* each half one, and each Wood about an Inch thick, and of the shape of each respective *Bottom-Plate*. The Wood hath all its Sides except the hind-side, about a *Pica* longer than the *Bottom-Plate*; but the hind-side lies even with the *Bottom-Plate*. The *Bottom-Plate*, as afore was said in ¶ 2. of this §. hath an *Iron Pin* on its under side, about half an Inch long, with a *Male-screw* on its end, which *Pin* being let fit into an Hole in the Wood does by a *Nut* with a *Female-screw* in it draw, all the *Iron Work* close and fast to the Wood.

But because the Wood is an Inch thick, and the *Pin* in the *Bottom-Plate* but half an Inch long, therefore the outer or under side of the Wood (as posited in the Figure) hath a wide round Hole made in it flat at the Bottom, to reach within an *English*, or a *Great Primmer* of the upper side of the Wood. This round Hole is wide enough to receive the *Nut* with the *Female-*
male-

male-screw in it; and the *Pin* being now long enough to receive the *Female-screw* at the wide Hole, the *Female-screw* may with *round nosed Pliers* be turned about the *Male-screw* on the *Pin* aforesaid, till it draw all the *Iron Work* close to the *Wood*.

The *Wood* behind on the upper half is cut away as the *Bottom-Plate* of that half is; and into the thickness of the *Wood*, close by the right and left-hand side of this *Notch* is a small square *Wyer-staple* driven, which we may call the *Matrice-Check*; for its Office is only to keep the *Shanck* of the *Matrice* from flying out of this *Notch* of the *Mold* when the *Caster* is at Work. And the *Nuts* and *Screws* of the *Carriage* and *Mouth-piece*, &c. that lie under the *Bottom-Plate*, are with small *Chissels* let into the upper side of the *Wood*, that the *Bottom-plates* may lie flat on it.

Sect. XVI. *Of justifying the Mold.*

ALthough the *Mold* be now made; nay, very well and Workman-like made, yet is it not imagin'd to be fit to go to work withal; as well because it will doubtless Rag (as *Founders* call it; for which Explanation see the Table) as because the *Body*, Thickness, Straightness, and length of the *Shanck* must be finish't with such great Nicety, that without several Proofs and Tryings, it cannot be expected to be perfectly true.

Therefore before the sinking and justifying the *Matrices*, the *Mold* must first be *Justified*: And first, he justifies the *Body*, which to do, he casts about twenty *Proofs* or Letters, as they are called, though it
matters

matters not whether the *Shancks* have yet Letters on them or no. These *Proofs* he sets up in a *Composing-stick*, as is described in § 17. ¶ 2. Plate 19. at G, with all their *Nicks* towards the right Hand, and then sets up so many Letters of the same *Body*, (which for Distinction-sake we will call *Patterns*) that he will justifie his *Body* too, upon the *Proofs*, with all their *Nicks* also to the right Hand, to try if they agree in length with the same Number of Letters that he uses for his *Pattern*; which if they do not, for very seldom they do, but by the Workman's fore-cast are generally somewhat too big in the *Body*, that there may be Substance left to *Justifie* the *Mold*, and clear it from *Ragging*. Therefore the *Proofs* may drive out somewhat, either half a Line (which in *Founders* and *Printers* Language is half a *Body*) or a whole Line. (more or less.)

He also tries if the two sides of the *Body* are parallel, *viz.* That the *Body* be no bigger at the *Head* than at the *Foot*; and that he tries by taking half the number of his *Proofs*, and turning the Heads of them lays them upon the other half of his *Proofs*, so that if then the *Heads* and *Feet* be exactly even upon each other, and that the Heads and Feet neither *drive out*, nor *get in*, (*Founders* and *Printers* Language, for which see the Table) the two sides of the *Body* are parallel; but if either the *Head* or *Foot* *drives out*, the two sides of the *Body* are not parallel, and must therefore be mended.

And as he has examin'd the Sides of the *Body* so also he examines the thickness of the Letter, and tries if the two Sides of the thickness be also parallel, which

to

to do, he sets up his *Prooves* in the *Composing-stick* with their *Nicks* upwards. Then taking half of the *Prooves*, he turns the *Heads* and lay the *Heads* upon the *Feet* of the other half of his *Prooves*, and if the *Heads* and *Feet* lies exactly upon each other and neither *drive-out* or *get-in* the two Sides of the thickneses are parallel. But if either the *Head* or *Foot drive-out* the two Sides of the thickneses are not parallel; and must therefore be mended.

Next, he considers whether the sides of the *Body* be straight, first by laying two Letters with their *Nicks* upwards upon one another, and holding them up in his Fingers, between his Eye and the Light, tries if he can see Light between them: For if the least Light appear between them, the *Carriage* is not straight. Then he lays the *Nicks* against one another, and holds them also against the Light, as before: Then he lays both the *Nicks* outward, and examines them that way, that he may find whether either or both of the *Carriages* are out of straight.

But we will suppose now the *Body* somewhat too big, and that it drives out at the *Head* or *Foot*; and that the thickness *drives-out* at the *Head* or *Foot* and that the Sides of the *Body* are not straight. These are Faults enough to take the *Mold* asunder: but yet if there were but one of these Faults it must be taken asunder for that; by unscrewing the *Male-Gage*, to take the *Body* off the *Carriage*, and the *Carriage* off the *Bottom-Plate*.

Having found where the Fault of one or both sides of the *Body* is, he lays the *Body* down upon the *Ufing File*; and if the Fault be extuberant, he rubs the
Extu-

Extuberancy down, by preffing his Finger or Fingers hard upon the opposite side of the Body, just over the extuberant part; and so rubbing the Body hard forwards on the *Ufing-File*, and drawing it lightly backwards, he rubs till he has wrought down the extuberancy, which he examins by applying the *Lyner* to that side of the Body, and holding it so up between his Eye and the Light, tries whether or not the *Lyner* ride upon the part that was extuberant; which if it do, the extuberancy is not sufficiently rub'd off, and the former Process must again begin and be continued till the extuberancy be rub'd off. And if the Body were too big, he by this Operation works it down: Because the extuberancy of the *Body* rid upon the *Carriage*, and bore it up.

And if the fault be a *Dawk*, or Hollow in the *Body*, then he Works the rest of that side of the *Body* down to the bottom of the *Dawk*, which by applying the *Lyner* (as afore) he tries, and this also lessens the *Body*.

If the *Body* drive-out at *Head* or *Foot*, he lays the weight of his Fingers heavy at that side or end of the *Body* which is too thick, and so rubs that down harder.

If the thickness of the Letter, drive-out at *Head*, or *Foot*, he Screws the *Body* into the *Vice*, and with a flat sharp *File*, files the *Side* down at the *Head*, or *Foot*. At the same time, if the *Shanck* of the Letter be not Square, he mends that also, and smooth-files it very well.

Then

Then he puts the *Mold* together again: And melting, (or laying aside) his first *Proofs*, lest they should make him mistake, he again *Cast*s about twenty New *Proofs*, and examines by them as before, how well he has mended the *Body*, and how near he has brought the *Body* to the size of the *Pattern*: For he does not expect to do it the *First*, *Second*, or *Seventh* time; but mends on, on, on, by a little at a time, till at last it is so finish'd.

If the *Body* prove too small, it is underlaid with a thick or a thin *Affidue*; or sometimes a thin *Plate* of *Brass*.

Then he examines the *Mouth-piece*, and sees that the *Jaws* slide exactly true, upon every part of the *Pallat* without riding.

If the *Throat* of the *Mouth-piece* lie too low, as most commonly it is design'd so to do; Then a *Plate* of *Brass* of a proper thickness is laid under it to raise it higher.

He also Justifies the *Registers*, making their *Cheeks* truly Square. And Screwing them about an n from the Corner of the *Body*.

He tries that the *Male* and *Female-Gages* fit each other exactly, and lie directly straight along, and parallel to both the Sides of the *Carriage*.

All this thus performed he needs not (perhaps) take the *Mold* asunder again. But not having yet consider'd, or examin'd the length of the *Shanck* of the Letter, he now does; and if it be somewhat too long (as we will suppose by forecast it is) then the *Body* and *Carriage* being Screwed together, and both the Halves fitted in their *Gages*, the Edges of the
Carri-

Carriage and *Body* are thus together rub'd upon the *Ufing-File*, till the *Carriage* be brought to an exact length.

Having thus (as he hopes) finish'd the justifying of the *Mold*; and put it together, and Screwed it fast up, he puts the two Halves together, and then Rubs or Slides them hard against one another, to try if he can perceive any little part of the *Body* Ride upon the *Carriage*, or *Carriage* ride upon the *Body*: To know which of them it is that Rides, or is extuberant, he uses the *Liner*; applying it to both the Places, as well of the *Body* as the *Carriage*: where he sees they have Rub'd or bore upon one another: And which of them that is extuberant, the Edge of the *Liner* will shew, by Riding upon it: And that part he Files upon with a small flat and very fine *File*, by little and little, taking off the extuberancy, till the *Bodies* and *Carriages* lie exactly flat upon, and close to one another: Which if they do not, the *Mold* will be sure to *Rag*.

§. XVII. ¶ 1. *Of Sinking the Punches into the Matrices.*

THAT the *Matrice*, and all its parts may be the better understood, as I shall have Occasion to Name them, I have given you a *Draft* of the *Matrice* in Plate, 18 at E. and shall here explain its parts.

E The *Matrice*, wherein is Punched E, the *Face* of the *Letter*.

a The *Bottom* of the *Matrice*.

b The *Top* of the *Matrice*.

c The

c The *Right Side* of the *Matrice*.

d The *Left Side* of the *Matrice*.

f g The *Face* of the *Matrice*.

h i The *Leather Groove* of the *Matrice*.

In the *Back* or *Side* behind the *Matrice*, juſt behind *E* is filed in athwart the *Back*, from the right to the left *Side* a *Notch*, to ſettle and hold the point of the *Spring* or *Wyer* of the *Mold* in, that the *Matrice* fly or ſtart not back when it is at *Work*.

As I told you (in §. 11. ¶ 1.) that the *Punches* are to be made of ſeveral *Thickneſſes*, for reaſons there ſhewed; and that therefore the *Letter-Cutter* makes *Wooden Patterns* for his ſeveral *Sizes* of *Thickneſſes* as well as *Heights*; ſo now I am come to the *Sinking* of the *Punches* into the *Matrices*, I muſt tell you again that the *Letter-Cutter* or elſe the *Founder*, (either of which that *Sinks* them; for ſometimes it is a *Task* Incumbent on each of them) conſiders the *Thickneſſes* of all the *Punches* he has to *Sink*, though *Heighth* he need not conſider in *Sinking* the *Matrices*: For the *Matrices*, by reaſon of their length in *Copper* upwards and downwards, have *Subſtance* enough and to ſpare, for the longeſt *Letters* to be *Sunk* into them: Therefore I ſay, he only conſiders the ſeveral *Thickneſſes* of all the *Punches*, and makes *Wooden Patterns* for them, marking with a *Pen* and *Inck* the number of each ſize, on the *Pattern* as before he did for the *Steel-Punches*: But the *Patterns* he made for the *Steel-Punches* will be too *Thin* for the *Copper Matrices*: Becauſe the *Steel-Punches* by *Sinking* into the *Matrices*, ſtretch and force the *Sides* of the *Copper* out, and ſometimes crack them for want of *Subſtance*

stance; and at other times carry or force the Substance of the *Matrice* so low with their *Sholder* if the *Letter* be broad, that it creates a great Trouble to rub them *Flat*, (as it is called) because it is done upon the *Ufing-File*.

Therefore he makes *Wooden Patterns* for every of the former siz'd *Punches*, so thick or rather an n thicker at the least, then he made the *Wooden Patterns*, that the *Steel-Punches* were made to be *Forged* by, that there may be Substance enough on each-side the *Copper* to bear the dilating that the sinking of the *Punch* into it will make, because the *Counter-Puncht-Letters* are Thicker by their *Stems* and *Footing* or *Topping* than the *Counter-Punches* made for them need be.

Therefore (as before) for three sizes of *Punches* to be *Counter-Puncht*, he made three several siz'd *Patterns*; so now for the several siz'd *Punches* that are to be *Sunk* into *Matrices*, he makes three several siz'd *Patterns* of *Wood* for the *Copper-Smith* to draw out *Rods* of *Copper* of those several Sizes by, and each of them (as aforesaid) an n, and for the Thick *Letters* an m (at least) Thicker than the *Patterns* were made, for the *Steel-Punches* to be *Forged* to a size by.

In the *Forging* of these *Copper Rods*, he instructs the *Copper-Smith* to make Choice of the softest *Copper* he can get, that the *Steel-Punches* may run the less hazzard of breaking; and sometimes (if too soft *Temper'd*) battering their *Stroaks*.

The *Rose Copper* is commonly accounted the softest :
But

But yet I have many times *Sunk Punches* indifferently into every fort of *Copper*. Nay, even caft *Copper*, which is generally accounted the Hardeft: Because *Copper*, as well (as some other Mettals) Hardens with Melting.

These *Rods of Copper* are (as I told you in §. III. ¶ 1. to be Cut into small Lengths, each about an Inch and an half long, and a *Great-Primmer* or *Double-Pica* deep; and for great Bodyed *Letters* a *Two-lin'd-English* deep; But their Thickness not affignable, becaufe of the Different Thicknesses in *Letters*, both of the fame and other *Bodies*, as in part I shewed, in §. II. and more fully in this present §. and ¶.

The reason why the *Copper-Rods* are Forg'd fo deep, is, That the more substance of *Copper* may lie under the *Face* of the *Punch*: For if the *Rod* have not a convenient depth, the *Face* of the *Punch* in *Sinking*, does the fooner ingage with the Hardness of the *Face* of the *Stake* it is *Sunk* upon: And having with a few Blows of the *Hammer*, soon hardned the *Copper* juft under the *Face* of the *Punch*, as well the hardness of the small (thus hardned) *Body* of *Copper* juft under the *Face* of the *Punch*, as the Hardness of the *Face* of the *Stake* contribute a complicated assistance to the breaking or battering the *Face* of the *Punch*. But if the *Rod* be deep, the Substance of *Copper* between the *Face* of the *Punch* and the *Stake* is less hardned, and consequently the *Punch* will *Sink* the easier, and deeper with less Violence.

But

But sometimes it has happ'ned that for the *Sinking* one *Matrice* or two, I have been loath to trouble my self to go to the *Copper-Smiths*, to get one *Forg'd*: and therefore I have made shift with such *Copper* as I have had by me. But when it has not been so deep as I could have wisht it, I have just entered the *Punch* into the *Matrice* upon the *Stake*, and to *Sink* it deep enough, I have laid it upon a good thick piece of *Lead*, which by reason of its softness has not hardned the *Copper* just under the *Face* of the *Punch*; but suffered the *Punch* to do its *Office* with good Success.

Having cut the *Copper-Rods*, into fit Lengths with a Cold *Chissel*, He files the end that is to stand upon the *Stool* of the *Mold* exactly square, and the Right-side of the *Matrice*, that stands against the *Carriage* and *Body*, also exactly Square and smooth upon the *Ufng-File*. Then he places the filed end, or *Bottom* upon the *Stool*, with the *Face* of the *Matrice* towards the *Carriage* and *Body*, and the Right side of the *Matrice*, close against the *Register*: Then if the *Punch* to be sunck be an ascending Letter. He with a fine pointed *Needle*, makes a small Race by the upper side of the *Carriage* upon the *Face* of the *Matrice*, and that Race is a mark for him, to set the top of the *Ascending Letter* at, when he *Sinks* it into the *Matrice*: So that then placing the *Punch* upright upon the middle of the Thickness of the *Matrice*, the *Matrice* lying solid on the *Stake*: He with the *Face* of an *Hammer* fizable to the bigness of his *Punch*, cautiously knocks upon the *Hammer-end* of the *Punch*, with reiterated Blows, till he

he have driven the *Punch* deep enough into the *Matrice*.

But if it be a short *Letter*, or a Descending *Letter*, and not Ascending also: Then he elects any *Cast-Letter* of the Thickness of the *Beard*, (as *Founders* and *Printers* call it) For which Explanation see the Table, and he lays that *Letter* upon the *Surface* of the *Carriage*, and then placing the *Bottom* of the *Matrice* to be *Sunk* as before, on the *Stool*, and against the *Register*, He draws with a *Needle* as before, a race above the *Surface* of that *Letter*, against the *Face* of the *Matrice*, and that race is a Mark for him to place the *Head* of the *Letter* by. Then managing the *Punch* and *Hammer* as before was shewed, he *Sinks* the *Punch* into the *Matrice*.

But here arises a Question, *viz.* How deep the *Punches* are to be *Sunk* into the *Matrices*? The Answer is, a Thick *Space* deep, though deeper even to an *n* would be yet better: Because the deeper the *Punches* are *Sunk*, the lower does the *Beards* stand below the *Face*, and those *Beards* when the *Cast Letter* comes into the *Printers* Hands to be used, are the less subject to *Print*, as too oft they do both at *Head* or *Foot* of a *Page*, than when they lie so high that the softness of the *Blankets*, and Hardness of a *Pull*, or else carelessness of Running the *Carriage* of the *Press* to a considered Mark they would be. But they are seldom *Sunk* any deeper than a thick *Space*: and the reason is, because the breaking or battering the *Face* of the *Punch* should not be to much hazarded.

The

The many *Punches* to be *Sunk* into *Matrices* for the same *Body*, are difficult to be *Sunk* of an equal depth. Therefore I always make a *Beard-Gage*, as is described in *Plate 19* at *F*, where *a b* is a *Sholder* that rests upon the *Face* of the *Matrice*, *c* is the *Point* or *Gage* that measures the depth of the *Sunken Punch*. So that, when the *Point c* just touches the *Bottom*, and both the *Sholders a b* the *Face* of the *Matrice*, the *Punch* may be accounted well *Sunk* as to depth.

But though it be accounted well *Sunk* for a first *Essay*, yet can it not be reasonably imagined it is well *Sunk* for good and all; as well because in *Sinking* the *Punches* it has carryed some part of the *Surface* of the *Matrice* down below the *Face* of the *Matrice* into the *Body* of the *Copper*, as because both the *Sides* are doubtless extorted, and one *Side* or *Part* of the *Punch* *Sunk* more or less deeper than the other. Wherefore I now come to

¶ 2. *Justifying the Matrices.*

Justifying of *Matrices* is, 1. to make the *Face* of the *Sunken* Letter, lie an exact designed depth below the *Face* of the *Matrice*, and on all its sides equally deep from the *Face* of the *Matrice*. 2. It is to set or *Justifie* the *Foot-line* of the Letter exactly in *Line*. 3. It is to *Justifie* both the sides, *viz.* the *Right* and *left-sides* of a *Matrice* to an exact thickness.

Therefore to proceed *Methodically*, he first slightly *Files* down the *Bunchings* out that the *Punch* made

made in the Sides of the *Matrice*; And then slightly Files down all the *Copper*, on the *Face* of the *Matrice*, till the Hollow the *Punch* made becomes even with the whole *Face* of the *Matrice*.

Then he *Cast*s a *Proof-Letter* or two, and *Rubs* them: And with the Edge of a Knife cuts out what may remain in the bottom of the *Shanck* by reason of the un-even breaking, off of the *Break* that the square bottom of the *Shanck* may not be born off the *Bottom-Ledge* of the *Lining-Stick*.

But having till now said nothing of the *Lining-Stick*, it is proper before I proceed, to give a Description of it: It is delineated in *Plate 19* at G. Where G is the *Plain*, *a* the *Side-Ledge*, *b* the *Bottom-Ledge*, *c* the *Stilt*, all made of *Brass*.

The *Plain* is exactly Flat, Straight, and Smooth, that the *Shancks* of the *Letter* being likewise so, may lie flat and solidly on it. Its depth between the *Bottom-Ledge*, and the fore edge is about the length of the *Shanck* of the *Letter*: But the whole *Plain* of *Brass* is yet deeper; Because the *Bottom-Ledge* is fastened on it. The *Lining-Stick* is about two *Inches* long for small *Letters*; but longer for *Big-Bodied Letters*.

Both *Bottom* and *Side-Ledge*, is a thin piece of *Brass*, from a *Scaboard* to a *Pica* thick, according as the *Body* whose *Face* and *Foot-line* is to be *Justified* in it is bigger or less. These two *Ledges* is an *Inside Square* exactly wrought, and with small *Rivets* fastened on the *Side* edge, and on the *Bottom* edge.

The

The *Stilt* is a thin flat piece of *Brass-Plate* about a *Scaboard* thick, and a *Double-Pica* broad: One of its edges is *Soldered* to the under-side of the *Plain*, about a *Double-Pica* within the fore-edge of the *Plain*, that the *Lining-Stick* (when set by with *Proof-Letters* in it) may not lie flat on its *Bottom*; but have its fore edge *Tilted* up, that the *Letters* in it may rest against the *Bottom-Ledge*.

Having cut the *Notch* in the *Break* of the *Letters* as aforefaid, He *Rubs* every side of them on the *Stone*, with two or three hard *Rubs*, to take off the small *Rags* that may happen on the *Shanck* of the *Letter*, notwithstanding the *Mold* is imagined to be very truly made and *Justified*.

The *Stone* is commonly a whole *Grind-Stone*, about eighteen Inches diameter, having both its sides truly *Rub'd* flat and smooth, by *Jostling* it (as *Masons* call it) upon another broad long and flat *Stone* with *Sand* and *Water*. It must have a fine, but very sharp *Greet*. Now to return.

He places a *Quadrat* of the same *Body*, on the *Plain* of the *Lining-stick*, and against the *Side-Ledge* of it He sets up three or four old m's of the same *Body*: Then sets up his *Proof-Letter* or *Letters*, and after his *Proof-Letter* three or four old m's more of the same *Body*; and being very careful that the *Foot* of the *Shanck* of the *Letter* stands full down against the *Bottom-Ledge* of the *Lining-stick*, He applies the edge of the *Liner* to the *Faces* of all these *Letters*: And if he finds that the edge of the *Liner* just touch (and no more) as well all the parts of his *Proof-Letters*

ters as they do upon his old *Letters*, He concludes his *Matrice* is *Sunk* to a true *Height against Paper*.

But he seldom hopes for so good luck; but does more likely expect the *Matrice* is *Sunk* too deep or too shallow, and awry on the right and left-side, or on the top or bottom of the *Line*, for all or any of these Faults the *Liner* will easily discover. Therefore I shall shew you how he *Justifies* a *Matrice* that is too *High against Paper*.

We will suppose the *Face* of the *Punch* is *Sunk* flat and straight down into the *Matrice*; but yet it is a little too deep *Sunk*. Therefore he considers how much it is too deep: If it be but a little too deep, perhaps when the *Face* of the *Matrice* shall be made exactly flat (for yet it is but *Rough-Filed*) it may be wrought down to be just of an *Height against Paper*. But if the *Punch* be *Sunk* so much too deep that the smoothing the flat of the *Face* on the *Ufing-File* will not work it low enough; then with a *Bastard-cut flat-File*, he takes off (according to his Discretion) so much *Copper* from the *Face* of the *Matrice* as will make it so much nearer as he thinks it wants to the *Face* of the *Letter*. But yet considers that the *Face* of the *Matrice* is yet to smoothen on the *Ufing-File*, and therefore he is careful not to take too much off the *Face* of the *Matrice* with the *Rough-File*.

He is also very careful that when he is to *File* upon the *Face* of the *Matrice*, to *Screw* the *Face* of it Horizontally flat in the *Vice*: And that in *Filing* upon it, he keeps his *File* directly Horizontal, as
was

was shewed, *Numb. 1. Fol. 15, 16. Vol. 1.* For if he let his right or left-Hand dip, the *File* will in its Natural Progress take too much off the side it dips upon, and consequently the *Face* of the Letter on that side will lie shallower from the *Face* of the *Matrice* then it will on the opposite side. The like caution he makes, in *Filing* between the *Top* and *Bottom* of the *Matrice* on the *Face*. For if he *Files* away too much *Copper* toward the *Top* or *Bottom*, the *Face* of the *Letter* on its *Top* or *Bottom-Line*, will lie on that end shallower from the *Face* of the *Matrice*.

Then he considers by his *Proof-Letters* how much too thick the right or left side of the *Matrice* is.

I told you in § 11. ¶ 4. that the Angle the *Sholder* made with the *Face* of the *Letter*, is about 100 Degrees, which is 10 Degrees more then a *right Angle* or *Square*. So that if a *Letter* be *Cast* and *Rub'd* just so thick that the *Liner* when applied to the *Shanck* of the *Letter* reaches just to the *Sholder*, there will be an *Angle* of 10 Degrees, contained between the edge of the *Liner* and the *Straight Line* that proceeds from the *Sholder* at the *Shanck*, to the outer-edge of the *Face* of the *Letter*. And if two *Letters* be thus *Cast* and *Rub'd* and *Set* together, the *Angle* contained between their *Shancks*, and the outer-edge of the *Face* of the *Letter* will be 20 Degrees, which is too wide by half for the *Faces* of two *Letters* to stand assunder. Therefore the sides of the *Matrice* must be so *Justified*, that when the *Shancks* of two *Letters* stand close together, the *Angle* between

tween both the *Shancks*, and the adjacent outer-edges of the *Faces* of the *Letters* may both make an *Angle* of about 10 Degrees as aforefaid, which is a convenient diftance for two *Letters* to ftand affunder at the *Face*. But to do which, If the right-side be too thick, the *Register* of the under-half of the *Mold*, being (as I faid) hard screw'd, fo as to ftand about an n off the edge of the *Body* towards the right hand; He places the *Foot* of the *Matrice* on the *Stool*, and the right-side of the *Matrice* clofe againft the *Register*, and obferves how much too thick that fide of the *Matrice* is: For fo much as the right-hand edge of the *Orifice* of the *Matrice* ftands on the left hand fide of the *Body*, fo much is the right fide of the *Matrice* too thick, and muft by feveral offers be *Filed* away with a *Baftard-Cut-File*, not all at once, leaft (ere he be aware) he makes that fide of the *Matrice* too thin, which will be a great dammage to the *Matrice*, and cannot be mended but with a *Botch*, as fhall in proper place be fhewed.

Having by feveral proffers wrought the right-side of the *Matrice* thus near its thicknefs, he proceeds to *Justifie* the left-side alfo. But this fide muft be *Justified* by the upper half of the *Mold*; By turning the top of the *Matrice* downwards, and placing the left-side of it (now the right-side) againft the *Register*, and works away the left-side in all refpects as he did the right-side; ftill being very cautious he takes not to much *Copper* away at once.

To *Justifie* the *Letter in Line* he examines the *Proof-Letter* (yet ftanding in the *Lining-Stick*) and applies the
the

the *Liner* to the *Foot-line*: And if the *Liner* touch all the way upon the *Foot-line* of the *Proof-Letter* and the *Foot-Line* of all the old m's, that *Matrice* is *Justified* in *Line*. But this also very rarely happens at first, for by design it is generally made to stand too low in *Line*: Because the *Bottom* of the *Matrice* may by several proffers be *Filed* away till the *Letter* stand exactly in *Line*. But should he take too much off the *Bottom* of the *Matrice*, it cannot be made to stand lower without another *Botch*.

Nor does he reckon that this first Operation, or perhaps several more such, shall *Justifie* the *Matrice* in *Line*. But after bringing both the sides of the *Matrice* thus near, and also bringing the *Matrice* thus near the *Line*. He *Cast*s another *Proof-Letter* or two, and *Rubbing* all the sides of their *Shancks*, as before was shew'd, he tries by *Rubbing* the *Letters* how near he has brought the thickness of both the sides: For when the sides of the *Matrice* are brought just to such a thickness, that the *Shanck* of the *Letter* (*Cast* in the *Mold*) *Rubs* flat half way up beyond the *Beard* towards the *Face* of the *Letter*, the *Matrice* is of a convenient thickness, and there the *Angle* from the *Beard* of the *Shanck*, to the outer-edge of two *Letters* set together, will make an *Angle* of about 10 degrees as aforesaid, which being about one third part of a *thin-Space* is a convenient distance for the adjacent edges of two *Letters* to stand assunder: But yet *Founders* sometimes to *Get in* or *Drive out*, *Cast* the *Letters* thinner or thicker, and consequently their *Faces* stand closer or wider assunder

der, which is unfeemly when the *Letter* comes to be *Printed*.

Then he sets the *Proof-Letters* in the *Lining-Stick*, between four or five old m's as before, and with the *Liner* exams again how well these *Proof-Letters* stand in *Line* with the old m's, which if they do not, he Reiterates the former Operations so oft, till the sides and *Line* of the *Matrice* is *Justified*, and at every Operation *Cafts* new *Proof-Letters* to examine the thickness of both the Sides, and how well the *Matrice* is *Justified* to *Stand in Line*.

The *Matrice* being now *Justified*, he *Files* a *Leather-Groove* round about it, viz a *Notch* (made prope- rest with a three square *File*) within about a thick *Scaboard* of the top of the *Matrice*, to tie the *Leather* fast to.

He also *Files* another *Notch* in the back-side of the *Matrice* athwart it, to rest the point of the *Wyer* or *Spring* in. But this *Notch* must by no means be made before the *Matrice* be *Justified* to its true *Height against Paper*: Because when this *Notch* is made, the *Punch* cannot again be struck in the *Matrice*; For that the *Matrice* will not lie solid on the *Stake* in that place.

¶ 3. *Of Botching-Matrices, to make them serve the better.*

Matrices are sometimes either through a careless, or sometimes through an unlucky stroak or two of the *File* made too thin. And sometimes the *Foot* of the *Matrice* is too much taken away, and the *Letter* by that

that means stands too high in *Line*: And sometimes the *Face* of the *Matrices* is too much taken away; So that the Letter will not stand *High enough against Paper*.

To remedy all or any part of these inconveniencies, *Founders* are forced to make *Botches* on the *Matrice*: As first, If the *Matrice* be too thin on the right or left side, or both; They prick up that side, by laying the *Matrice* flat on the *Work-Bench*, with the thin side upwards, and holding the point of a *Punch-Graver* aslope upon the thin side, with an *Hammer* drive the point into the thin side of the *Matrice*, and so raise a *Bur* upon that side; which *Bur* (though it thicken not the *Matrice*, yet it) makes the side of the *Matrice* stand off the *Register*, and consequently is equivalent to thickning it.

The higher this *Bur* is raised, the better is the *Matrice Botcht*; because the thin fine points thus raised (if not pretty well flatted into the Substance of the *Bur*) will quickly either wear off by the pressure of the *Register* against them, or else flatten into the *Body* of the *Bur*, and both ways makes the *Matrice* again too thin.

Sometimes they do not *Botch* the *Matrice* thus for this fault; but only Paste a piece of Paper, or a Card, (according as it may want thickness) against the thin side of the *Matrice* and so thicken it.

But to mend the sides I use another Expedient, *viz.* by Soldering a piece of *Plate-Brass* against its thin side or sides, which is much better than *Botching* it.

Second-

Secondly, If the *Matrice* be filed away too much at the *Foot*, they knock it up with the *Pen* of the *Hammer*; and stretch it between the *Foot* and the *Orifice* of the *Matrice*, and then *Justifie* it again in *Line*. Or a piece may be *Soldered* under the *Foot*.

Thirdly, If the *Face* of the *Matrice* be too much taken away, and either the *Punch* spoiled or the *Notch* in the back of the *Matrice* made so, as it cannot be *Sunken* deeper, they raise a *Bur* on the *Face*, as they did on the thin sides, to keep the *Matrice* off the *Carriages* and *Bodies* which Lengthens the height of the Letter *against Paper* so much as is the height of the raised *Bur*. But of all the *Botches* this is the worst, because the *Beard* lies now nearer the *Face*: And the hollow standing off of the *Face* of the *Matrice* from the *Carriages* and *Bodies*, subjects the *Mettal* to run between them, and so pesters the *Workman* to get the Letter out of the *Mold* and *Matrice*.

Sect. XVIII, Of setting up the Furnance.

HAVING *Justified* the *Mold* and *Matrice*, we come now to *Casting of Letters*: But yet we have neither *Furnance*, *Mettal*, or *Ladle*. Wherefore it is the *Founders* care, first to provide these.

The *Furnance* I have described in Plate 20. It is built of *Brick* upright, with four square sides and a *Stone* on the top, in which *Stone* is a wide round hole for the *Pan* to stand in.

a b c d The

a b c d The square Stone at the top, covering the whole *Furnance*. This is indeed the *Furnance*.

a d, b c The breadth two Foot and one Inch.

a b, c d The Length two Foot three Inches. Into the Breadth and Length about the whole Stone, is let in even with the top of the Stone a square *Iron Band* two Inches deep, and a quarter and half quarter of an Inch thick to preserve the Edges of the Stone from battering.

e The round hole the *Pan* stands in, which hath an *Iron Plate* let into it eight Inches diameter, an Inch and half broad and one quarter of an Inch thick.

This *Iron-Plate* fits the *inside* of the *Hole* so far as it is Circular, and consequently is a *Segment* of a *Circle*. But where the *Smoak-vent* breaks off the Circularity of the Stone, there ends this Plate of *Iron*, that the *Smoak* may have the freer vent. Its Office also is to preserve the Edge of the *Hole* from battering, with the oft taking out and putting in the *Iron Pan*.

f The *Funnel* seven Inches high, and five Inches wide.

g The *Stoke-Hole* four Inches wide, and six Inches long.

h h The height of the *Furnance* two Foot ten Inches.

i The *Air-Hole* just underneath the *Hearth* to let in Air that the Fire may burn the freer.

k The *Ash-Hole* where the Ashes that fall from the *Hearth* are taken away.

l m n o The

l m n o The *Bench* two Foot broad, three Foot long, and two Foot eight Inches high. The *Bench* is to empty the Letters out of the *Mold* upon, as the *Founder Casts* them.

The *Hearth* lies seven Inches below the top of the round *Hole*, and hath under it another round *Iron-Ring* of the same demensions with the first, on which straight *Iron-Bars* are fastened that the *Fire* is laid on.

In the round *Iron-Ring* (or rather Segment) on the top of the *Furnance* is set the *Pan*, which is either a *Plate Ladle*, or a small *Cast-Iron Kettle* that sinks into it within two Inches of the *Brim*s of the *Pan*.

¶ 2. Of making Mettal.

The *Mettal Founders* make *Printing Letters* of, is *Lead* hardned with *Iron*: Thus they chuse *stub-Nails* for the best *Iron* to Melt, as well because they are assured *stub-Nails* are made of good soft and tough *Iron*, as because (they being in small pieces of *Iron*) will Melt the sooner.

To make the *Iron Run*, they mingle an equal weight of *Antimony* (beaten in an *Iron-Morter* into small pieces) and *stub-Nails* together. And preparing so many Earthen forty or fifty pounds *Melting-Pots* (made for that purpose to endure the *Fire*) as they intend to use: They *Charge* these Pots with the mingled *Iron* and *Antimony* as full as they will hold.

Every

Every time they Melt *Mettal*, they build a new *Furnance* to melt it in: This *Furnance* is called an *Open Furnance*; because the Air blows in through all its sides to Fan the *Fire*: They make it of Bricks in a broad open place, as well because the Air may have free access to all its sides, as that the Vapours of the *Antimony* (which are Obnoxious) may the less offend those that officiate at the *Making* the *Mettal*: And also because the Violent Fire made in the *Furnance* should not endanger the Firing any adjacent Houses.

They consider before they make the *Furnance* how many Pots of *Mettal* they intend to Melt, and make the *Furnance* fizable to that number: We will suppose *five Pots*. Therefore they first make a Circle on the Ground capable to hold these five *Pots*, and wider yet by three or four Inches round about: Then within this Circle they lay a Course of Bricks close to one another to fill the Plain of that Platform, with their broad or flat sides downwards, and their ends all one way, and on this Course of Bricks they lay another Course of Bricks as before, only the Lengths of this Course of Bricks lies athwart the Breadths of the other Course of Bricks: Then they lay a third Course of Bricks with their lengths cross the Breadth of the second Course of Bricks.

Having thus raised a Platform, they place these five *Pots* in the middle of it close to one another, and then on the Foundation or Plat-form raise the *Furnance* round about by laying the Bricks of the first *Lay* end to end and flat, close to one another:

On

On the second *Lay*, they place the middle of a Brick over a *Joynt* (as *Brick-layers* call it) that is where the ends of two Bricks joyn together, and so again lay Bricks end to end till they *Trim* round the *Platform*. Then they lay a third *Lay* of Bricks, covering the *Joynts* of the second *Lay* of Bricks as before: So is the Foundation finisht.

Then they raise the Walls to the *Furnance* on this Foundation; But do not lay the ends of their Bricks close together. But lay the ends of each Brick about three Inches off each other, to serve for *Wind-holes* till they *Trim* round about: Then they lay another *Lay* of Briks leaving other such *Wind-holes* over the middle of the last *Lay* of Bricks, and so *Trim* as they work round either with half Bricks or Bats that the *Wind-holes* of the last *Lay* may be covered: And in this manner and order they lay so many *Lays* till the Walls of the *Furnance* be raised about three Bricks higher than the *Mouths* of the *Melting-Pots*, still observing to leave such *Wind-holes* over the middle of every Brick that lies under each *Lay*.

Then they fill the sides of the *Furnance* round about the *Melting-Pots*, and over them with *Char-coal*, and *Fire* it at several *Wind-holes* in the bottom till it burn up and all over the *Furnance*, which a moderate Wind in about an Hours time will do: And about half an Hours time after they lay their Ears near the Ground and listen to hear a *Bubling* in the *Pots*; and this they do so often till they do hear it. When they hear this *Bubling*, they conclude the *Iron* is melted: But yet they will let it stand, perhaps half an hour longer or more, according as they guess the
the

the Fire to be Hotter or Cooler, that they may be the more assured it is all thoroughly Melted. And when it is Melted the Melting *Pot* will not be a quarter full.

And in or against that time they make another small *Furnance* close to the first, (to set an *Iron Pot* in, in which they Melt *Lead*) on that side from whence the Wind blows; Because the Person that Lades the *Lead* out of the *Iron-Pot* (as shall be shewed by and by) may be the less annoyed with the Fumes of the *Mettal*, in both *Furnances*. This *Furnance* is made of three or four *Course* of Bricks open to the windward, and wide enough to contain the designed *Iron Pot*, with room between it and the sides to hold a convenient quantity of *Charcoal* under it, and about it.

Into this *Iron-Pot* they put for every three Pound of *Iron*, about five and twenty pounds of *Lead*. And setting Fire to the *Coals* in this little *Furnance* they Melt and Heat this *Lead* Red-hot.

Hitherto a Man (nay, a Boy) might officiate all this Work; But now comes Labour would make *Hercules* sweat. Now they fall to pulling down so much of the side of the open *Furnance* as stands above the Mouth of that *Melting-Pot* next the *Iron-Pot*, And having a thick strong *Iron Ladle*, whose *Handle* is about two Yards long, and the *Ladle* big enough to hold about ten Pounds of *Lead*, and this *Ladle* Red-hot that it chill not the *Mettal*, they now I say with this *Ladle* fall to clearing this first *Melting-Pot* of all the *Coals* or filth that lie on the top of the Melted *Mettal*: while another Man at the same time stand

stands provided with a long strong round *Iron Stirring Pot*; the *Handle* of which *Stirring Pot* is also about two Yards long or more, and the *Pot* itself almost twice the length of the depth of the *Melting Pot*. This *Pot* is nothing but a piece of the same *Iron* turned to a square with the *Handle*: And this *Pot* is also in a readiness heated Red-hot.

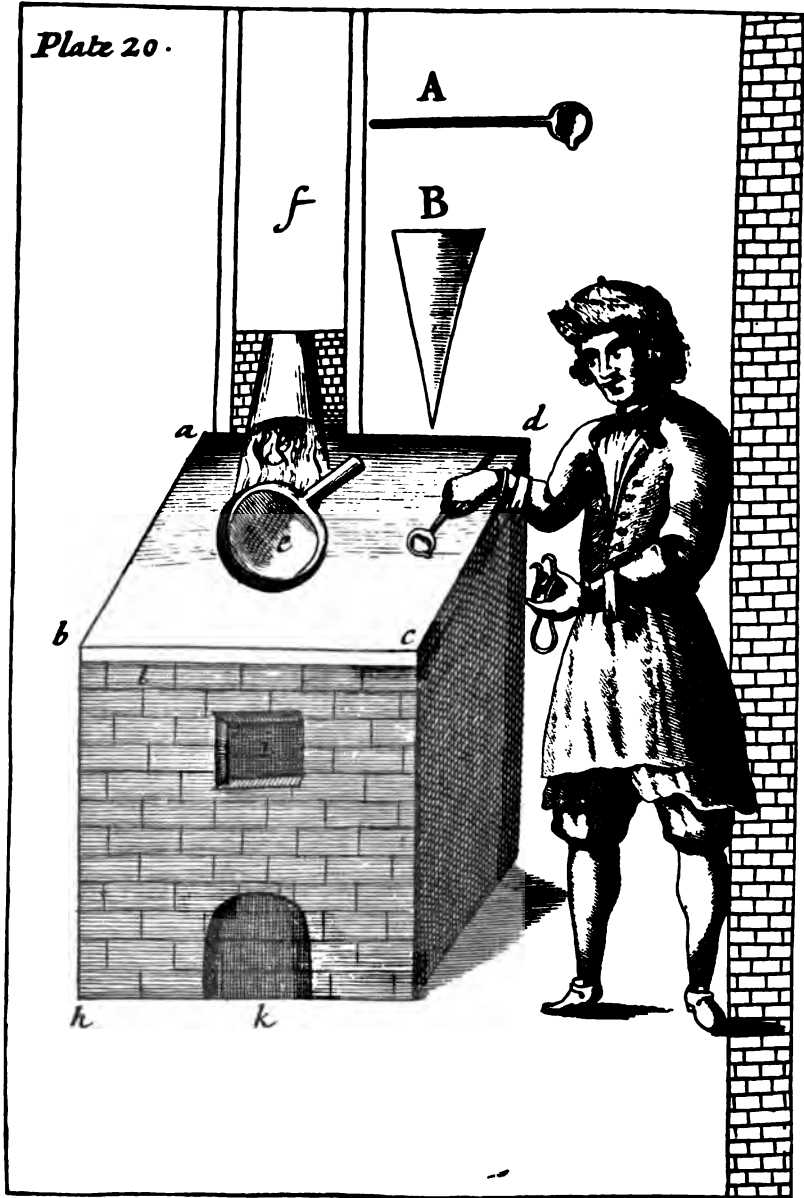
Now one Man with the *Ladle Lades* the *Lead* out of the *Iron-Pot* into the *Melting Pot*, while the other Man with the *Pot* stirs and Labours the *Lead* and *Mettal* in the *Melting Pot* together till they think the *Lead* and *Mettal* in the *Melting Pot* be well incorporated: And thus they continue *Lading* and *Stirring* till they have near filled the *Melting Pot*.

Then they go to another next *Melting-Pot*, and successively to all, and Lade and stir *Lead* into them as they did into the first. Which done the *Mettal* is made: And they pull down the *Walls* of the *Open Furnance*, and rake away the Fire that the *Mettal* may cool in the *Pots*.

Now (according to Custom) is Half a Pint of Sack mingled with Sallad Oyl, provided for each Workman to Drink; intended for an Antidote against the Poysonous Fumes of the *Antimony*, and to restore the Spirits that so Violent a Fire and Hard Labour may have exhausted.

¶ 3. Of

Plate 20.



¶ 3. *Of Letter-Ladles.*

Letter-Ladles differ nothing from other common *Ladles*, save in the size: Yet I have given you a Draft of one in Plate 20 at A. Of these the *Caster* has many at Hand, and many of several sizes that he may successively chuse one to fit the several sizes of *Letters* he has to *Cast*; as well in *Bodies* as in *Thicknesses*.

§ XIX. ¶ 1. *Of Casting, Breaking, Rubbing, Kerning, and setting up of Letters.*

BEfore the *Caster* begins to *Cast* he must kindle his *Fire* in the *Furnance*, to *Melt* the *Mettal* in the *Pan*. Therefore he takes the *Pan* out of the Hole in the Stone, and there lays in *Coals* and kindles them. And when it is well kindled, he sets the *Pan* in again, and puts *Mettal* into it to *Melt*. If it be a small *Bodied-Letter* he *Cast*s, or a thin *Letter* of Great *Bodies*, his *Mettal* must be very hot; nay, sometimes Red-hot to make the *Letter Come*. Then having chose a *Ladle* that will hold about so much as the *Letter* and *Break* is, he lays it at the *Stoking-hole*, where the Flame bursts out to heat. Then he ties a thin *Leather* cut into such a Figure as is described in Plate 20 at B with its narrow end against the *Face* to the *Leather-Groove* of the *Matrice*, by whipping a *Brown Thred* twice about the *Leather-Groove*, and fastning the *Thred* with a *Knot*. Then he puts both Halves of the *Mold* together, and puts the
the

the *Matrice* into the *Matrice Cheek*, and places the *Foot* of the *Matrice* on the *Stool* of the *Mold*, and the broad end of the *Leather* upon the *Wood* of the upper half of the *Mold*, but not tight up, left it might hinder the *Foot* of the *Matrice* from *Sinking* close down upon the *Stool* in a train of Work. Then laying a little *Rofin* on the upper *Wood* of the *Mold*, and having his *Cafting Ladle* hot, he with the bol-ling fide of it Melts the *Rofin*; And when it is yet *Melted* preffes the broad end of the *Leather* hard down on the *Wood*, and fo fastens it to the *Wood*. All this is Preparation.

Now he comes to *Cafting*. Wherefore placing the under-half of the *Mold* in his left hand, with the *Hook* or *Hag* forward, he clutches the ends of its *Wood* between the lower part of the *Ball* of his Thumb and his three hind-Fingers. Then he lays the upper half the *Mold* upon the under half, fo as the *Male-Gages* may fall into the *Female-Gages*, and at the fame time the *Foot* of the *Matrice* place it felf upon the *Stool*. And clafping his left-hand Thumb ftrong over the upper half of the *Mold*, he nimbly catches hold of the *Bow* or *Spring* with his right-hand Fingers at the top of it, and his Thumb under it, and places the point of it againft the middle of the *Notch* in the backfide of the *Matrice*, preffing it as well forwards towards the *Mold*, as downwards by the *Sholder* of the *Notch* close upon the *Stool*, while at the fame time with his hinder-Fingers as aforefaid, he draws the under-half of the *Mold* towards the *Ball* of his Thumb, and thrufts by the *Ball* of his Thumb the upper part towards his Fingers,

gers, that both the *Registers* of the *Mold* may press against both sides of the *Matrice*, and his Thumb and Fingers press both Halves of the *Mold* close together.

Then he takes the Handle of his *Ladle* in his right Hand, and with the *Boll* of it gives a stroak two or three outwards upon the *Surface* of the *Melted Mettal* to scum or clear it from the Film or Dust that may swim upon it. Then takes up the *Ladle* full of *Mettal*, and having his *Mold* as aforesaid in his left hand, he a little twists the left-side of his *Body* from the *Furnance*, and brings the *Geat* of his *Ladle* (full of *Mettal*) to the *Mouth* of the *Mold*, and twists the upper part of his right-hand towards him to turn the *Mettal* into it, while at the same moment of Time he Jilts the *Mold* in his left hand forwards to receive the *Mettal* with a strong *Shake* (as it is call'd) not only into the *Bodies* of the *Mold*, but while the *Mettal* is yet hot, running swift and strongly into the very *Face* of the *Matrice* to receive its perfect Form there, as well as in the *Shanck*.

Then he takes the upper half of the *Mold* off the under half, by placing his right-Hand Thumb on the end of the *Wood* next his left-Hand Thumb, and his two middle Fingers at the other end of the *Wood*, and finding the Letter and *Break* lie in the under-Half of the *Mold* (as most commonly by reason of its weight it does) he throws or tosses the Letter *Break* and all upon a Sheet of Waste Paper laid for that purpose on the *Bench* just a little beyond his left-hand, and is then ready to *Cast* another Letter as before,

fore, and alfo the whole number that is to be *Caft* with that *Matrice*.

But fometimes it happens that by a *Shake*, or too big a *Ladle*, the *Mettal* may spill or flabber over the *Mouth* of the upper Half of the *Mold*, fo that the fpilt *Mettal* fticking about the out-fides of the *Mouth*, may lift the Letter off the under half of the *Mold*, and keep it in the upper half. Therefore he with the point of the *Hag* in the Wood of the under half of the *Mold*, picks at the hollow in the fore part of the *Break* made by the *Shaking* out of the *Mettal*, and draws *Break* and *Letter* both out. It fometimes fticks in the under Half of the *Mold* by the fame caufe, and then he uſes the point of the *Hag* in the upper half of the *Mold*, to pick or hale it out, as before.

It alfo fometimes fticks when any of the Joynts of the *Mold* open never fo little, the *Mettal* thus getting in between thoſe Joynts: But this fault is not to be indured, for before he can *Caft* any more, this fault muſt be mended.

But beſides *Letters*, there is to be *Caft* for a perfect *Fount* (properly a *Fund*) *Spaces* Thick and Thin, n *Quadrats*, m *Quadrats* and *Quadrats*. Theſe are not *Caft* with *Matrices* but with *Stops* (as we may call them) Becauſe when theſe are *Caft* they are all ſhorter than the *Shanck* of the Letter, that they may not *Print*. Therefore they take off the *Register* of the under-Half *Mold*, and fit a piece of *Plate-Brafs* about a *Brevier* Thick and a *Brevier* longer than to reach to the edge of the *Body* in the place of the *Register*, and drill a hole in this *Plate-Brafs* right againſt the

the Hole in the *Carriage* that the *Female-Screw* lies in: This Hole is made so wide that the *Male-Screw* which screwed the *Register* close to the *Carriage* and *Body* may enter in at it, and screw this *Plate-Brass* close to them, as it did the *Register*: Then they make a mark with the point of a *Needle* on the *Plate-Brass* just against the side of the Edge of the *Body*, and at this mark they double down the end of the *Plate-Brass* inwards to make a perfect *Square* with the *inside* of the whole *Plate*. This doubling down is called the *Stop* aforesaid, and must be made just so thick as they design the *Thin* or *Thick Space* to be, and must have its *Upper* and *Under-Edges* filed so exactly to the *Body*, that it may lie close upon the *Under-Carriage*, and just even so high as the upper-side of the *Body*. So that when the *Upper-half* of the *Mold* is placed on the *under-Half*, and *Mettal Cast* in at the *Mouth* (as before) the *Mettal* shall descend no deeper between the two *Bodies* then just to his *Stop*: You must note that this *Stop* must be filed exactly true as to *Body* and *Thickness*: For if it be never so little too big in *Body*, the *Carriage* of the *Mold* will ride upon it and make the *Body* of the *Space* bigger. Or if the *Body* be never so little too little, the *Hot Mettal* will run beyond the *Stop*; both which *Miscarriages* in making the *Stop*, spoil the *Space*.

If the *Space* be too short, they *File* the end of the *Stop* shorter.

This *Brevier* thick *Plate* will be thick enough for *Stops* for the *Thin* or *Thick Spaces* of any *Body* though of *Great-Cannon*, and for the *n* *Quadrat Stop*
of

of any Body under a *Great Primmer*. And for the m *Quadrat Stop* of all to a *Brevier* and all Bodies under it. But for *Stops* that require to be Thicker then a *Brevier*, instead of doubling the *Stop* inwards on the *Plate*, I *Solder* on the in-side of that end of the *Plate* a *Stop* full big enough in Body, and big enough in Thickness for the *Quadrat* I intend to make, and afterwards file and fit the *Stop* exactly as before.

When they *Cast* these *Spaces* or *Quadrats*, this *Stop* is always screwed fast upon the *Carriage* of the under-Half *Mold* as aforesaid. So that they only fit the upper half *Mold* on the under, and *Cast* their Number almost twice as quick as they do the Letters in *Matrices*.

It is generally observed by *Work-men* as a Rule, That when they *Cast Quadrats* they *Cast* them exactly to the Thickness of a set Number of m's or *Body*, viz. two m's thick, three m's thick, four m's thick, &c. And therefore the *Stops* aforesaid must all be filed exactly to their several intended thicknesses, The reason is, that when the *Compositer* Indents any Number of Lines, he may have *Quadrats* so exactly *Cast* that he shall not need to *Justifie* them either with *Spaces* or other helps.

¶ 2. *Some Rules and Circumstances to be observed in Casting.*

1. If the Letter be a small *Body*, it requires a Harder *Shake* than a great *Body* does: Or if it be a thin Letter though of a greater *Body*, especially
small

small *i*, being a thin Letter its Tittle will hardly *Come*; So that sometimes the *Caster* is forced to put a little *Block-Tin* into his Mettal, which makes the Mettal Thinner, and consequently have a freer flux to the *Face* of the *Matrice*.

2. He often examines the *Registers* of the *Mold*, by often *Rubbing* a *Cast* Letter: For notwithstanding the *Registers* were carefully *Justified* before, and hard screwed up; yet the constant thrusting of both *Registers* against the sides of the *Matrice*, may and often do force them more or less to drive backwards. Or a fall of one half or both Halfs of the *Mold*, may drive them backwards or forwards: Therefore he examinns, as I said, how they *Rub*, whether too Thick or too Thin. And if he see Cause, mends the *Registers*, as I shew'd § 5. ¶ 2.

Or if the *Matrice* be *Botcht*, as I shew'd you § 5. ¶ 3. then those *Botches* (being only so many fine points rising out of the Body of the *Copper* of the *Matrice*) may with so many reiterated pressures of the *Registers* against them, flatten more and more, and press towards the Body of the *Matrice*, and consequently make the Letter Thinner: Which if it do, this must be mended in the *Matrice* by re-raising it to its due Thickness.

3. He pretty often examinns, as I shew'd in § 5. ¶ 2. how the Letters stand in *Line*: For when great Numbers are *Cast* with one *Matrice*, partly by pressing the point of the *Wyer* against the *Bottom-Shoulder* of the *Notch* in the back-side of the *Matrice*, and partly by the softness of the matter of his *Matrice* and hardness of the *Iron-stool*, the *Foot* of the *Matrice* (if
it

it wear not) may batter fo much as to put the Letter out of Line. This muft be mended with a *Botch*, viz. by knocking up the *Foot* of the *Matrice*, as I fhew'd § 5. ¶ 3.

A Work-man will *Caft* about four thousand of thefe Letters ordinarily in one day.

¶ 3. *Of Breaking off Letters.*

Breaking off is commonly Boys-work: It is only to *Break* the *Break* from the *Shanck* of the *Letter*. All the care in it is, that he take up the *Letter* by its *Thicknefs*, not its *Body* (unlefs its *Thicknefs* be equal to its *Body*) with the fore *Finger* and *Thumb* of his right *Hand* as clofe to the *Break* as he can, left if when the *Break* be between the fore-*Finger* and *Thumb* of his left *Hand*, the force of *Breaking off* the *Break* fhould bow the *Shanck* of the *Letter*.

¶ 4. *Of Rubbing of Letters.*

Rubbing of Letters is alfo moft commonly Boys-work: But when they do it, they provide *Finger-ftalls* for the two fore-*Fingers* of the right-*Hand*: For elfe the *Skin* of their *Fingers* would quickly rub off with the fharp greet of the *Stone*. Thefe *Finger-ftalls* are made of old *Ball-Leather* or *Pelts* that *Printers* have done with: Then having an heap of one fort of *Letters* lying upon the *Stone* before them, with the left-*Hand* they pick up the *Letter* to be *Rub'd*, and lay it down in the *Rubbing* place with
one

one of its sides upwards they clap the Balls of the fore-Finger and middle-Finger upon the fore and hinder-ends of the *Letter*, and *Rubbing* the *Letter* pretty lightly backwards about eight or nine Inches, they bring it forwards again with an hard pressing *Rub* upon the *Stone*; where the fore-Finger and Thumb of the left-Hand is ready to receive it, and quickly turn the opposite side of the *Letter*, to take such a *Rub* as the other side had.

But in *Rubbing* they are very careful that they press the Balls of their Fingers equally hard on the *Head* and *Foot* of the *Letter*. For if the *Head* and *Foot* be not equally prest on the *Stone*, either the *Head* or *Foot* will *Drive out* when the *Letters* come to be *Composed* in the *Stick*; So that without *Rubbing* over again they cannot be *Drest*.

¶ 5. *Of Kerning of Letters.*

Amongst the *Italick-Letters* many are to be *Kern'd*, some only on one side, and some both sides. The *Kern'd-Letters* are such as have part of their *Face* hanging over one side or both sides of their *Shanck*: These cannot be *Rub'd*, because part of the *Face* would *Rub* away when the whole side of the *Shanck* is toucht by the *Stone*: Therefore they must be *Kern'd*, as *Founders* call it: Which to do, they provide a small *Stick* bigger or less, according as the *Body* of the *Letter* that is to be *Kern'd*. This *Kerning-stick* is somewhat more than an *Handful* long, and it matters not whether it be square or round: But if it be square the *Edges* of it must be pretty

ty well rounded away, left with long uſage and hard Cutting they Gall the Hand. The upper ſide of this *Kerning-Stick* is flattened away ſomewhat more than the length of the *Letter*, and on that flat part is cut away a flat bottom with two ſquare ſides like the *Sides* or *Ledges* of the *Lining-ftick* to ſerve for two *Sholders*. That ſide to be *Kern'd* and *ſcrap'd*, is laid upwards, and its oppoſite ſide on the bottom of the *Kerning-ftick* with the *Foot* of the *Letter* againſt the bottom *Sholder*, and the ſide of the *Letter* againſt the ſide *Sholder* of the *Kerning-ftick*.

He alſo provides a *Kerning-Knife*: This is a pretty ſtrong piece of a broken Knife, about three Inches long, which he fits into a Wooden-Handle: But firſt he breaks off the Back of the Knife towards the Point, ſo as the whole edge lying in a ſtraight-line the piece broken off from the back to the edge may leave an angle at the point of about 45 Degrees, which irregular breaking (for ſo we muſt ſuppoſe it) he either *Grinds* or *Rubs* off on a *Grind-ftone*. Then he takes a piece of a Broom-ftick for his Handle, and ſplits one end of it about two Inches long towards the other end, and the ſplit part he either Cuts or Raſps away about a *Brevier* deep round about that end of the Handle. Then he puts about an Inch and an half of his broken blade into the ſplit or ſlit in the Handle, and ties a four or five doubled Paper a little below the Raſped part of the Handle round about it, to either a *Pica* or *Long-Primmer* thick of the ſlit end of the Handle. This *Paper* is ſo ordered that all its ſides round about ſhall ſtand equally diſtant from all the

the

the Rasped part of the Handle: For then setting the other end of the Handle in Clay, or otherwise fastening it upright, when *Mettal* is poured in between the Rasped part of the Handle and the Paper about it, that *Mettal* will make a strong *Ferril* to the *Handle* of the *Knife*. The irregularities that may happen in *Castting* this *Ferril* may be Rasped away to make it more handy and Handsome.

Now to return again where I left off. Holding the Handle of the *Kerning-stick* in his left-Hand, He lays the side of the *Letter* to be *Kern'd* upwards with the *Face* of the *Letter* towards the end of the *Kerning-stick*: the side of the *Letter* against the side *Sholder* of the *Kerning-stick*, and the *Foot* of the *Letter* against the bottom *Sholder* of the *Kerning-stick*, and laying the end of the Ball of his left-Hand Thumb hard upon the *Shanck* of the *Letter* to keep its *Side* and *Foot* steady against the *Sholders* of the *Kerning-stick*, he with the *Kerning-Knife* in his right-Hand cuts off about one quarter of the *Mettal* between the *Beard* of the *Shanck* and the *Face* of the *Letter*. Then turning his *Knife* so as the back of it may lean towards him, he scrapes towards him with the edge of the *Knife* about half the length of that upper-side, *viz.* about so much as his Thumb does not cover: Then he turns the *Face* of the *Letter* against the lower *Sholder* of the *Kerning-stick*, and scraping fromwards him with a stroak or two of his *Knife* smoothes that end of the *Letter* also.

If the other side of the *Letter* be not to be *Kern'd*
it

it was before *Rub'd* on the *Stone*, as was shewed in the last ¶: But if it be to be *Kern'd*, then he makes a little hole in his *Kerning-stick*, close to the lower *Sholder* of it and full deep enough to receive all that part of the *Face* of the *Letter* that hangs over the *Shanck*, that the *Shanck* of the *Letter* may lie flat and solid on the bottom of the *Kerning-stick*, and that so the *Shanck* of the *Letter* bow not when the weight of the *Hand* presses the edge of the *Kerning-Knife* hard upon it. Into this hole he puts (as before said) so much of the *Face* of the *Letter* as hangs over the side of the *Shanck*, and so scrapes the lower end of the *Letter* and *Kerns* the upper end, as he did the former side of the *Letter*.

¶ 6. Of Setting up, or Composing Letters.

I described in § 5. ¶ 2. the *Lining-stick*, But now we are come to *Setting up*, or *Composing* of *Letters*. The *Founder* must provide many *Composing-sticks*; five or six dozen at the least. These *Composing-sticks* are indeed but long *Lining-sticks*, about seven or eight and twenty Inches long *Handle* and all: Whereof the *Handle* is about three Inches and an half long: But as the *Lining-stick* I described was made of *Brass*: So these *Composing-sticks* are made of *Beech-Wood*.

When the *Boy Sets up Letters* (for it is commonly *Boys Work*) The *Caster Casts* about an hundred *Quadrats* of the same *Body* about half an Inch broad at least, let the *Body* be what it will, and of the

the length of the whole *Carriage*, only by placing a flat *Brass* or *Iron Plate* upon the *Stool* of the *Mold* close against the *Carriage* and *Body*, to stop the *Mettal* from running farther.

The Boy (I say) takes the *Composing-stick* by the *Handle* in his left-Hand, clasping it about with his four Fingers, and puts the *Quadrat* first into the *Composing-stick*, and lays the Ball of his Thumb upon it, and with the fore-Finger and Thumb of his right-Hand, assisted by his middle Finger to turn the *Letter* to a proper position, with its *Nick* upwards towards the bottom side of the *Composing-stick*; while it is coming to the *Stick*, he at the same time lifts up the Thumb of his left-Hand, and with it receives and holds the *Letter* against the fore-side of the *Quadrat*, and after it, all the *Letters* of the same sort, if the *Stick* will hold them, If not he *Sets* them in so many *Sticks* as will hold them: Observing to *Set* all the *Nicks* of them upwards, as aforesaid. And as he *Set* a *Quadrat* at the beginning of the *Composing-stick*, so he fills not his *Stick* so full, but that he may *Set* another such *Quadrat* at the end of it.

¶ 7. *Some Rules and Circumstances to be observed in Setting up Letters.*

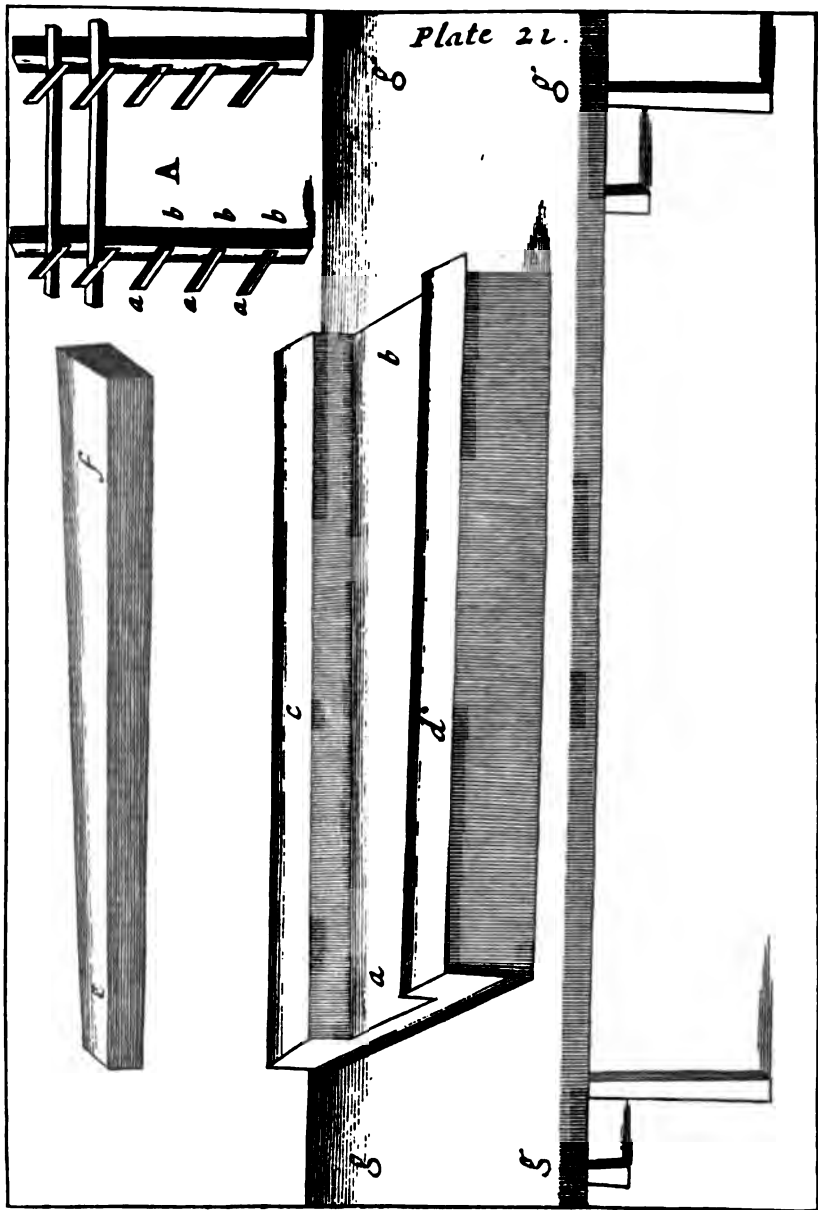
1. If they *Drive* a little out at *Head* or *Foot*, so little as not to require new *Rubbing* again, then he holds his Thumb harder against the *Head* or *Foot*, so as to draw the *Driving* end inward: For else when they come to *Scraping*, and *Dressing* the *Hook* of the
Dres-

Dressing-Hook drawing Square, will endanger the middle or some other part of *Letters* in the *Stick* to *Spring* out: And when they come into the *Dressing-block*, the *Knots* of the *Blocks* drawing also square subject them to the same inconvenience. And if they *Drive* out at the *Head*, the *Feet* will more or less stand off one another: So that when the *Tooth* of the *Plow* comes to *Dress* the *Feet*, it will more or less job against every *Letter*, and be apt to make a bowing at the *Feet*, or at least make a *Bur* on their sides at the *Feet*.

2. When *Short-Letters* are begun to be *Set* up in a *Stick*, the whole *Stick* must be fill'd with *Short-Letters*: Because when they are *Dressing*, the *Short Letters* must be *Bearded* on both sides the *Body*: And should *Short-Letters* or *Ascending* or *Descending* or *Long* stand together, the *Short* cannot be *Bearded* because the *Stems* of the *Ascending* or *Descending* or *Long-Letters* reach upon the *Body* to the *Beard*: So that the *Short-Letters* cannot be *Bearded*, unless the *Stems* of the other *Letters* should be scraped off.

3. When *Long-Letters* are begun to be *Set* up in the *Stick*, none but such must fill it, for the reason aforesaid.

4. If any *Letters Kern'd* on one side be to be *Set* up, and the *Stems* of the same *Letters* reach not to the opposite *Beard* as *f* or *f*, in *Setting* up these or such like *Letters*, every next *Letter* is turned with its *Nick* downwards, that the *Kern* of each *Letter* may lie over the *Beard* of its next. But then they must be all *Set* up again with a *Short-Letter*



Letter between each, that they may be *Bearded*.

As every *Stick-full* is set up, he sets them by upon the *Racks*, ready for the *Dresser* to *Dress*, as shall be shewed in the next §.

The *Racks* are described in *Plate 21.* at A. They are made of Square *Deal Battens* about seven Inches and an half long, as at *a b a b a b*, and are at the ends *b b b* let into two upright *Stiles*, standing about sixteen Inches and an half assunder, and the fore-ends of the *Racks* mounting a little, that when *Sticks* of *Letters* is *Set* by on any two parallel *Racks*, there may be no danger that the *Letters* in them shall slide off forward; but their *Feet* rest against the *Bottom-Ledges* of the *Composing-sticks*. They set by as many of these *Sticks* with *Letter* in them, as will stand upon one another between every two *Rails*, and then set another pile of *Sticks* with *Letter* in them before the first, till the length of the *Rail* be also filled with *Sticks* of *Letter* before one another. They set all the *Sticks* of *Letters* with their ends even to one another with the *Faces* of the *Letter* forwards.

This *Frame of Racks* is always placed near the *Dressing-Bench*, that it may stand convenient to the *Letter-Dressers* Hand.

§ 20. ¶ I. *Of Dressing of Letters.*

THERE be several Tools and Machines used to the *Dressing of Letters*: And unless I should describe them to you first, you might perhaps in my following discourse not well understand
me:

me: Wherefore I shall begin with them: They are as follows.

1. The *Dressing-Sticks*.
2. The *Bench, Blocks* and its Appurtenances.
3. The *Dressing-Hook*.
4. The *Dressing-Knife*.
5. The *Plow*.
6. The *Mallet*.

Of each of these in order.

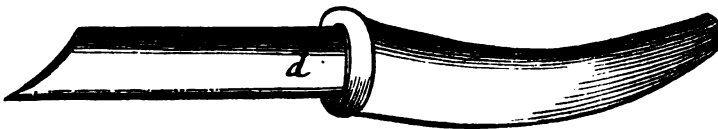
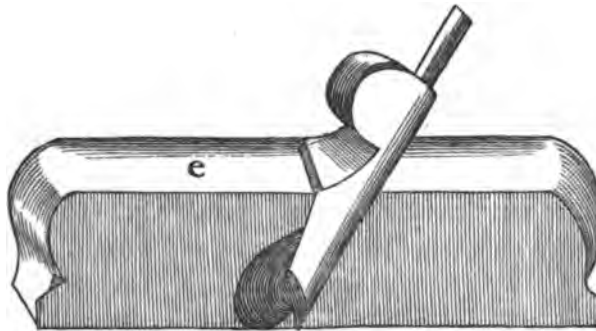
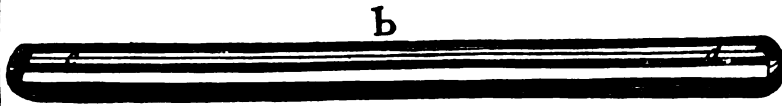
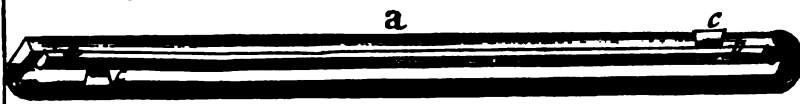
¶ 2. *Of the Dressing-Sticks.*

I need give no other Description of the *Dressing-sticks*, than I did in the last § and ¶ of the *Composing-Sticks*: Only they are made of hard Wood, and of greater Substance, as well because hard Wood will work smoother than soft Wood, as because greater Substance is less Subject to warp or shake than smaller Substance is. And also because hard Wood is less Subject to be penetrated by the sharpness of the *Bur* of the *Mettal* on the *Letters* than the soft.

¶ 3. *Of the Block-Grove, and its Appurtenances.*

The *Block-Grove* is described in *Plate 21. a b* The *Groove* in which the *Blocks* are laid, two Inches deep, and seven Inches and an half wide at one end, and seven Inches wide at the other end: One of the *Cheeks* as *c* is three Inches and an half broad at one end, and three Inches broad at the other end, and the other *Cheek* three Inches broad the whole
Length

Plate 22.



Length: The Length of these *Cheeks* are two and twenty Inches.

The *Wedge e f* is seven and twenty Inches and an half long, two Inches broad at one end, and three Inches and an half broad at the other end; And two Inches deep.

g g g g The *Bench* on which the *Dressing-Blocks* are placed, are about sixteen Inches broad, and two Foot ten Inches high from the Floor. • The *Bench* hath its farther Side, and both ends, railed about with slit Deal about two Inches high, that the *Hook*, the *Knife*, and *Plow*, &c. fall not off when the Work-man is at Work.

The *Blocks* are described in *Plate 21* at *a b*: They are made of hard Wood. These *Blocks* are six and twenty Inches long, and each two Inches square. They are *Male* and *Female*, *a* the *Male*, *b* the *Female*: Through the whole Length of the *Male-Block* runs a *Tongue* as at *a b*, and a *Groove* as at *c d*, for the *Tongue* of the *Plow* to run in; This *Tongue* is about half an Inch thick, and stands out square from the upper and under sides of the *Block*. About three Inches within the ends of the *Block* is placed a *Knot* as at *c c*: These *Knots* are small square pieces of *Box-wood*, the one above, and the other below the *Tongue*.

The *Female Block* is such another *Block* as the *Male Block*, only, instead of a *Tongue* running through the length of it a *Groove* is made to receive the *Tongue* of the *Male-Block*, and the *Knots* in this *Block* are made at the contrary ends, that when the *Face* of a *Stick of Letter* is placed on the
Tongue

Tongue the *Knot* in the *Male-Block* stops the *Stick* of *Letter* from sliding forwards, while the other *Knot* in the *Female-Block* at the other end, by the knocking of a *Mallet* on the end of the *Block* forces the *Letter* between the *Blocks* forwards, and so the whole *Stick* of *Letters* between these two *Knots* are screwzed together, and by the *Wedge e f* in *Plate 21* (also with the force of a *Mallet*) *Wedges* the two *Blocks* and the *Stick* of *Letter* in them also tight, and close between the sides of the two *Blocks*; that afterwards the *Plow* may more certainly do its Office upon the *Foot* of the *Letter*; as shall be shewed hereafter.

¶ 3 *Of the Dressing-Hook.*

The *Dressing-Hook* is described in *Plate 21* at *c*. This is a long square *Rod* of *Iron*, about two Foot long and a *Great-Primmer* square: Its end *a* is about a *two-Lin'd English* thick, and hath a small *Return* piece of *Iron* made square to the under-side of the *Rod*, that when the whole *Dressing-Hook* is laid along a *Stick* of *Letter*, this *Return* piece or *Hook* may, when the *Rod* is drawn with the *Ball* of the *Thumb*, by the *Knot* on the upper side of it at *c*, draw all the *Letter* in the *Stick* tight and close up together, that the *Stick* of *Letter* may be *Scraped*, as shall be shewed.

¶ 4 *Of*

¶ 4 *Of the Dressing-Knife.*

The *Dressing-Knife* is delineated at d in *Plate. 21*. It is only a short piece of a *Knife* broken off about two Inches from the *Sholder*: But its Edge is *Bafil'd* away from the back to the point pretty suddenly to make it the stronger: The *Sprig* or *Pin* of the *Handle* is commonly let into an Hole drilled into a piece of the Tip of an Harts-horn, as in the Figure and is fastned in with *Rosen*, as other *Knives* are into their *Handles*.

¶ 5 *Of the Plow.*

The *Plow* is delineated in *Plate 21* at e: It is almost a common *Plain* (which I have already described in *Vol. 1. Numb. 4. Plate 4. and § 2 to 9.*) only with this distinction, that through the length of the *Sole* runs such a *Tongue*, as does through the *Male-Block* to slide tight and yet easily through the *Groove* made on the top of the *Male-block*: Its *Blade* makes an *Angle* of 60 Degrees with the *Sole* of it.

§ 21. ¶ 1. *Of Dressing of Letters.*

THE *Letter Dresser* hath (as I told you before) his *Letter Set* up in *Composing-sticks*, with their *Nicks* upwards, and those *Sticks* set upon the *Racks*: Therefore he takes one *Stick* off the *Racks*, and placing the *Handle* of the *Composing-stick* in his left-hand, he

he takes the contrary end of the *Dreffing-ftick* in his right-hand, and laying the Back of the *Dreffing-ftick* even upon or rather a little hanging over the Back of the *Compoſing-ftick*, that the *Feet* of the *Letter* may fall within the *Bottom-Ledge* of the *Dreffing-ftick*; He at the ſame time fits the *Side-Ledge* of the *Dreffing-ftick* againſt the farther end of the *Line of Letters* in the *Compoſing-ftick*: And holding then both *Sticks* together, his left-Hand at the *Handle-end* of the *Compoſing-ftick*, and his right-Hand within about two Handfuls of the *Handle-end* of the *Dreffing-ftick*, He turns his Hands, *Sticks* and all, outward from his left-Hand, till the *Compoſing-ftick* lies flat upon the *Dreffing-ftick*, and conſequently the *Letters* in the *Compoſing-ftick* is turned and laid upon the *Dreffing-ftick*.

Then he goes as near the Light as he can with the *Letters* in his *Dreffing-ftick*, and examines what *Letters Come not well* either in the *Face* or *Shanck*: So that then holding the *Dreffing-ftick* in his left-Hand, and tilting the *Bottom-Ledge* a little downward, that the *Feet* of the *Letter* may reſt againſt the *Bottom-Ledge*, and laying the Ball of his Thumb upon any certain Number of *Letters* between his *Body* and the *Letter* to be *Caſt out*, He with the *Foot* of a *Space* or ſome thin *Letter*, lifts up the *Letter* to be *Caſt out*, and lets it fall upon the *Dreffing-Bench*: and thus he does to all the *Letters* in that *Stick* that are to be *Thrown out*.

Then taking again the *Dreffing-Stick* in his left-Hand at or near the handle of it, he takes the *Dreffing-Hook* at the *Knot*, between the fore-Finger and
Thumb

Thumb of his right-Hand, and laying the *Hook* over the edge of the *Quadrat* at the farther end of the *Dressing-stick*, near the *bottom-Ledge* of it, he flips his right-Hand to the *Handle* of the *Dressing-stick*, and his left-Hand towards the middle of the *Dressing-stick*, so as the end of the Ball of his Thumb may draw by the farther end of the *Knot* on the *Dressing-Hook* the whole *Dressing-Hook*, and the *Hook* at the end of it the whole *Stick* of *Letter* close together towards him; While at the same time he with his Fingers clutched about the *Stick* and *Letter*, and the Thumb-ball of his Hand presses the under flat of the *Hooking-stick* close against the *Letter* and *Dressing-stick*, that the *Letter* in the *Stick* may lie fast and manageable.

Then he takes the *Handle* of the *Dressing-Knife* in his right-Hand, and inclining the back of it towards his *Body*, that its *Back-edge* may *Cut* or *Scrape* the smoother, He *Scrapes* twice or thrice upon so much of the whole *Line* of *Letters* as lies between the outer-side of the *Dressing-Hook* and the *Face* of the *Letter*.

But if twice or thrice *Scraping*, have not taken all the *Bur* or irregularities off so much of the *Letter* as he *Scraped* upon, he *Scrapes* yet longer and oftner till the whole number of *Letters* in the *Dressing-stick* from end to end seems but one intire piece of *Mettal*.

Thus is that side of the fore-part (*viz.* that part towards the *Face*) of the *Shanck* of the *Body* finisht.

To *Scrape* the other end of that side of the *Letter*

ter, viz. that towards the *Feet*; He turns the *Handle* of the *Stick* from him, and removing the *Dressing-Hook* towards the *Face* of the *Letter* which is already *Scraped*, he places his *Thumb* against the *Knot* of the *Dressing-Hook*, and presses it hard from him, that the *Hook* of the *Dressing-Hook* being now towards him, may force the whole *Stick* of *Letter* forwards against the *Side-Ledge* of the *Dressing-stick*; that so the whole *Line* in the *Stick* may lie again the faster and more manageable: Then he *Scrapes* with the *Dressing-Knife* as before, till the end of the *Shanck* of the *Letter* towards the *Feet* be also *Drest*.

Then he lays by his *Dressing-Hook*, and keeping his *Dressing-stick* of *Letter* still in his left-Hand, he takes a second *Dressing-stick*, with its *Handle* in his right-Hand, and lays the *Side-Ledge* of it against the hither side of the *Quadrat* at the hither end of the *Dressing-stick*, and the *bottom-Ledge* of the second *Stick* hanging a little over the *Feet* of the *Letter*, that they may be comprehended within the *bottom-Ledge* of the second *Dressing-stick*; and so removing his left-Hand towards the middle of both *Dressing-sticks*, and clasping them close together, he turns both *Hands* outwards towards the left, till the *Letter* in the first *Dressing-stick* lie upon the second *Dressing-stick*, and then the *Face* of the *Letter* will lie outwards toward the right-Hand, and the *Nicks* upwards. Then he uses the *Dressing-Hook* and *Dressing-Knife* to *Scrape* this side the *Line* of *Letter*, as he did before to the other side of the *Line* of *Letter*: So shall both sides be *Scraped* and *Drest*.

Having thus *Scraped* both the sides, He takes the
Handle

Handle of the *Dressing-stick* into his left-Hand, as before, and takes the *Male-block* into his right-Hand, and placing the *Tongue* of the *Block* against the *Face* of the *Letter* in the *Dressing-stick*, he also places the *Knot* of the *Block* against the farther side of the *Quadrat* at the farther end of the *Stick*, and so placing his right-Hand underneath the middle of the *Dressing-stick* and *Block*, he turns his Hand outwards towards the left, as before, and transfers the *Letter* in the *Dressing-stick* to the *Male-Block*: Yet he so holds and manages the *Block* that the *Shanck* of the *Letter* may rest at once upon the side of the *Block* the *Knot* is placed in, and the *Face* of the *Letter* upon the *Tongue*.

When his *Stick* of *Letters* is thus transfer'd to the *Male-Block*, He claps the middle of the *Male-Block* into his left-Hand, tilting the *Feet* of the *Letter* a little upwards, that the *Face* may rest upon the *Tongue*, and then takes about the middle of the *Female-Block* in his right-Hand, and lays it so upon the *Male-Block*, that the *Tongue* of the *Male-Block* may fall into the *Tongue* of the *Female-Block*, and that the *Knot* at the hither end of the *Female Block* may stand against the hither side of the *Quadrat* at the hither end of the *Line* of *Letters*: So that when the *Knot* of the *Male-Block* is lightly drawn towards the *Knot* of the *Female-Block*, or the *Knot* of the *Female-Block* lightly thrust towards the *Knot* of the *Male-Block*, both *Knots* shall squeeze the *Letter* close between them.

Then he grasps both *Blocks* with the *Letter* between them in both his Hands, and lays them in the
the

the *Block-Groove*, with the *Feet* of the *Letter* upwards, and the hither side of the hither *Block* against the hither *Cheek* of the *Block-Groove*. And putting the *Wedge* into the vacant space between the *Blocks* and the further *Cheek* of the *Block-Groove*, he lightly with his right-Hand thrusts up the *Wedge* to force the *Blocks* close together, and pinch the *Letter* close between the *Blocks*.

Then with the *Balls* of the *Fingers* of both his *Hands*, he Patts gently upon the *Feet* of the *Letter*, to press all their *Faces* down upon the *Tongue*; which having done, he takes the *Mallet* in his right-Hand, and with it knocks gently upon the head of the *Wedge* to pinch the *Letter* yet closer to the insides of the *Blocks*. Then he Knocks lightly and successively upon the *Knot-ends* of both the *Blocks*, to force the *Letters* yet closer together. And then again knocks now pretty hard upon the head of the *Wedge*, and also pretty hard upon the *Knot-ends* of the *Blocks*, to Lock the *Letter* tight and close up.

Then he places the *Tongue* of the *Plow* in the upper *Groove* of the *Block*; And having the *Tooth* of the *Iron* fitted in the *Plow*, so as to fall just upon the middle of the *Feet* of the *Letter*, he grasps the *Plow* in his right-Hand, placing his *Wrist-Ball* against the *Britch* of it, and guiding the fore-end with his left-Hand, slides the *Plow* gently along the whole length of the *Blocks*; so as the *Tooth* of the *Iron* bears upon the *Feet* of the *Letter*: And if it be a small *Letter* he *Plows* upon, the *Tooth* of the *Iron* will have cut a *Groove* deep enough through the length of the whole *Block* of *Letters*:

ters: But if the *Body* of the *Letter* be great, he reiterates his *Traverses* two three or four times according to the *Bigness* of the *Body* of the *Letter*, till he have made a *Groove* about a *Space* deep in the *Feet* of the *Shancks* of the whole *Blocks* of *Letter*, and have cut off all the irregularities of the *Break*.

Then with a small piece of *Buff* or some other soft *Leather*, he rubs a little upon the *Feet* of the *Letter* to smoothen them.

Then he unlocks the *Blocks* of *Letter*, by knocking with the *Mallet* upon the small end of the *Wedge*, and first takes the *Wedge* from between the *Blocks* and *Cheeks*, and lays it upon the farther *Cheek*, and afterwards takes the *Blocks* with *Letter* in it near both ends of the *Blocks* between the *Fingers* and *Thumbs* of both his *Hands*, and turns the hithermost *Block* upon the hithermost *Cheek*, and with his *Fingers* and *Thumbs* again lifts off the upper *Block*, leaving the *Letter* on the undermost *Block* with its *Face* against the *Tongue*.

Then taking the *Block* with *Letter* in it in his left-*Hand*, he places the *Knot-end* from him, and takes the *Handle* of the *Dressing-stick* in his right-*Hand*, and lays the *Side-Ledge* of it against the hither side of the *Quadrat* at the hither end, and the *Bottom-ledge* against the *Feet* of the *Letter*, he grasps the *Handle* of the *Dressing-stick* *Block* and all in his left-*Hand*, and lays his right-*Hand* *Thumb* along the under side of the *Dressing-stick* about the middle, and with the *Fingers* of the same *Hand* grasps the *Block*, and turning his *Hands*, *Block*, and *Dressing-stick* to the right, transfers the *Letter* in the *Block* upon the *Dressing-stick*.
Then

Then grasping the *Dressing-stick* by the *Handle* with his left-Hand, he with his right-Hand takes the *Dressing-Hook* by the *Knot*, and lays the inside of the *Hook* of it against the farther side of the *Quadrat* at the farther end of the *Stick*, and drawing the *Hook* and *Letter* in the *Dressing-stick* with his left Thumb by the *Knot* close up toward him, he resting the *Stick* upon the *Dressing-bench* that he may *Scrape* the harder upon the *Beard* with the Edge of the *Dressing-Knife*, *Scrapes* off the *Beard* as near the *Face* as he dares for fear of spoiling it, and about a *Thick Space* deep at least into the *Shanck*.

If the Bottom and Top are both to be *Bearded*, He transfers the *Letter* into another *Dressing-stick*, as hath been shewed, and *Beards* it also as before.

¶ 2. *Some Rules and Circumstances to be observed in Dressing of Letters.*

1. The *Letter-Dresser* ought to be furnisht with three or four sorts of *Dressing-sticks*, which differ nothing from one another save in the Height of their *Ledges*. The *Ledges* of one pair no higher than a *Scaboard*. This pair of *Sticks* may serve to *Dress*, *Pearl*, *Nomparel*, and *Brevier*. Another pair whose *Ledges* may be a *Nomparel* high. And this pair of *Dressing-sticks* will serve to *Dress* *Brevier*, *Long-Primmer*, and *Pica*: Another pair whose *Ledges* may be a *Long-Primmer* high: And these *Dressing-sticks* may serve to *Dress* *Pica*, *English*, *Great-Primmer*, and *Double-Pica*. And if you will another pair of *Dressing-*

Dressing-sticks, whose *Ledges* may be an *Engliſh* High: And theſe *Dressing-sticks* may ſerve to *Drefs* all big Bodied *Letters*, even to the Greateſt.

2. As he ought to be furniſht with ſeveral ſorts of *Dressing-sticks* as aforeſaid: So ought he alſo to be furniſht with ſeveral *Blocks*, whoſe *Knots* are to correſpond with the Sizes of the *Ledges* of the *Dressing-sticks*, for the *Dreſſing* of ſeveral *Bodies* as aforeſaid.

3. He ought to be furniſht with three or four *Dressing-Hooks*, whoſe *Hooks* ought to be of the ſeveral Depths aforeſaid, to fit and ſuit with the ſeveral *Bodied-Letters*.

4. He muſt have two *Dressing-Knives*, one to lie before the *Blocks* to *Scrape* and *Beard* the *Letter* in the *Sticks*, and the other behind the *Dressing-blocks* to uſe when occaſion ſerves to *Scrape* off a ſmall *Bur*, the *Tooth* of the *Plow* may have left upon the *Feet* of the *Letter*. And though one *Dressing-Knife* may ſerve to both theſe uſes: Yet when *Work-men* are in a *Train* of *Work* they begrutch the very turning the *Body* about, or ſtepping one ſtep forward or backward; accounting that it puts them out of their *Train*, and hinders their riddance of *Work*.

5. For every *Body* of *Letter* he is to have a particular *Plow*, and the *Tooth* of the *Iron* of each *Plow* is to be made exactly to a ſet bigneſs, the meaſure of which bigneſs is to be taken from the ſize of the *Break* that is to be *Plowed* away. For Example, If it be a *Pearl Body* to be *Plowed*, the breadth of the *Tooth* ought not to be above a thin *Scaboard*: Becauſe the *Break* of that *Body* cannot be bigger, for Reaſons I have

have given before; But the *Tooth* must be full broad enough, and rather broader than the *Break*, lest any of the irregularity of the *Break* should be left upon the *Foot* of the *Letter*. And so for every *Body* he fits the *Tooth* of the *Iron*, full broad enough and a little broader than the size of the *Break*. This is one reason why for every particular *Body* he ought to have a particular *Plow*. Another reason is.

The *Tooth* of this *Plow* must be exactly set to a punctual distance from the *Tongue* of the *Plow*: For if they should often shift *Irons* to the several *Stocks* of the *Plow*, they would create themselves by shifting more trouble than the price of a *Stock* would compensate.

A *Fount* of *Letter* being new *Cast* and *Drest*, the *Boy Papers* up each sort in a *Cartridge* by it self, and puts about an hundred Pounds weight, *viz.* a *Porters* Burthen into a *Basket* to be sent to the *Master-Printers*.

The *Steel-Punches* being now *Cut*, the *Molds* made, the *Matrices Sunk*, the *Letters Cast*, and *Drest*, the application of these *Letters* falls now to the task of the *Compositer*; whose *Trade* shall be (God willing) the Subject of the next *Exercises*.

F I N I S.

**MOXON'S
MECHANICK EXERCISES**

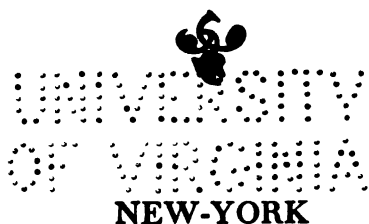
**OR THE DOCTRINE OF HANDY-WORKS
APPLIED TO THE ART OF**

PRINTING

**A LITERAL REPRINT IN TWO VOLUMES OF
THE FIRST EDITION PUBLISHED IN THE YEAR 1683**

**WITH PREFACE AND NOTES BY
THEO. L. DE VINNE**

VOLUME I



THE TYPOTHETÆ OF THE CITY OF NEW-YORK

MDCCLXXXVI

MECHANICK EXERCISES:

Or, the Doctrine of

Handy-works.

Applied to the Art of

Printing.

By *Joseph Moxon*, Member of the Royal Society, and *Hydrographer* to the King's Most Excellent Majesty.

LONDON.

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