To the Right Reverend Father in GOD, *JOHN* Lord Biſhop of *Oxford*, and Dean of *Chriſt-Church*; And to the Right Honourable Sir *LEOLINE JENKINS* Knight, and Principal Secretary of State; And to the Right Honourable Sir *JOSEPH WILLIAMSON* Knight; and one of His Majeſties moſt Honourable Privy-Council.

Right Honourable.

YOur ardent affections to promote Typographie *has eminently appeared in the great Charge you have been at to make it famous here in* England; *whereby this Royal Iſland ſtands particularly obliged to your Generous and Publick Spirits, and the whole Common-Wealth of Book-men throughout the World, to your Candid Zeal for the promulgation of good Learning.*

Wherefore I humbly Dedicate this Piece of Typographie *to your Honours; and*

as it is (I think) the first of this nature, so I hope you will favourably excuse small Faults in this Undertaking; for great ones I hope there are none, unless it be in this presumptuous Dedication; *for which I humbly beg your Honours pardon: Subscribing my self, My Lord and Gentlemen,*

Your Honours most Humble and Obedient Servant.

Joseph Moxon.

MECHANICK

MECHANICK EXERCISES:

Or, the Doctrine of

Handy-works.

Applied to the Art of

Printing.

The Second VOLUMNE.

PREFACE.

Before I begin with Typographie, *I shall say some-what of its Original Invention; I mean here in* Europe, *not of theirs in* China *and other Eastern Countries, who (by general assent) have had it for many hundreds of years, though their Invention is very different from ours; they Cutting their Letters upon Blocks in whole Pages or Forms, as among us our Wooden Pictures are Cut; But* Printing *with single Letters Cast in Mettal, as with us here in* Europe, *is an Invention scarce above Two hundred and fifteen years old; and yet an undecidable Controversie about the original Contriver or Contrivers remains on foot,*

between the Harlemers *of* Holland, *and those of* Mentz *in* Germany: *But because the difference cannot be determin'd for want of undeniable Authority, I shall only deliver both their Pleas to this* Scientifick Invention.

The Harlemers *plead that* Lawrensz Jansz Koster of Harlem *was the first Inventer of* Printing, *in the year of our Lord* 1430. *but that in the Infancy of this Invention he us'd only Wooden Blocks (as in* China, *&c. aforesaid) but after some time he left off Wood, and Cut single Letters in Steel, which he sunck into Copper* Matrices, *and fitting them to Iron Molds, Cast single Letters of Mettal in those* Matrices. *They say also, that his Companion,* John Gutenberg, *stole his Tools away while he was at Church, and with them went to* Mentz *in* Germany, *and there set his Tools to work, and promoted His claim to the first Invention of this Art, before* Koster *did His.*

To prove this, they say that Rabbi Joseph *(a Jew) in his Chronicle, mentions a Printed Book that he saw in* Venice, *in the year* 5183. *according to the Jewish Account, and by ours the year* 1428. *as may be read in* Pet. Scriverius.

They say much of a Book intituled De Spiegel, *Printed at* Harlem *in* Dutch *and* Latin; *which Book is yet there to be seen: and they alledge that Book the first that ever was Printed: But yet say not when this Book was Printed.*

Notwithstanding this Plea, I do not find (perhaps because of their imperfect Proofs) but that Gutenberg *of* Mentz *is more generally accepted for the first Inventer of* Printing, *than* Koster *of* Harlem.

The Learned Dr. Wallis *of* Oxford, *hath made an Inquiry into the original of this Invention, and hath in brief sum'd up the matter in these words.*

About

About the year of our Lord 1460. The Art of *Printing* began to be invented and practised in *Germany*, whether first at *Mentz* or first at *Harlem* it is not agreed: But it seems that those who had it in consideration before it was brought to perfection, disagreeing among themselves, did part Company; and some of them at *Harlem*, others at *Mentz* persued the design at the same time.

The Book which is commonly reputed to have been first Printed is, Tullies Offices, *of which there be Copies extant (as a Rarity) in many Libraries; which in the close of it is said to be Printed at* Mentz, *in the year of our Lord* 1465. *(so says that Copy in the* Bodleyan *Library) or* 1466. *(so that in the Library of* Corpus Christi.) *The words in the close of that in* Corpus Christi *Colledge* Oxon *are these,*

Præsens *Marcij Tullij* Clarissimum opus, *Johanes Hust, Moguntinus* Civis, non Atrimento, plumali canna, neq; ærea, sed Arte quadam perpulchra, *Petri* manu *Petri de Geurshem* pueri mei, feliciter effeci, finitum Anno MCCCCLXVI quarto die Mensis *Februarij.*

The like in the Bodleyan *Library; save there the Date is only thus,* Finitum Anno MCCCCLXV. *In the same Book there are these written Notes subjoyned:* Hic est ille *Johannes Faustus,* coadjutor *Johannes Gutenbergij* primi *Typographiæ* inventaris, Alter coadjutō erat *Petrus Schæfer,* i. Opilio. Quovix.

Cælando promptior alter erat, inquit *Johan. Arnoldus* in Libello de Chalcographiæ inventione, *Scheffer* primas finxit quas vocant *Matrices.* Hi tres exercuerunt artem primo in communi. mox rupto fœdere seorsim sibi quisq; privatim.

And again (*in a later hand*) Inventionem artis *Typographicæ* ad Annum 1453. aut exerciter referunt Sabellicus *En.*10.lib.6.& *Monsterus.* Alij ad Annum 1460. Vi. de *Polid. Virg.* lib. 2. de Invent. Rerum, *Theod. Bibland. de Ratione communis linguarum.* cap. de *Chalcographia.*

At Harlem *and some other places in* Holland, *they pretend to have Books Printed somewhat ancienter than this; but they are most of them* (*if not all*) *done by way of Carving whole Pages in Wood, not by single Letters Cast in Mettal, to be Composed and Distributed as occasion serves, as is now the manner.*

The chief Inventer at Harlem *is said to be* Laurens Jansz Koster.

After these two places (Mentz *and* Harlem) *it seems next of all to have been practised at* Oxford : *For by the care, and at the charge of King* Henry *the 6th, and of* Thomas Bourchier *then Arch-Bishop of* Canterbury (*and Chancellour of the University of* Oxford) Robert Turner *Master of the Robe, and* William Caxton *a Merchant of* London *were for that purpose sent to* Harlem, *at the charges partly of the King, partly of the Arch-Bishop, who then* (*because these of* Harlem *were very chary of this secret*) *prevailed privately with one* Frederick Corseles *an under-Workman, for a sum of Money, to come over hither; who thereupon did at* Oxford *set up the Art of* Printing, *before it was exercised any where else in* England, *or in* France, Italy, Venice, Germany, *or any other place, except only* Mentz *and* Harlem (*aforementioned*): *And there be several Copies yet extant* (*as one in the Archives of the University of* Oxford, *another in the Library of Dr.* Tho. Barlow, *now Bishop of* Lincoln) *of a Treatise of*

of St. Jerome (*as it is there called* (*because found among St.* Jerom's *Works*) *or rather* Ruffinus *upon the Creed, in a broad* Octavo) *Printed at* Oxford *in the year* 1468. *as appears by the words in the close of it.*

Explicit expositio Sancti *Jeronimi* in sembolo Apostolorum ad papam Laurentium Impressi *Oxonie* & finita Anno Domini MCCCCLXVIII. xvij die *Decembris.*

Which is but three years later than that of Tullies Offices *at* Mentz, *in* 1465. *and was perhaps one of the first Books Printed on Paper,* (*that of* Tully *being on Vellom.*) *And there the exercise of* Printing *hath continued successively to this day.*

Soon after William Caxton (*the same I suppose who first brought it to* Oxford) *promoted it to* London *also, which* Baker *in his Chronicle* (*and some others*) *say to have been about the year* 1471. *but we have scarce any Copies of Books there Printed remaining* (*that I have seen*) *earlier than the year* 1480. *And by that time, or soon after, it began to be received in* Venice, Italy, Germany, *and other places, as appears by Books yet extant, Printed at divers places in those Times. Thus far Dr.* Wallis.

But whoever were the Inventers of this Art, or (*as some Authors will have it*) *Science; nay, Science of Sciences* (*say they*) *certain it is, that in all its Branches it can be deemed little less than a Science: And I hope I say not to much of* Typographie : *For Dr.* Dee, *in his Mathematical Preface to* Euclids Elements of Geometrie, *hath worthily taken pains to make* Architecture *a Mathematical Science; and as a vertual Proof of his own Learned Plea, quotes two Authentique Authors,* viz.

Vitruvius *and* Leo Baptista, *who both give their descriptions and applause of* Architecture: *His Arguments are somewhat copious, and the Original easily procurable in the English Tongue; therefore instead of transcribing it, I shall refer my Reader to the Text it self.*

Upon the consideration of what he has said in behalf of Architecture, *I find that a* Typographer *ought to be equally qualified with all the Sciences that becomes an* Architect, *and then I think no doubt remains that* Typographie *is not also a Mathematical Science.*

For my own part, I weighed it well in my thoughts, and find all the accomplishments, and some more of an Architect *necessary in a* Typographer: *and though my business be not Argumentation, yet my Reader, by perusing the following discourse, may perhaps satisfie himself, that a* Typographer *ought to be a man of Sciences.*

By a Typographer, *I do not mean a* Printer, *as he is Vulgarly accounted, any more than Dr* Dee *means a* Carpenter *or* Mason *to be an* Architect: *But by a* Typographer, *I mean such a one, who by his own Judgement, from solid reasoning with himself, can either perform, or direct others to perform from the beginning to the end, all the Handy-works and Physical Operations relating to* Typographie.

Such a Scientifick *man was doubtless he who was the first Inventer of* Typographie; *but I think few have succeeded him in Science, though the number of* Founders *and* Printers *be grown very many: Insomuch that for the more easie managing of* Typographie, *the Operators have found it necessary to devide it into several Trades, each of which (in the strictest sence) stand no nearer*

nearer related to Typographie, *than* Carpentry *or* Masonry, *&c. are to* Architecture. *The several devisions that are made, are,*

First *The* Master Printer, *who is as the Soul of* Printing; *and all the Work-men as members of the Body governed by that Soul subserveient to him; for the* Letter-Cutter *would Cut no Letters, the* Founder *not sinck the* Matrices, *or Cast and Dress the Letters, the* Smith *and* Joyner *not make the* Press *and other Utensils for* Printing, *the* Compositer *not Compose the Letters, the* Corrector *not read Proves, the* Press-man *not work the Forms off at the the* Press, *or the* Inck-maker *make* Inck *to work them with, but by Orders from the* Master-Printer.

Secondly, The Letter-Cutter,
Thirdly, The Letter-Caster,
Fourthly, The Letter-Dresser. } Founders.

But very few Founders *exercise, or indeed can perform all these several Trades.; though each of these are indifferently called* Letter-Founders.

Fifthly, The Compositer,
Sixthly, The Corrector,
Seventhly, The Press-man,
Eightly, The Inck-maker. } Printers.

Besides several other Trades they take in to their Assistance; as the Smith, *the* Joyner, *&c.*

ADVER-

ADVERTISEMENT.

THE continuation of my ſetting forth *Mechanick Exerciſes* having been obſtructed by the breaking out of the Plot, which took off the minds of my few Cuſtomers from buying them, as formerly; And being of late much importun'd by many worthy Perſons to continue them; I have promiſed to go on again, upon Condition, That a competent number of them may be taken off my hand by Subſcribers, ſoon after the publication of them in the *Gazet*, or poſting up Titles, or by the *Mercurius Librarius*, &c.

Therefore ſuch Gentlemen or others as are willing to promote the coming forth of theſe *Exerciſes*, are deſired to Subſcribe their Names and place of abode: That ſo ſuch Perſons as live about this City may have them ſent ſo ſoon as they come forth: Quick Sale being the beſt encouragement.

Some Gentlemen (to whom they are very acceptable) tell me they will take them when all *Trades* are finiſh't, which cannot reaſonably be expected from me (my Years conſidered) in my life-time; which implies they will be Cuſtomers when I'me dead, or perhaps by that time ſome of themſelves.

The price of theſe Books will be 2 *d.* for each Printed Sheet. And 2 *d.* for every Print taken off of Copper Cuts.

There are three reaſons why this price cannot be thought dear.

1. The Writing is all new matter, not Collected, or Tranſlated from any other Authors: and the drafts of the Cuts all drawn from the Tools and Machines uſed in each reſpective Trade.

2. I Print but 500 on each Sheet, And thoſe upon good Paper: which makes the charge of Printing dear, proportionable to great numbers.

3. Some Trades are particularly affected by ſome Cuſtomers, (who deſire not the reſt,) and conſequently ſooner ſold off, which renders the remainder of the un-ſold *Exerciſes* unperfect, and therefore not acceptable to ſuch as deſire all: ſo that they will remain as waſte-Paper on my hands.

JOSEPH MOXON.

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§ 2. *Of the Office of a Maſter-*Printer.

I Shall begin with the Office of a *Maſter-Printer*, becauſe (as aforeſaid) he is the Director of all the Work men, he is the Baſe (as the *Dutchmen* properly call him) on which the Workmen ſtand, both for providing Materials to Work withal, and ſucceſſive variety of Directions how and in what manner and order to perform that Work.

His Office is therefore to provide a Houſe, or Room or Rooms in which he is to ſet his *Printing-Houſe*. This expreſſion may ſeem ſtrange, but it is *Printers* Language: For a *Printing-Houſe* may admit of a twofold meaning; one the Vulgar acceptance,

and is relative to the House or Place wherein *Printing* is used; the other a more peculiar Phrase *Printers* use among themselves, *viz.* only the *Printing* Tools, which they frequently call a *Printing House*: Thus they say, Such a One has set up a *Printing House*, when as thereby they mean he has furnish'd a House with *Printing* Tools. Or such a one has remov'd his *Printing-House*, when thereby they only mean he has remov'd the Tools us'd in his former House. These expressions have been used Time out of mind, and are continued by them to this day.

But to proceed, Having consider'd what number of *Presses* and *Cases* he shall use, he makes it his business to furnish himself with a Room or Rooms well-lighted, and of convenient capacity for his number of *Presses* and *Cases*, allowing for each *Press* about Seven Foot square upon the Floor, and for every *Frame* of *Cases* which holds Two pair of *Cases*, *viz.* one pair *Romain* and one pair *Italica*, Five Foot and an half in length (for so much they contain) and Four Foot and an half in breadth, though they contain but Two Foot and Nine Inches: But then room will be left to pass freely between two *Frames*.

We will suppose he resolves to have his *Presses* and *Cases* stand in the same Room (though in *England* it is not very customary) He places the *Cases* on that side the Room where they will most conveniently stand, so, as when the *Compositer* is at work the Light may come in on his Left-hand; for else his Right hand plying between the Window-light and his Eye might shadow the *Letter* he would pick up: And the *Presses* he places so, as the Light may fall from a Window right

right before the *Form* and *Tinpan*: And if scituation will allow it, on the North-side the Room, that the *Press-men*, when at their hard labour in *Summer* time, may be the less uncommoded with the heat of the *Sun*: And also that they may the better see by the constancy of that Light, to keep the whole *Heap* of an equal Colour.

He is also to take care that his *Presses* have a solid and firm Foundation, and an even Horizontal Floor to stand on, That when the *Presses* are set up their Feet shall need no Underlays, which both damage a *Press*, are often apt to work out, and consequently subject it to an unstable and loose position, as shall further be shewn when we come to the Setting up of the *Press*.

And as the Foundation ought to be very firm, so ought also the Roof and Sides of the *Press Room* to be, that the *Press* may be fastned with Braces overhead and on its Sides, as well and steddy as under foot.

He is also to take care that the Room have a clear, free and pretty lofty Light, not impeded with the shadow of other Houses, or with Trees; nor so low that the Sky-light will not reach into every part of the Room: But yet not too high, lest the violence of *Winter* (*Printers* using generally but Paper-windows) gain too great advantage of Freesing the Paper and Letter, and so both Work and Workman stand still. Therefore he ought to Philosophize with himself, for the making the height of his Lights to bear a rational proportion to the capacity of the Room.

Here being but two sides of the Room yet used,

he places the *Correcting ſtone* againſt a good Light, and as near as he can towards the middle of the Room, that the *Compoſiters* belonging to each end of the Room may enjoy an equal acceſs to it. But ſometimes there are ſeveral *Correcting-ſtones* plac'd in ſeveral parts of the Room.

The *Lye-Trough* and *Rincing-Trough* he places towards ſome corner of the Room, yet ſo as they may have a good Light; and under theſe he cauſes a *Sink* to be made to convey the Water out of the Room: But if he have other conveniencies for the placing theſe Troughs, he will rather ſet them out of the Room to avoid the ſlabbering they cauſe in.

About the middle of the Room he places the *Deſtributing-Frame* (*viz.* the *Frame* on which the *Forms* are ſet that are to be *Deſtributed*) which may ſtand light enough, though it ſtand at ſome conſiderable diſtance from the Window.

In ſome other empty place of the Room (leaſt frequented) he cauſes ſo many *Neſt-Frames* to be made as he thinks convenient to hold the *Caſes* that may lye out of preſent uſe; and the *Letter-boards* with *Forms* ſet by on them, that both the *Caſes* and the *Forms* may be the better ſecured from running to *Pye*.

Having thus contrived the ſeveral Offices of the Room, He furniſhes it with *Letters*, *Preſſes*, *Caſes*, *Chaſes*, *Furniture*, &c. Of each of which in Order.

¶. 2. *Of*

¶. 2. *Of* Letter.

He provides a *Fount* (properly a *Fund*) of *Letter* of all Bodies; for moſt *Printing-Houſes* have all except the two firſt, *viz. Pearl*, *Nomparel*, *Brevier*, *Long-Primmer*, *Pica*, *Engliſh*, *Great-Primmer*, *Double-Pica*, *Two Lin'd Engliſh*, *Great-Cannon*.

Theſe are the *Bodies* moſt of uſe in *England*; But the *Dutch* have ſeveral other *Bodies*: which becauſe there is little and almoſt no perceivable difference from ſome of theſe mentioned, I think they are not worth naming. Yet we have one *Body* more which is ſometimes uſed in *England*; that is a *Small Pica*, but I account it no great diſcretion in a *Maſter-Printer* to provide it; becauſe it differs ſo little from the *Pica*, that unleſs the Workmen be carefuller than they ſometimes are, it may be mingled with the *Pica*, and ſo the Beauty of both *Founts* may be ſpoil'd.

Theſe aforeſaid *Bodies* are commonly *Caſt* with a *Romain*, *Italica*, and ſometimes an *Engliſh Face*. He alſo provides ſome *Bodies* with the *Muſick*, the *Greek*, the *Hebrew*, and the *Syriack Face*: But theſe, or ſome of theſe, as he reckons his oppertunities may be to uſe them.

And that the Reader may the better underſtand the ſizes of theſe ſeveral *Bodies*, I ſhall give him this Table following; wherein is ſet down the number of each *Body* that is contained in one Foot.

Pearl,	184	contained in one Foot.
Nomparel,	150	
Brevier,	112	
Long-Primmer,	92	
Pica,	75	
English,	66	
Great-Primmer,	50	
Double-Pica,	38	
Two-Lin'd English,	33	
Great-Cannon.	17½	

His care in the choice of these *Letters* are,

First, That the *Letter* have a true shape: Which he may know, as by the §. of *Letter-Cutting.*

I confess this piece of Judgement, *viz.* knowing of true Shape, may admit of some controversy; because neither the Ancients whom we received the knowledge of these *Letters* from, nor any other authentick Authority have delivered us Rules, either to make or know true shape by: And therefore it may be objected that every one that makes *Letters* but tolerably like *Romain, Italick, &c.* may pretend his to be true shap'd.

To this I answer, that though we can plead no Ancient Authority for the shape of *Letters,* yet doubtless (if we judge rationally) we must conclude that the *Romain Letters* were Originally invented and contrived to be made and consist of Circles, Arches of Circles, and straight Lines; and therefore those *Letters* that have these Figures, either entire, or else properly mixt, so as the Course and Progress of the Pen

Pen may best admit, may deserve the name of true Shape, rather than those that have not.

Besides, Since the late made *Dutch-Letters* are so generally, and indeed most deservedly accounted the best, as for their Shape, consisting so exactly of Mathematical Regular Figures as aforesaid, And for the commodious Fatness they have beyond other *Letters,* which easing the Eyes in Reading, renders them more Legible; As also the true placing their Fats and their Leans, with the sweet driving them into one another, and indeed all the accomplishments that can render *Letter* regular and beautiful, do more visibly appear in them than in any *Letters* Cut by any other People: And therefore I think we may account the Rules they were made by, to be the Rules of true shap'd *Letters.*

For my own part, I liked their *Letters* so well, especially those that were Cut by *Christophel Van Dijck* of *Amsterdam,* that I set my self to examine the Proportions of all and every the parts and Members of every *Letter,* and was so well pleased with the Harmony and Decorum of their Symetrie, and found so much Regularity in every part, and so good reason for his Order and Method, that I examined the biggest of his *Letters* with Glasses, which so magnified the whole *Letter,* that I could easily distinguish, and with small Deviders measure off the size, scituation and form of every part, and the proportion every part bore to the whole; and for my own future satisfaction collected my Observations into a Book, which I have inserted in my *Exercises* on *Letter-Cutting.* For therein I have exhibited to the

the World the true Shape of *Christophel Van Dijcks* aforesaid *Letters*, largely Engraven in Copper Plates.

Whence I conclude, That since common consent of Book men assign the Garland to the *Dutch-Letters* as of late *Cut*, and that now those *Letters* are reduced unto a Rule, I think the Objection is Answered; And our *Master Printers* care in the choice of good and true shap'd *Letters* is no difficult Task: For if it be a large Bodied *Letter*, as *English*, *Great-Primmer* and upwards, it will shew it self; and if it be small, as *Pearl*, *Nomparel*, &c. though it may be difficult to judge the exact Symetry with the naked Eye, yet by the help of a *Magnifying-Glass* or two if occasion be, even those small *Letters* will appear as large as the biggest Bodied *Letters* shall to the naked Eye: And then it will be no difficult Task to judge of the Order and Decorum even of the smallest Bodied *Letters*. For indeed, to my wonder and astonishment, I have observ'd *V. Dijcks Pearl Dutch Letters* in Glasses that have Magnified them to great *Letters*, and found the whole Shape bear such true proportion to his great *Letters*, both for the *Thickness*, *Shape*, *Fats* and *Leans*, as if with Compasses he could have measur'd and set off in that small compass every particular Member, and the true breadth of every *Fat* and *Lean Stroak* in each *Letter*, not to exceed or want (when magnified) of *Letter Cut* to the *Body* it was Magnified to.

His second care in the choice of *Letters* is, That they be deep *Cut*; for then they will *Print* clear the longer, and be less subject to entertain *Picks*.

His third care, That they be deep sunck in the *Matrices*,

Matrices least the bottom line of a *Page* Beard. Yet though they be deep sunk, His care ought to be to see the Beard also well cut off by the *Founder*.

And a Fourth Care in the choice of *Letter* is, That his *Letter* be Cast upon good Mettal, that it may last the longer.

Of each Body he provides a *Fount* suitable to such sorts of Work as he designs to do; But he provides not an equal wieght of every *Fount*; Because all these Bodies are not in equal use: For the *Long-Primmer*, *Pica* and *English* are the Bodies that are generally most used; And therefore he provides very large *Founts* of these, *viz.* of the *Long-Primmer* in a small *Printing-House*, Five hundred Pounds weight *Romain* and *Italica*, whereof One hundred and fifty Pounds may be *Italica*. Of the *Pica* and *English*, *Roman* and *Italica*, Eight, Nine hundred, or a Thousand Pounds weight: when as of other *Founts* Three or Four hundred Pounds weight is accounted a good *Fount*: And of the *Cannon* and *Great-Cannon*, One hundred Pounds or somewhat less may serve his turn; Because the common use of them is so set Titles with.

Besides *Letters* he Provides Characters of Astronomical Signs, *Planets*, *Aspects*, *Algebraical* Characters, Physical and Chimical Characters, &c. And these of several of the most used Bodies.

He Provides also *Flowers* to set over the Head of a *Page* at the beginning of a Book: But they are now accounted old-fashion, and therefore much out of use. Yet *Wooden Borders*, if well Drawn, and neatly Cut, may be *Printed* in a Creditable Book, As also,

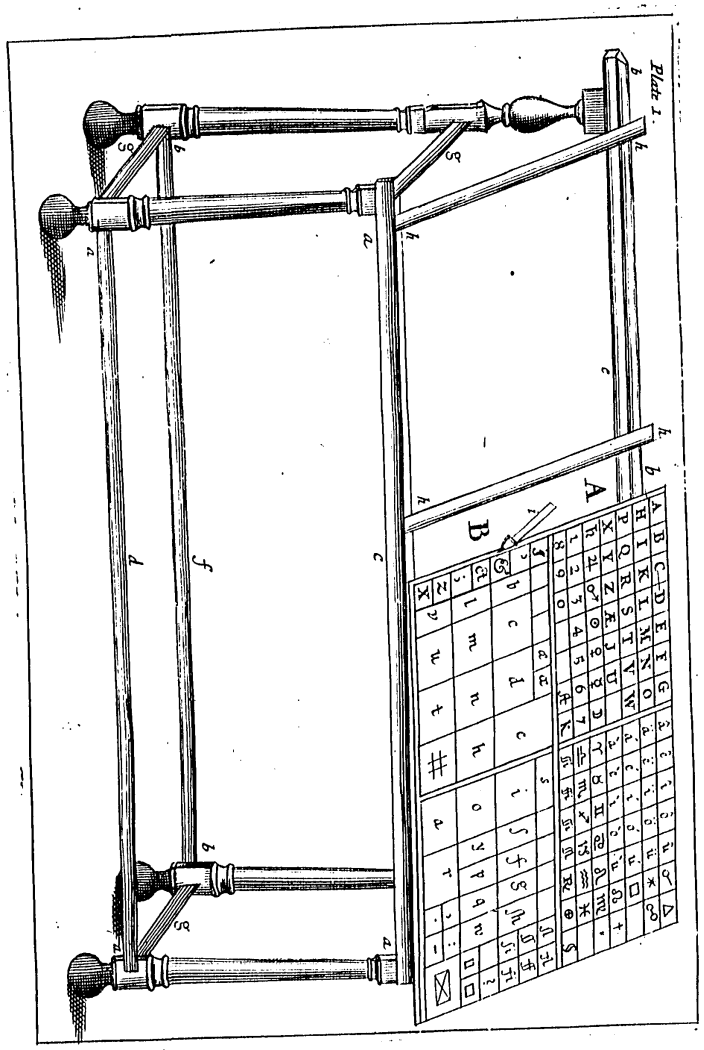
Wooden-Letters well Drawn and neatly Cut may be uſed at the beinning of a *Dedication, Preface, Section, &c.* Yet inſtead of *Wooden Letters*, *Capitals* Caſt in Mettal generally now ſerves; becauſe but few or good *Cutters* in *Wood* appear.

He alſo provides *Braſs Rules* of about Sixteen Inches long, that the *Compoſiter* may cut them into ſuch Lengths as his Work requires.

In the choice of his *Braſs Rules*, he examines that they be exactly *Letter* high; for if they be much too high, they may cut through *Paper, Tinpan* and *Blankets* too; And if they be but a little too high, not only the Sholder, or Beard, on either ſide them will *Print* black; but they will bear the *Plattin* off the *Letters* that ſtand near them, ſo that thoſe *Letters* will not *Print* at all: And if they be too low, then the *Rules* themſelves will not *Print*.

It ſometimes happens through the unskilfulneſs of the *Joyner*, (for they commonly, but unproperly, imploy *Joyners* to make them) that a Length ſhall be hollow in the middle both on the Face and Foot, and ſhall run driving higher and higher towards both ends: Hence it comes to paſs, that when the *Compoſiter* cuts a piece of *Rule* to his intended Length, the *Rule* ſhall *Print* hard at one end, and the other ſhall not *Print* at all; So that he ſhall be forced to knock up the foot of the low end, as ſhall be ſhewn in its proper place.

But the careful *Maſter-Printer* having found that his *Braſs Rules* is *Letter* high all the whole Length, will alſo examine whether it be ſtraight all the whole Length, which he does by applying both the Face



Face and Foot to the ſurface of the *Correcting-ſtone*.; And if the Face and Foot comply ſo cloſely with the *Correcting-ſtone*, that light cannot be ſeen between them, he concludes the *Braſs-Rule* is ſtraight.

Then he examines the Face or Edge of the *Rule*, whether it have an Edge of an equal breadth all the whole Length, and that the Edge be neither too thick nor too fine for his porpoſe.

He ſhould alſo take care that the *Braſs*, before it be cut out, be well and skilfully Planiſh't, nor would that charge be ill beſtowd; for it would be ſaved out of the thickneſs of the *Braſs* that is commonly uſed: For the *Joyners* being unskilful in Planiſhing, buy Neal'd thick *Braſs* that the *Rule* may be ſtrong enough, and ſo cut it into ſlips witout Hammering, which makes the *Rule* eaſily bow any way and ſtand ſo, and will never come to ſo good and ſmooth an Edge as Planiſh't *Braſs* will. Beſides, *Braſs* well Planiſh't will be ſtiffer and ſtronger at half the thickneſs than unplaniſh't *Braſs* will at the whole: As I ſhall further ſhew when I come to Exerciſe upon *Mathematical Inſtrument-making*.

§. 3. *Of* Caſes.

Next he provides *Caſes*. A Pair of *Caſes* is an *Upper-Caſe* and a *Lower Caſe*.

The *Upper Caſe* and the *Lower-Caſe* are of an equal length, breadth and depth, *viz.* Two Foot nine Inches long, One Foot four Inches and an half broad, and about an Inch and a quarter deep, beſides the bottom Board; But for ſmall Bodied *Letters* they are made ſomewhat ſhallower, and for great Bodies deeper.

Long-Primmer and downwards are accounted ſmall Bodies; *Engliſh* and upwards are accounted great Bodies.

The conveniencies of a ſhallow *Caſe* is, that the *Letters* in each Box lye more viſible to the laſt, as being leſs ſhadowed by the ſides of the *Boxes*.

The conveniencies of a deep *Caſe* is, that it will hold a great many *Letters*, ſo that a *Compoſiter* needs not ſo often *Deſtribute*. 2dly. It is not ſo ſoon *Low*, (as *Compoſiters* ſay when the *Caſe* grows towards empty) and a *Low Caſe* is unconvenient for a *Compoſiter* to work at, partly becauſe the *Caſe* ſtanding ſhelving downwards towards them, the *Letters* that are in the *Caſe* tend towards the hither ſide of the *Caſe*, and are ſhadowed by the hither ſide of that *Box* they lye in, ſo that they are not ſo eaſily ſeen by the Eye, or ſo ready to come at with the Fingers, as if they lay in the middle of the *Box*.

Theſe *Caſes* are encompaſſed about with a *Frame* about Three quarters of an Inch broad, that the ends of the ſeveral partitions may be let into the ſubſtance of the *Frame*: But the hithermoſt ſide of the *Frame* is about half an Inch higher thanthe other ſides, that when either the *Galley* or another pair of *Caſes* are ſet upon them, the bottom edge of the *Galley*, or of thoſe *Caſes* may ſtop againſt that higher *Frame*, and not ſlide off.

Both the *Upper* and the *Lower Caſe* have a thick Partition about three quarters of an Inch broad, Duſt-tail'd into the middle of the upper and under Rail of the *Frame*. This Partition is made thus broad, that Grooves may be made on either ſide of it to receive

ceive the ends of thoſe Partitions that devide the breadth of the *Caſe*, and alſo to ſtrengthen the whole *Frame*; for the bottom Board is as well nailed to this thick Partition as to the outer *Frame* of the *Caſe*.

But the deviſions for the ſeveral *Boxes* of the *Upper* and *Lower Caſes* are not alike: for each half of the whole length of the *Upper-Caſe* is devided into ſeven equal parts, as you may ſee in Plate 1. at A, and its breadth into ſeven equal parts, ſo that the whole *Upper-Caſe* is divided into Ninety eight ſquare *Boxes*, whoſe ſides are all equal to one another.

But the Two halfs of the length of the *Lower-Caſe* are not thus devided; for each half of the length of the *Lower-Caſe* is devided into Eight equal parts, and its breadth into Seven; but it is not throughout thus devided neither; for then the *Boxes* would be all of equal ſize: But the *Lower-Caſe* is devided into four ſeveral ſizes of *Boxes*, as you may ſee in Plate 1. B.

The reaſon of theſe different ſizes of *Boxes* is, That the biggeſt *Boxes* may be diſpoſed neareſt the *Compoſiters* hand, becauſe the Engliſh Language, and conſequently all Engliſh *Coppy* runs moſt upon ſuch and ſuch Sorts; ſo that the *Boxes* that holds thoſe Sorts ought to be moſt capacious.

His care in the choice of theſe *Caſes* is, That the Wood they are made of be well-ſeaſon'd Stuff.

That the Partitions be ſtrong, and true let into one another, and that the ends fill up and ſtand firm in the Grooves of the *Frame* and middle *Rail* of the *Caſe*.

There is an inconvenience that often happens, theſe thin Partitions, eſpecially if they be made of unſeaſon'd Stuff. *viz.* as the Stuff dries it ſhrinks in the

Grooves

Grooves of the *Frame*, and ſo not only grows looſe, but ſometimes ſtarts out above the top of the *Frame*. To prevent this inconvenience, I have of late cauſed the ends of theſe thin partitions to be made Male-Duſ-tails, broadeſt on the under ſide, and have them fitted into Female-Duſ-tails in the Frame of the *Caſe*, and middle Rail before the bottom Boards are nailed on.

That the Partitions be full an *Engliſh* Body thick.

That the Partitions lye cloſe to the bottom of the *Caſe*, that ſo the *Letters* ſlide not through an upper into an under *Box*, when the Papers of the *Boxes* may be worn.

§. 4. *Of* Frames *to ſet the* Caſes *on.*

Frames are in moſt *Printing Houſes* made of thick *Deal-board Batttens*, having their ſeveral *Rails Tennanted* into the *Stiles*: but theſe ſorts of *Frames* are, in reſpect of their matter (*viz. Fir*) ſo weak, and in reſpect of their ſubſtance (*viz.* little above an Inch thick) ſo ſlight, that experience teaches us, when they are even new made, they tremble and totter, and having laſted a little while, the thinneſs of their *Tennants* being a little above a quarter of an Inch thick, according to the Rules of *Joynery*, as I have ſhewn in *Numb.* 5. §. 17. They Craze, their *Tennants* break, or *Morteſſes* ſplit, and put the *Maſter-Printer* to a freſh Charge.

It is rationally to be imagined that the *Frames* ſhould be deſigned to laſt as long as the *Printing houſe*; and therefore our *Maſter-Printer* ought to take care that they be made of matter ſtrong enough, and of ſubſtance big enough to do the Service they are intended for;

for; that they ſtand ſubſtantial and firm in their place, ſo as a ſmall Joſtle againſt them ſhake them not, which often reiterated weakens the *Frame-work*, and at that preſent is ſubject to ſhake the *Letter* in the *Galley* down.

I ſhall not offer to impoſe Rules upon any here, eſpecially ſince I have no Authority from Preſcript or Cuſtom; yet I ſhall ſet down the Scantlings that I my ſelf thought fit to uſe on this occaſion. A Delineation of the *Frames* are in Plate 1. at C.

a a a a The *Fore-Rails.*
b b b b The *Hind-Rails.*
c The *Top Fore-Rail.*
d The *Bottom-Fore-Rail.*
e The *Top Hind-Rail.*
f The *Bottom Hind Rail.*
g g g g The *End Rail.*
h h h h Croſs Bearers.

I made the *Rails* and *Stiles* of well-ſeaſoned fine *Oak*, clean, (that is free from Knots and Shakes) the *Stiles* and *Rails* two Inches and an half ſquare, the Top and Bottom *Fore-Rails* and the Bottom *Hind-Rail* four Foot three Inches long, beſides their *Tennants*; And the Top *Hind Rail* five Foot three Inches long. The two *Fore Rails* and Bottom *Hind-Rail* had Iron Female Screws let into them, which, through an hole made in the *Stiles*, received a Male-Screw with a long ſhank, and a Sholder at the end of it to ſcrew them tight and firm together, even as the Rails of a *Bedſted* are ſcrewed into the *Morteſſes* of a *Bed Poſt.*

Each *Back Stile* was four Foot one Inch and an half high beſides their *Tennants*, and each *Fore-Stile* three Foot three Inches high; each *Fore* and *Back-Stile* had two *Rails* one Foot ſeven Inches long, beſides their *Tennants* Tennanted and Pin'd into them, becauſe not intended to be taken aſſunder.

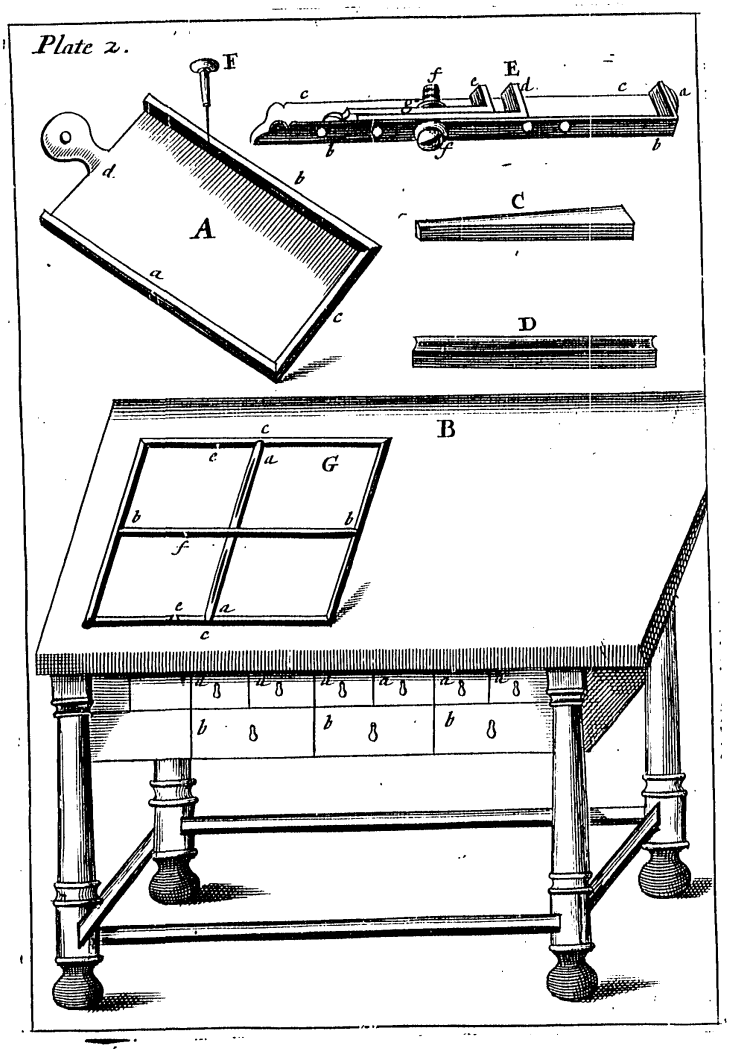
It muſt be conſidered, that the *Fore-ſtiles* be of a convenient height for the pitch of an ordinary Man to ſtand and work at, which the heighth aforeſaid is; And that the *Hind ſtiles* be ſo much higher than the *Fore-ſtiles*, that when the *Croſs-Bearers* are laid upon the upper *Fore* and *Hind-Rail*, and the *Caſes* laid on them, the *Caſes* may have a convenient declivity from the upper ſide the *Upper-Caſe*, to the lower ſide the *Lower-Caſe*.

The Reaſon of this declivity is, becauſe the *Caſes* ſtanding thus before the Workman, the farther *Boxes* of the *Upper-Caſe* are more ready and eaſie to come at, than if they lay flat; they being in this poſition ſomewhat nearer the hand, and the *Letters* in thoſe *Boxes* ſomewhat eaſier ſeen.

If the Workman prove taller than Ordinary, he lays another or two pair of *Caſes* under the *Caſes* he uſes, to mount them: If the Workman be ſhort, as Lads, *&c.* He lays a *Paper-board* (or ſometimes two) on the floor by the Fore-ſide of the *Frame*, and ſtanding to work on it, mounts himſelf.

The *Bearers* are made of *Slit-Deal*, about two Inches broad, and ſo long as to reach from the *Fore-Rail* through the *Upper-Rail*, and are let in, ſo as to lye even with the ſuperficies of the *Fore* and *Hind-Rail*, and at ſuch a diſtance on both the *Rails*, as you may ſee in the Figure.

On



On the Superficies of the *Fore-Rail*, even with its Fore-Edge is nailed a ſmall *Riglet* about half an Inch high, and a quarter and half quarter of an Inch thick, that the *Caſes* ſet on the *Frame* having the aforeſaid declivity, may by it be ſtop't from ſliding off.

§. 5. *Of the* Galley.

Our *Maſter-Printer* is alſo to provide *Galleys* of different ſizes, That the *Compoſiter* may be ſuited with ſmall ones when he *Compoſes* ſmall *Pages*, and with great ones for great *Pages*.

The *Galley* is marked A in Plate 2.

a b c The Sides or Frame of the *Galley*.
d The *Slice*.

Theſe *Galleys* are commonly made of two flat *Wainſcot Boards*, each about a quarter and half quarter of an Inch thick, the uppermoſt to ſlide in Grooves of the Frame, cloſe down to the undermoſt, though for ſmall *Pages* a ſingle Board with two ſides for the Frame may ſerve well enough: Thoſe *Wainſcot Boards* are an Oblong Square, having its length longer than its breadth, even as the form of a *Page* hath. The three Sides of the Frame are fixed faſt and ſquare down on the upper Plain of the undermoſt Board, to ſtand about three fifth parts of the height of the *Letter* above the ſuperficies of the *Slice*. The Sides of the Frame muſt be broad enough to admit of a pretty many good ſtrong *Oaken Pins* along

the Sides, to be drove hard into the Bottom Board, and almoſt quite through the Sides of the Frame, that the Frame may be firmly fixed to it: But by no means muſt they be Glewed on to the Bottom Board, becauſe the *Compoſiter* may ſometimes have occaſion to wet the *Page* in the *Galley*, and then (the *Galley* ſtanding aſlope upon the *Caſe*) the Water will ſoak between the ſides of the Frame, and under Board, and quickly looſen it.

§. 6. *Of the* Correcting-ſtone.

The *Correcting-Stone* marked B in Plate 2. is made of *Marble*, *Purbeck*, or any other Stone that may be made flat and ſmooth: But yet the harder the Stone is the better; wherefore *Marble* is more preferable than *Purbeck*. Firſt, Becauſe it is a more compact Stone, having fewer and ſmaller Pores in it than *Purbeck*. And Secondly, becauſe it is harder, and therefore leſs ſubject to be prick'd with the corners of a *Chaſe*, if through careleſneſs (as it ſometimes happens) it be pitch'd on the Face of the Stone.

It is neceſſary to have it capacious, *viz.* large enough to hold two *Chaſes* and more, that the *Compoſiter* may ſometimes for his convenience, ſet ſome *Pages* by on it ready to *Impoſe*, though two *Chaſes* lye on the *Stone*: Therefore a *Stone* of about Four Foot and an half long, and Two Foot broad is a convenient ſize for the generality of Work.

This *Stone* is to be laid upon a ſtrong *Oaken*-wood Frame, made like the Frame of a common Table, ſo high, that the Face of the *Stone* may lye about three Foot

Foot and an Inch above the Floor: And under the upper Rail of the Frame may be fitted a Row or two of Draw-Boxes, as at *a a a a a a* and *b b b* on each of its longeſt Sides to hold *Flowers*, *Braſs-Rules*, *Braces*, *Quotations*, ſmall *Scabbords*, &c.

§. 7. *Of* Letter-Boards, *and* Paper-Boards.

Letter-Boards are Oblong Squares, about two Foot long, eighteen Inches broad, and an Inch and a quarter thick. They ought to be made of clean and well-ſeaſon'd Stuff, and all of one piece: Their upper-ſide is to be Plained very flat and ſmooth, and their under-ſide is Clamped with pieces about two Inches ſquare, and within about four Inches of either end, as well to keep them from Warping, as to bear them off the Ground or any other Flat they ſtand on, that the Fingers of the *Compoſiter* may come at the bottom of the Board to remove it whither he will: They are commonly made of *Fir*, though not ſo thick as I have mentioned, or all of one Piece: *Deal-Boards* of this breadth may ſerve to make them of; but *Joyners* commonly put *Maſter-Printers* off with ordinary *Deal-Boards*, which not being broad enough, they joyn two together; for which cauſe they frequently ſhrink, ſo as the joynt comes aſſunder, and the *Board* becomes uſeleſs, unleſs it be to ſerve for a *Paper-Board* afterwards: For ſmall and thin *Letters* will, when the Form is open, drop through, ſo as the *Compoſiter* cannot uſe the Board.

I us'd to make them of *Sugar-Cheſt*; That Stuff being commonly well-ſeaſon'd, by the long lying of the

Sugar

Sugar in it, and is beſides a fine hard Wood, and therefore leſs ſubject to be injured by the end of the *Shooting-Stick* when a *Form* is *Unlocking*.

Paper Boards are made juſt like the *Letter-Boards*, though ſeldom ſo large, unleſs for great Work: Nor need ſuch ſtrict care be taken in making them ſo exactly ſmooth: their Office being only to ſet *Heaps of Paper* on, and to *Preſs* the *Paper* with.

§. 8. *Of* Furniture, Quoyns, Scabbord, *&c.*

By *Furniture* is meant the *Head-ſticks*, *Foot-ſticks*, *Side ſticks*, *Gutter-ſticks*, *Riglets*, *Scabbords* and *Quoyns*.

Head ſticks and all other *Furniture*, except *Scabbord*, are made of dry *Wainſcot*, that they may not ſhrink when the *Form* ſtands by; They are *Quadrat* high, ſtraight, and of an equal thickneſs all the length: They are made of ſeveral thickneſſes for ſeveral Works, *viz.* from a *Brevier* which ſerves for ſome *Quarto's* to ſix or eight *Pica* thick, which is many times us'd to *Folio's*: And many of the *Head ſticks* may alſo ſerve to make Inner *Side ſticks* of; for the *Maſter Printer* provides them of lengths long enough for the *Compoſiter* to cut to convenient Scantlins or Lengths, they being commonly about a Yard long when they come from the *Joyners*. And *Note*, that the *Head* and *Side-ſticks* are called *Riglets*, if they exceed not an *Engliſh* thick.

Outer *Side-ſticks* and *Foot ſticks* marked C in Plate 2. are of the ſame heighth of the *Head-ſticks*, *viz.* *Quadrat* high, and are by the *Joyner* cut to the given length, and to the breadth of the particular *Pages* that

that are to be *Impoſed*: The *Side-ſticks* are placed againſt the outer ſide of the *Page*, and the *Foot-ſticks* againſt the foot or bottom of the *Page*: The outer ſides of theſe *Side* and *Foot-ſticks* are bevil'd or ſloped from the further to the hither end.

Gutter-ſticks marked D in Plate 2. are as the former, *Quadrat* high, and are uſed to ſet between *Pages* on either ſide the *Croſſes*, as in *Octavo's*, *Twelves*, *Sixteens*, and *Forms* upwards; They are made of an equal thickneſs their whole length, like *Head-ſticks*; but they have a Groove, or Gutter laid on the upper ſide of them, as well that the Water may drain away when the *Form* is Waſhed or Rinced, as that they ſhould not *Print*, when through the tenderneſs of the *Tinpan*, the *Plattin* preſſes it and the *Paper* lower than ordinary.

Scabbord is that ſort of *Scale* commonly ſold by ſome *Iron-mongers* in Bundles; And of which, the *Scabbords* for *Swords* are made: The *Compoſiter* cuts it *Quadrat* high, and to his Length.

The *Maſter-Printer* is to provide both *Thick* and *Thin Scabbord*, that the *Compoſiter* may uſe either when different Bodied *Letter* happens in a *Page*, to juſtifie the *Page* to a true length; And alſo that the *Preſsman* may chuſe *Thick* or *Thin* to make truer *Regiſter*, as ſhall be ſhewed in proper place.

Quoyns are alſo *Quadrat* high, and have one of their ſides Bevil'd away to comply with the Bevil of the *Side* and *Foot-ſticks*; they are of different Lengths, and different Breadths: The great *Quoyns* about three Inches ſquare, except the Bevil on one ſide as aforeſaid; and theſe ſizes deminiſh downwards

to an Inch and an half in length, and half an Inch in breadth.

Of these *Quoyns* our *Master-Printer* provides several hundreds, and should provide them of at the least ten different Breadths between the aforesaid sizes, that the *Compositer* may chuse such as will best fit the *Chase* and *Furniture.*

The Office of these *Quoyns* are to *Lock* up the *Form, viz.* to wedge it up (by force of a *Mallet* and *Shooting-stick*) so close together, both on the sides and between Head and Foot of the *Page,* that every *Letter* bearing hard against every next *Letter,* the whole *Form* may *Rise*; as shall be shewed hereafter.

Their farther Office is to make *Register* at the *Press.*

§. 9. ¶. 1. *Of the* Mallet, Shooting-stick *and* Dressing-Block, Composing-sticks, Bodkin, *and* Chase. *&c.*

Printers Mallets have a *Cilindrick* Head, and a round Handle; The Head somewhat bigger, and the Handle somewhat longer than those *Joyners* commonly use; Yet neither shape or size different for any reason to be given: But only a Custom always used to have them so. The Head is commonly made of *Beech.*

¶. 2. *Of*

¶. 2. *Of the* Shooting-stick.

The *Shooting-stick* must be made of *Box,* which Wood being very hard, and withal tough, will best and longest endure the knocking against the *Quoyns.* Its shape is a perfect Wedge about six Inches long, and its thicker end two Inches broad, and an Inch and an half thick; and its thin end about an Inch and an half broad, and half an Inch thick.

¶. 3. *Of the* Dressing-Block.

The *Dressing-Block* should be made of *Pear-tree,* Because it is a soft wood, and therefore less subject to injure the Face of the *Letter*; it is commonly about three Inches square, and an Inch high. Its Office is to run over the Face of the *Form,* and whilst it is thus running over, to be gently knock't upon with the Head of the *Shooting stick,* that such *Letters* as may chance to stand up higher than the rest may be pressed down.

Our *Master-Printer* must also provide a pair of *Sheers,* such as *Taylors* use, for the cutting of *Brass-Rules, Scabbords,* &c.

A large *Spunge* or two, or more, he must also provide, one for the *Compositers* use, and for every *Press* one.

Pretty fine *Packthread* to tye up *Pages* with; But this is often chosen (or at least directed) by the *Compositer,* either finer or courser, according to the great or small *Letter* he works upon.

 ¶. 4. *Of*

¶. 4. *Of the* Compoſing-ſtick.

Though every *Compoſiter* by Cuſtom is to provide himſelf a *Compoſing-ſtick*, yet our *Maſter-Printer* ought to furniſh his Houſe with theſe Tools alſo, and ſuch a number of them as is ſuitable to the ſize of his Houſe; Becauſe we will ſuppoſe our *Maſter-Printer* intends to keep ſome Apprentices, and they, unleſs by contract or courteſie, are not uſed to provide themſelves *Compoſing-ſticks*: And beſides, when ſeveral *Compoſiters* work upon the ſame Book, their Meaſures are all ſet alike, and their *Titles* by reaſon of *Notes* or *Quotations* broader than their common Meaſure, So that a *Compoſing-ſtick* is kept on purpoſe for the *Titles*, which muſt therefore be common to all the *Compoſiters* that work upon that Work; And no one of them is obliged to provide a *Compoſing-ſtick* in common for them all: Therefore it becomes our *Maſter-Printers* task to provide them.

It is delineated in Plate 2. at *E*.

a The *Head.*
b b The *Bottom.*
c c The *Back.*
d The lower *Sliding-Meaſure*, or *Cheek.*
e The upper *Sliding Meaſure*, or *Cheek.*
f f The *Male-Screw.*
g The *Female-Screw.*

Theſe *Compoſing-ſticks* are made of Iron Plate about the thickneſs of a thin *Scabbord*, and about ten Inches

Inches long doubled up ſquare; ſo as the Bottom may be half an Inch and half a quarter broad, and the Back about an whole Inch broad. On the further end of this Iron Plate thus doubled up, as at *a* is Soldered on an Iron Head about a *Long-Primmer* thick; But hath all its outer edges Baſil'd and Fil'd away into a Molding: This Iron Head muſt be ſo let into the Plate, and Soldered on to it, that it may ſtand truly ſquare with the bottom, and alſo truly ſquare with the Back, which may be known by applying the outer ſides of a ſquare to the Back and Bottom; as I ſhewed, *Numb.* 3. *Fol.* 38, 39. About two Inches from the Head, in the Bottom, is begun a row of round holes about an Inch aſunder, to receive the ſhank of the *Male-Screw* that ſcrews the *Sliding Meaſures* faſt down to the Bottom; ſo that the *Sliding-Meaſures* may be ſet nearer or further from the Head, as the Meaſure of a *Page* may require.

The lower *Sliding-Meaſure* marked *d* is an Iron Plate a *thick Scabbord* thick, and of the Breadth of the inſide of the Bottom; It is about four Inches long, and in its middle hath a Groove through it within half an Inch of the Fore-end, and three quarters of an Inch of the hinder end. This Groove is ſo wide all the way, that it may receive the Shank of the *Screw*. On the Fore-end of this Plate ſtands ſquare upright another Iron Head about a *Brevier* thick, and reaches ſo high as the top of the Back.

The upper *Sliding-Meaſure* is made juſt like the lower, only it is about three quarters of an Inch ſhorter.

Between these two *Sliding-Measures*, *Marginal Notes* are *Composed* to any Width.

Compositers commonly examine the Truth of their *Stick* by applying the head of the *Sliding-Measure* to the inside of the Head of the *Stick*; and if they comply, they think they are square and true made: But this Rule only holds when the Head it self is square. But if it be not, 'tis easy to file the *Sliding-Measures* to comply with them: Therefore, as aforesaid, the square is the only way to examine them by.

¶. 5. *Of the* Bodkin.

The *Bodkin* is delineated in Plate 2. at *F* Its *Blade* is made of *Steel*, and well tempered, its shape is round, and stands about two Inches without the *Shank* of the *Handle*. The *Handle* is turned of soft wood as *Alder*, *Maple*, &c. that when *Compositers* knock the Head of the *Bodkin* upon the Face of a Single *Letter* when it stands too high, it may not batter the Face.

¶. 6. *Of* Chases, *marked* G *on the* Correcting-Stone, *Plate* 2.

A *Chase* is an Iron Frame about two and twenty Inches long, eighteen Inches broad, and half Inch half quarter thick; and the breadth of Iron on every side is three quarters of an Inch: But an whole Inch is much better, because stronger. All its sides must stand exactly square to each other; And when it is laid on the *Correcting-Stone* it must lye exactly flat, *viz.*

viz. equally bearing on all its sides and Angles: The outside and inside must be Filed straight and smooth. It hath two *Crosses* belonging to it, *viz.* A *Short-Cross* marked *a a* and a *Long-Cross* marked *b b*: These two *Crosses* have on each end a Male Dustail Filed Bevil away from the under to the upper side of the *Cross*, so that the under side of the Dustail is narrower than the upper side of the Dustail. These Male-Dustails are fitted into Female-Dustails, Filed in the inside of the *Chase*, which are also wider on the upper side of the *Chase* than on the under side; because the upper side of the *Cross* should not fall through the lower side. These *Crosses* are called the *Short* and the *Long Cross*.

The *Short-Cross* is Dustail'd in as aforesaid, just in the middle of the *Chase* as at *c c*, and the *Long Cross* in the middle of the other sides the *Chase*, as at *d d*. The *Short-Cross* is also Dustail'd into Female-Dustails, made as aforesaid, about three Inches and an half from the middle; as at *e e*: So that the *Short Cross* may be put into either of the Female-Dustails as occasion serves. The middle of these two *Crosses* are Filed or notched half way through, one on its upper, the other on its under side to let into one another, *viz.* the *Short-Cross* is Filed from the upper towards the under side half way, and the *Long-Cross* is Filed from the lower towards the upper-side half way: The *Crosses* are also thus let into each other, where they meet at *f*, when the *Short-Cross* is laid into the other Female-Dustails fitted to it at *e e*.

In the middle, between the two edges of the upper side of the *Short-Cross*, is made two Grooves parallel

rallel to the ſides of the *Croſs*, beginning at about two Inches from each end, and ending at about ſeven Inches from each end: It is made about half an Inch deep all the way, and about a quarter of an Inch broad, that the *Points* may fall into them. The *Short-Croſs* is about three quarters of an Inch thick, and the *Long Croſs* about half that thickneſs. All their ſides muſt be Fil'd ſtraight and ſmooth, and they muſt be all the way of an equal thickneſs.

Hitherto our *Maſter-Printer* hath provided Materials and Implements only for the *Compoſiters* uſe; But he muſt provide Machines and Tools for the *Preſsmans* to uſe too: which (becauſe I am loath to diſcourage my Cuſtomers with a ſwelling price at the firſt reviving of theſe Papers) I ſhall (though againſt my intereſt) leave for the ſubject of the next ſucceeding *Exerciſes*.

Plate 3.

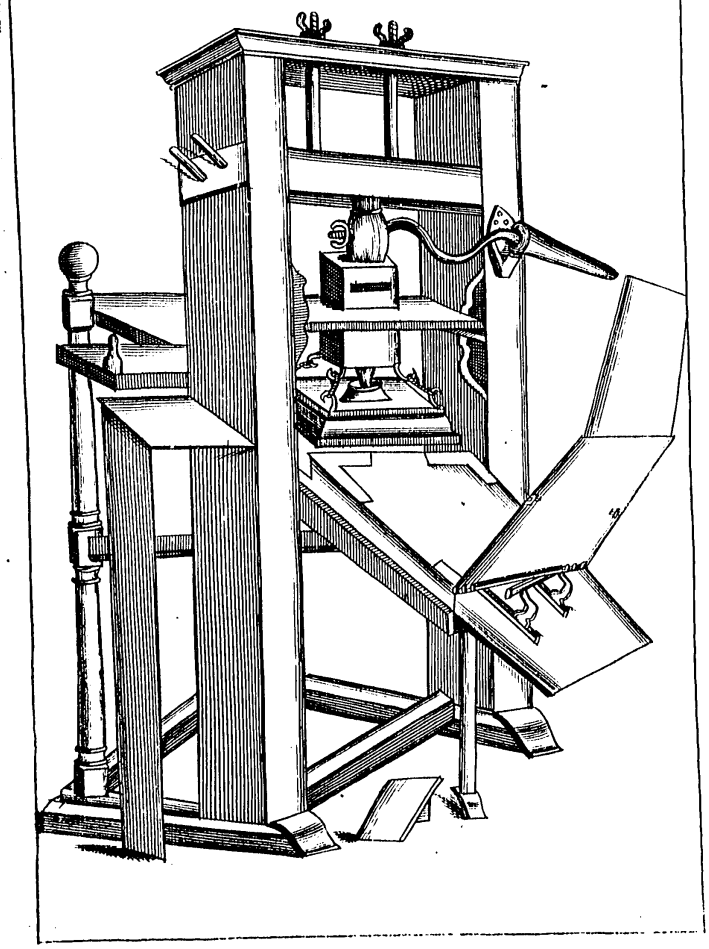
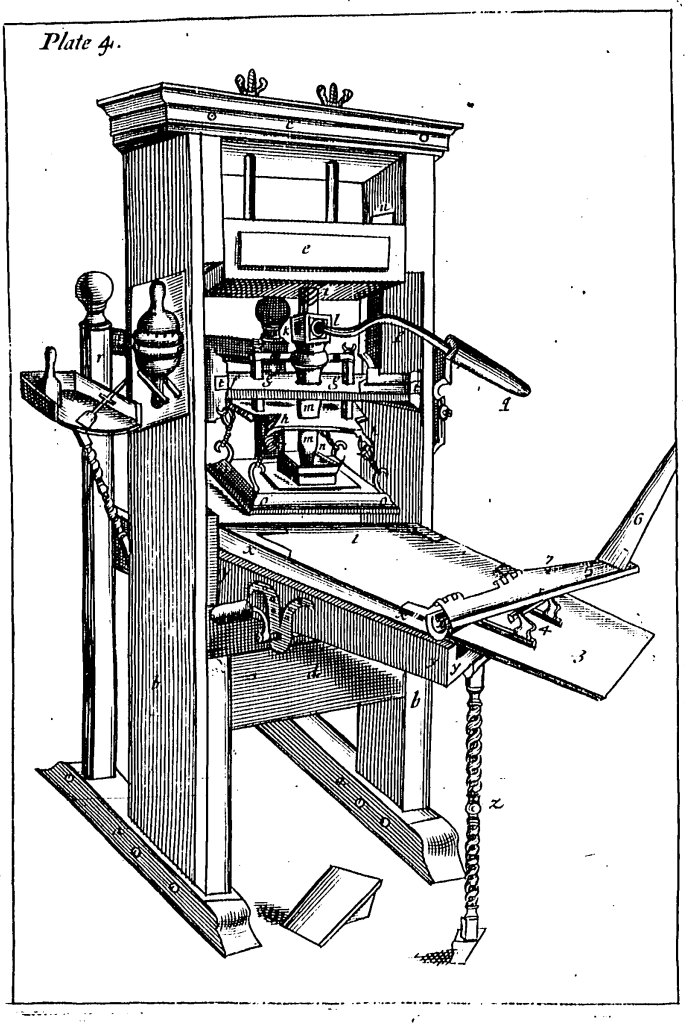


Plate 4.



MECHANICK EXERCISES:

Or, the Doctrine of

Handy-works.

Applied to the Art of

Printing.

The Second VOLUMNE.

§. 10. *Of the* Preſs.

THere are two ſorts of *Preſſes* in uſe, *viz.* the old faſhion and the new faſhion; The old faſhion is generally uſed here in *England*; but I think for no other reaſon, than becauſe many *Preſs-men* have ſcarce Reaſon enough to diſtinguiſh between an excellently improved Invention, and a make-ſhift ſlovenly contrivance, practiced in the minority of this Art.

The New-faſhion'd *Preſſes* are uſed generally throughout all the *Low-Countries*; yet becauſe the

Old-fashion'd *Presses* are used here in *England* (and for no other Reason) I have in Plate 3. given you a delineation of them; But though I give you a draft of them; yet the demensions of every particular Member I shall omit, referring those that think it worth their while, to the *Joyners* and *Smiths* that work to *Printers*: But I shall give a full description of the New-fashion'd *Press*, because it is not well known here in *England*; and if possible, I would for Publick benefit introduce it.

But before I proceed, I think it not amiss to let you know who was the Inventer of this New-fashion'd *Press*, accounting my self so much oblig'd to his Ingeniety for the curiosity of this contrivance, that should I pass by this oppertunity without nameing him, I should be injurious to his Memory.

It was *Willem Janſen Blaew* of *Amsterdam*: a Man as well famous for good and great *Printing*, as for his many *Astronomical* and *Geographical* exhibitions to the World. In his Youth he was bred up to *Joynery*, and having learn'd his Trade, betook himself (according to the mode of *Holland*) to Travel, and his fortune leading him to *Denmark*, when the noble *Tycho Brahe* was about setting up his *Astronomical Observatory*, was entertain'd into his service for the making his Mathematical-Instruments to Observe withal; in which Instrument-making he shew'd himself so intelligent and curious, that according to the general report of many of his personal acquaintance, all or most of the *Syderal Observations* set forth in *Tycho*'s name, he was intrusted to make, as well as the Instruments.

And

And before these Observations were publish'd to the World, *Tycho*, to gratify *Blaew*, gave him the Copies of them, with which he came away to *Amsterdam*, and betook himself to the making of *Globes*, according to those Observations. But as his Trade increased, he found it necessary to deal in *Geographical Maps* and *Books* also, and grew so curious in *Engraving*, that many of his best *Globes* and *Maps* were *Engraved* by his own Hands; and by his conversation in *Printing* of Books at other *Printing-houses*, got such in-sight in this Art, that he set up a *Printing-house* of his own. And now finding inconveniencies in the obsolete Invention of the *Press*, He contrived a remedy to every inconvenience, and fabricated nine of these New-fashioned *Presses*, set them all on a row in his *Printing-house*, and call'd each *Press* by the name of one of the *Muses*.

This short History of this excellent Man is, I confess forraign to my Title; But I hope my Reader will excuse the digression, considering it tends only to the commemoration of a Person that hath deserved well of Posterity, and whose worth without this small Monument, might else perhaps have slid into Oblivion.

The *Press* is a Machine consisting of many Members; it is delineated in Plate 4.

a a The *Feet.*
b b The *Cheeks.*
c The *Cap.*
d The *Winter.*
e The *Head.*
f The *Till.*

g g The *Hose*. In the Cross-Iron of which, encompassing the *Spindle*, is the *Garter*.

h h h h The *Hooks* on the *Hose* the *Plattin* hangs on.

i k l m n The *Spindle*.

i Part of the *Worm* below the *Head*, whose upper part lies in the *Nut* in the *Head*.

k l The *Eye* of the *Spindle*.

m The *Shank* of the *Spindle*.

n The *Toe* of the *Spindle*.

o o o o The *Plattin* tyed on the *Hooks* of the *Hose*.

p The *Bar*.

q The *Handle* of the *Bar*.

r r The *Hind-Posts*.

s s The *Hind-Rails*.

t t The *Wedges* of the *Till*.

u u The *Mortesses* of the *Cheeks*, in which the *Tenants* of the *Head* plays.

x x x x y y The *Carriage*.

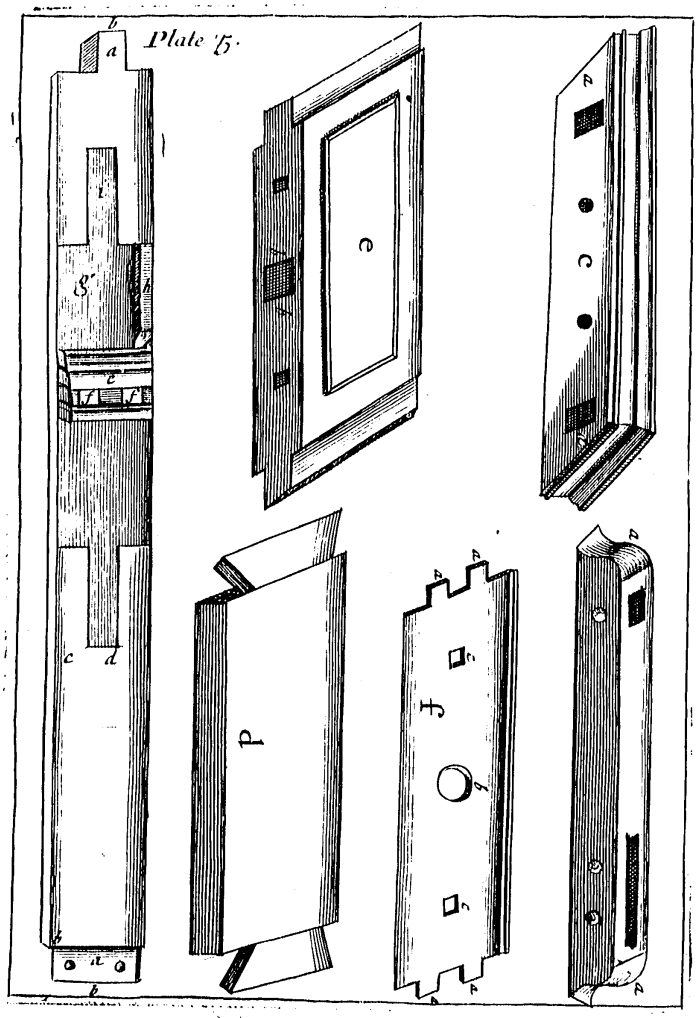
x x x x The outer *Frame* of the *Carriage*.

y y The *Wooden-Ribs* on which the *Iron-Ribs* are fastned.

z The *Stay* of the *Carriage*, or the *Stay*.

1. The *Coffin*.
2. The *Gutter*.
3. The *Planck*.
4. The *Gallows*.
5. The *Tinpans*.
6. The *Frisket*.
7. The *Points*.
8. The *Point-Screws*.

All these several Members, by their Matter, Form and Position, do particularly contribute such an assistance



ſiſtance to the whole Machine, that it becomes an Engine managable and proper for its intended purpoſe.

But becauſe the ſmallneſs of this altogether-Draft may obſcure the plain appearance of many of theſe Parts; Therefore I ſhall give you a more particular deſcription, and large delineation of every Member in the *Preſs*: And firſt of the Wooden work: Where, *Note*, that all the Fram'd Wooden-work of a *Preſs* is made of Good, Fine, Clean, Well-ſeaſon'd *Oak*.

¶. 1. *Of the* Feet.

The *Feet* (marked *a a* in Plate 5.) are two Foot nine Inches and an half long, five Inches deep; and ſix Inches broad, and have their out-ſides Tryed to a true ſquare, as was taught, *Numb.* 5. §. 15. It hath (for ornament ſake) its two ends bevil'd away in a Molding, from its upper-ſide to its lower, about four Inches within the ends; about four Inches and three quarters within each end of each Foot is made in the middle of the Breadth of the upper-ſide of the Foot a Morteſs two Inches wide, to receive the *Tennants* of the lower-end of the *Cheek*, and the *Tennant* of the lower end of the *Hind-Poſt*: The Morteſs for the *Cheek* is eight Inches long, *viz.* the Breadth of the *Cheek*: And the Morteſs for the Hind-Poſt is four Inches long, *viz.* the ſquare of the *Hind-Poſt*.

¶. 2. *Of the* Cheeks.

The *Cheeks* (marked *b b* in Plate 5) are five Foot and ten Inches long (beſides the *Tennants* of the top

and bottom) eight Inches broad, and four Inches and an half thick. All its Sides are tryed ſquare to one another. It hath a *Tennant* at either end, its lower *Tennant* marked *a* to enter the Fore-end of the Foot, runs through the middle of the Breadth of the *Cheek*, which therefore is made to fit the Morteſs in the *Foot*, and is about four Inches long, and therefore reaches within an Inch of the bottom of the *Foot*; But the *Tennant* at the upper end of the *Cheek* marked *a*, is cut a-thwart the breadth of the *Cheek*, and therefore can have but four Inches and an half of Breadth, and its thickneſs is two Inches, Its length is four Inches; ſo that it reaches into the Morteſs in the *Cap*, within half an Inch of the Top.

In the lower-end *Tennant* is two holes bored, within an Inch and an half of either ſide, and within an Inch and an half of the Sholder, with a three quarter Inch *Augure*, to be pin'd into the *Feet* with an Iron Pin.

In the middle of the upper *Tennant*, and within an Inch and an half of the Sholder, is bored another hole, to Pin the *Tennant* into the *Cap*, alſo with an Iron Pin.

Between *b c* two Foot and half an Inch, and three Foot ſeven Inches of the Bottom Sholder of the *Tennant*, *viz.* from the top of the *Winter* to the under Sholder the *Till* reſts upon, is cut flat away into the thickneſs of the *Cheek*, three Inches in the Inſide of the *Cheek*; ſo that in that place the *Cheek* remains but an Inch and an half thick: And the *Cheeks* are thus widened in this place, as well becauſe the Duftail *Tennants* of the *Winter* may go in between them, as alſo

ſo that the *Carriage* and *Coffin* may be made the wider.

Even with the lower Sholder of this flat cutting-in, is made a Duftail Morteſs as at *d*, to reach eight Inches and an half, *viz.* the depth of the *Winter* below the ſaid Sholder. This Morteſs is three Inches wide on the inſide the *Cheek*, and three Inches deep; But towards the inſide the *Cheek*, the Morteſs widens in a ſtraight line from the ſaid three Inches to five Inches, and ſo becomes a Duftail Morteſs. Into this Duftail Morteſs is fitted a Duftail *Tennant*, made at each end of the *Winter*.

Two Inches above the aforeſaid Cutting-in, is another cutting-in of the ſame depth, from the Inſide the *Cheek* as at *e*. This cutting-in is but one Inch broad at the farther ſide the *Cheek*, and an Inch and a quarter on the hither ſide the *Cheek*. The under ſide of this Cutting-in, is ſtraight through the *Cheek*, *viz.* Square to the ſides of the *Cheek*: But the upper ſide of this Cutting-in, is not ſquare through the *Cheeks*, But (as aforeſaid) is one quarter of an Inch higher on the fore-ſide the *Cheek* than it is on the further ſide; So that a Wedge of an Inch at one end, and an Inch and a quarter at the other end may fill this Cutting-in.

At an Inch within either ſide the *Cheek*, and an Inch below this Cutting-in, as at *f f*, is made a ſmall Morteſs an Inch and an half wide, to which two *Tennants* muſt be fitted at the ends of the *Till*, ſo that the *Tennants* of the *Till* being ſlid in through the Cutting-in aforeſaid, may fall into theſe Morteſſes; and a Wedge being made fit to the Cutting-in, may preſs upon the *Tennants* of the *Till*, and force it down to keep it ſteddy in its place. Here

Here we ſee remains a ſquare Sholder or ſubſtance of Wood between two Cuttings-in; But the under corner of this ſquare Sholder is for Ornament-ſake Bevil'd away and wrought into an *Ogee*.

At two Inches above the laſt Cutting-in, is another Cutting-in, but this Cutting-in goes not quite through the breadth of the *Cheek*, but ſtops at an Inch and an half within the further ſide the *Cheek*; So that above the *Till* and its *Wedge* is another Sholder or ſubſtance of Wood, whoſe upper Corner is alſo Bevil'd away, and wrought to a Molding as the former.

The laſt Cutting-in is marked *g*, and is eight Inches and a quarter above the Sholder of the *Till*, that it may eaſily contain the depth of the *Head*; The ſubſtance remaining is marked *h*. This Cutting-in is made as deep into the thickneſs of the *Cheek* as the former Cuttings-in are, *viz.* three Inches; and the reaſon the *Cheek* is cut-in here, is, that the *Cheeks* may be wide enough in this place to receive the *Head*, and its *Tennants*, without un-doing the *Cap* and *Winter*.

Juſt above this Cutting-in is made a ſquare Morteſs in the middle of the *Cheek*, as at *i*, it is eight Inches long, and two Inches and an half wide, for the *Tennant* of the *Head* to play in.

Upon the fore-ſide of the *Cheek* is (for Ornament ſake) laid a Molding through the whole length of the *Cheek* (a ſquare at the Top and Bottom an Inch deep excepted) it is laid on the outer ſide, and therefore can be but an Inch broad; Becauſe the Cuttings-in on the inſide leaves the ſubſtance of Stuff but an Inch

Inch and an half thick, and ſhould the Moldings be made broader, it would be interrupted in the ſeveral Cuttings in, or elſe a ſquare of a quarter of an Inch on either ſide the Molding could not be allowed, which would be ungraceful.

¶. 3. *Of the* Cap *marked* c *in Plate* 5.

The *Cap* is three Foot and one Inch long, four Inches and an half deep, and nine Inches and an half broad; But its fore-ſide is cut away underneath to eight Inches, *Viz* the breadth of the *Cheeks*. Three quarters of an Inch above the bottom of the *Cap*, is a ſmall *Facia*, which ſtands even with the thickneſs of the *Cheeks*; Half an Inch above that a Bead-Molding, projecting half an Inch over the *Facia*. Two Inches above that a broad *Facia*, alſo even with the thickneſs of the *Cheeks*; and an Inch and a quarter above that is the upper Molding made projecting an Inch and an half over the two *Facia*'s aforeſaid, and the thickneſs of the *Cheeks*.

Each end of the *Cap* projects three Inches quarter and half quarter over the *Cheeks*, partly for Ornament, but more eſpecially that ſubſtance may be left on either end beyond the Morteſſes in the *Cap*; and theſe two ends have the ſame Molding laid on them that the fore-ſide of the *Cap* hath.

Within two Inches and half quarter of either end, on the under-ſide the *Cap* is made a ſquare Morteſs two Inches wide, and four Inches and an half long, *viz.* the thickneſs of the *Cheek* inwards, as at *a a*, to receive the Top *Tennants* of the *Cheeks*; which Top

Tennants are with an Iron Pin(made tapering of about three quarters of an Inch thick) pin'd into the Mortesis of the *Cap*, to keep the *Cheeks* steddy in their position.

¶. 4. *Of the* Winter *marked* d *in* Plate 5.

The Length of the *Winter* besides the *Tennants*, is one Foot nine Inches and one quarter of an Inch; The Breadth of the *Winter* eight Inches, *viz.* the Breadth of the *Cheek*, and its depth nine Inches; all its sides are tryed square; But its two ends hath each a Duftail-*Tennant* made through the whole depth of the *Winter*, to fit and fall into the Duftail Mortesses made in the *Cheeks*: These Duftail-*Tennants* are intended to do the Office of a *Summer*, Because the spreading of the ends of these two *Tennants* into the spreading of the Mortesses in the *Cheeks*, keeps the two *Cheeks* in a due distance, and hinders them from flying asunder.

But yet I think it very convenient to have a *Summer* also, the more firmly and surer to keep the *Cheeks* together; This *Summer* is only a Rail *Tennanted*, and let into Mortesses made in the inside of the *Cheeks*, and Screwed to them as the Rails described, *Numb.* 15. §. 4. are Screwed into the Stiles of the *Case-Frame*; Its depth four Inches and an half, and its breadth eight Inches, *viz*, the breadth of the *Cheeks*.

¶. 5. *Of*

¶. 5. *Of the* Head *marked* e *in* Plate 5.

The length of the *Head* besides the *Tennant* at either end, is one Foot nine Inches and one quarter of an Inch; The breadth eight Inches and an half, and its depth eight Inches. The Top, Bottom and Hind-sides are tryed Square, but the foreside projects half an Inch over the Range of the fore-sides of the *Cheeks*; in which Projecture is cut a Table with a hollow Molding about it, two Inches distant from all the sides of the fore-side of the *Head*: Its *Tennants* are three Inches Broad, and are cut down at either end, from the top to the bottom of the *Head*, and made fit to the Mortesses in the *Cheeks*, that they may slide tight, and yet play in them.

In the under-side of the *Head* is cut a square Hole, (as at *a*,) about four Inches square, and three Inches and an half deep, into which the *Brass-Nut* is to be fitted: And to keep this *Nut* in its place(lest the weight of it should make it fall out)is made on either side the square hole, at about half an Inch distance from it, (as at *b b*) a square Hole quite through the Top and Bottom of the *Head* about three quarters of an Inch wide; and into this square Hole is fitted a square piece of Iron to reach quite through the *Head*, having at its under-end a Hook turned square to clapse upon the under-side of the *Nut*; and on its upper-end a Male-Screw reaching about an Inch above the upper-side of the *Head*, which by the help of a Female-screw made in an Iron *Nut*, with Ears to it to turn it about draws the *Clasp* at the bottom of the Iron *Shank*

close against the *Nut*, and so keeps it from falling out.

In the middle of the wide square Hole that the *Nut* is let into, is bored a round Hole through the top of the *Head*, of about three quarters of an Inch wide, for the *Press-man* to pour *Oyl* in at so oft as the *Nut* and *Spindle* shall want *Oyling*.

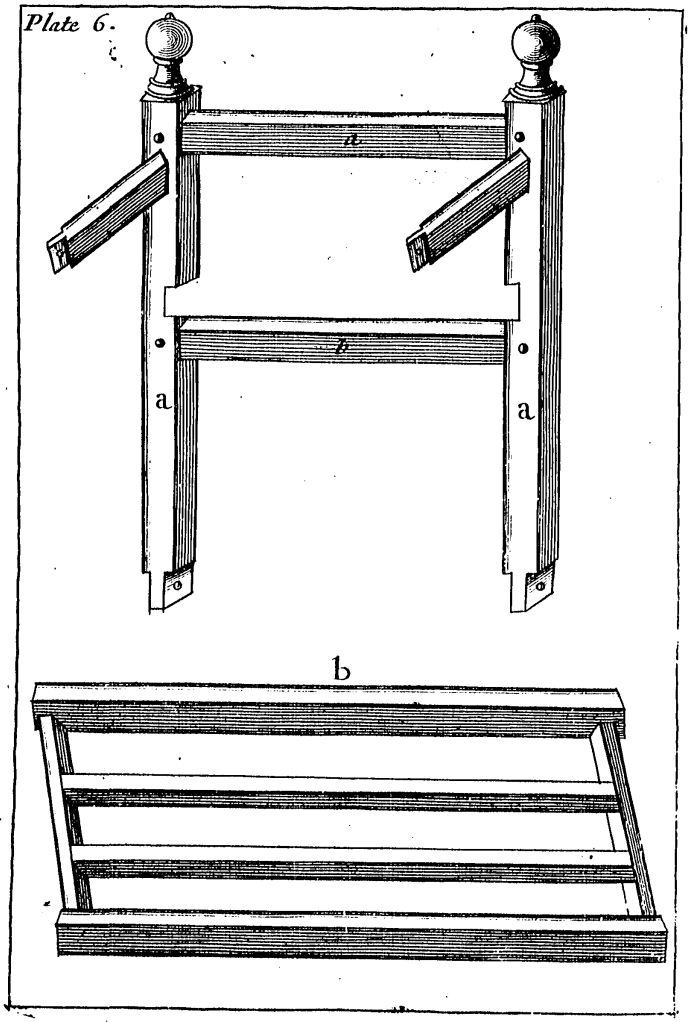
At three Inches from either end of the *Head* (as at *cc*) is bored a Hole quite through the top and bottom of the *Head*, which holes have their under ends squar'd about two Inches upwards, and these squares are made so wide as to receive a square Bar of Iron three quarters of an Inch square; But the other part of these Holes remain round: Into these Holes two Irons are fitted called the *Screws*.

The Shanks of these *Screws* are made so long as to reach through the *Head* and through the *Cap*: At the upper-end of these Shanks is made Male-screws, and to these Male-screws, Iron Female-screws are fitted with two Ears to twist them the easier about.

So much of these Iron Shanks as are to lye in the square Hole of the *Head* aforesaid, are also squared to fit those square Holes, that when they are fitted and put into the Holes in the *Head*; they may not twist about.

To the lower-ends of these Iron-Shanks are made two Square, Flat Heads, which are let into and buried in the under-side of the *Head*; And upon the Sholders of those two Flat Heads, rests the weight of the *Head* of the *Press*; And by the *Screws* at the Upper end of the Shanks are hung upon the upper-side of the *Cap*, and Screwed up or let down as occasion requires.

¶. 6. *Of*



¶. 6. *Of the* Till, *marked* f *in* Plate 5.

The *Till* is a Board about one Inch thick, and is as the *Head* and *Winter*, one Foot nine Inches and a quarter long, beſides the *Tennants* at either end; Its Breadth is the Breadth of the *Cheeks, viz.* eight Inches; It hath two *Tennants* at either end as at *a a a a*, each of them about an Inch and an half long, and an Inch and an half broad, and are made at an Inch diſtance from the fore and Back-ſide, ſo that a ſpace of two Inches is contained in the middle of the ends between the two *Tennants*; theſe *Tennants* are to be laid in the Morteſſes in the *Cheeks* delineated at *f f* in Plate 5. and deſcribed in this §. 10. ¶. 2.

In its middle it hath a round Hole about two Inches and an half wide, as at *b*, for the Shank of the *Spindle* to paſs through.

At ſeven Inches and a quarter from either end, and in the middle between the Fore and Back-ſide, is made two ſquare Holes through the *Till*, as at *c c*, for the Iron *Hoſe* to paſs through.

¶. 7. *Of the* Hind-Poſts *marked* a a *in* Plate 6.

At one Foot diſtance from the Hind-ſides of the *Cheeks* are placed upright to *Hind-Poſts*, they are three Foot and four Inches long beſides the *Tennants*, which *Tennants* are to be placed in the Morteſſes in the hinder ends of the *Feet*; Their thickneſs is four Inches on every ſide, and every ſide is tryed ſquare;

But within eight Inches of the top is turned a round Ball with a Button on it, and a Neck under it, and under that Neck a ſtraight Plinth or Baſe: This turn'd work on the top is only for Ornament ſake.

There are ſix *Rails* fitted into theſe *Hind-Poſts*, two behind marked *a b*, one of them ſtanding with its upper ſide at two Inches below the turned Work, the other having its upper-ſide lying level with the upper-ſide of the *Winter*.

Theſe two *Rails* are each of them *Tennanted* at either end, and are made ſo long, that the out-ſides of the *Hind-Poſts* may ſtand Range or even with the outer-ſides of the *Cheeks*; Theſe *Tennants* at either end are let into Morteſſes made in the in-ſides of the *Hind-Poſts*, and Pin'd up with half Inch wooden Pins, Glewed in, as was ſhewn Vol. 1. *Numb.* 5. §. 17. Becauſe the two *Hind-Poſts* need not be ſeparated for any alteration of the *Preſs*.

The two *Side-Rails* on either ſide the *Preſs* are *Tennanted* at each end, and let into Morteſſes made in the *Cheeks* and *Hind-Poſts*, ſo as they may ſtand Range with the outer-ſides of the *Cheeks* and *Hind-Poſts*; But the *Tennants* that enter the Morteſſes in the *Cheeks* are not pin'd in with Wooden Pins, and Glewed, becauſe they may be taken aſſunder if need be; But are Pin'd in with Iron Pins, made a little tapering towards the entring end, ſo as they may be driven back when occaſion ſerves to alter the *Preſs*: And the *Tennants* that enter the Morteſſes in the *Hind-Poſts* are faſtned in by a Female-ſcrew, let in near the end of the *Rail*, which receives a Male-ſcrew thruſt through the *Hind Poſts*, even as I ſhew'd in §. 4.

§. 4. the *Fore* and *Back-Rails* of the *Caſe-Frames* was.

¶. 8. *Of the* Ribs *marked* b *in* Plate 6.

The *Ribs* lye within a Frame of four Foot five Inches long, one Foot eleven Inches broad; its two *End-Rails* one Inch and an half thick, its *Side-Rails* two Inches and an half thick; and the breadth of the *Side* and *End-Rails* two Inches and an half. But the *Side-Rails* are cut away in the in-ſide an Inch and an half towards the outer ſides of the *Rails*, and an Inch deep towards the Bottom ſides of the *Rails*, ſo that a ſquare *Cheek* on either *Side-Rail* remains. This cutting down of the *Outer-Rails* of the *Frame* is made, becauſe the Planck of the *Carriage* being but one Foot eight Inches an an half broad, may eaſily ſlide, and yet be gaged between theſe *Cheeks* of the *Rail*, that the *Cramp-Irons* Nailed under the *Carriage Planck* joggle not on either ſide off the *Ribs*, as ſhall more fully be ſhewn in the next §.

Between the two *Side Rails* are framed into the two *End-Rails* the two *Wooden-Ribs* two Inches and an half broad, and an Inch and an half thick; they are placed each at an equal diſtance from each *Side-Rail*, and alſo at the ſame diſtance between themſelves. Upon theſe two *Ribs* are faſt Nailed down the *Iron-Ribs*, of which more ſhall be ſaid when I come to ſpeak of the Iron-work.

¶. 9. *Of*

¶. 9. *Of the* Carriage, Coffin *and its* Planck, *marked* a *in* Plate 7.

The *Planck* of the *Carriage* is an Elm-Planck an Inch and an half thick, four Foot long, and one Foot eight Inches and three quarters broad; upon this *Planck* at its fore-end is firmly Nailed down a ſquare Frame two Foot four Inches long, one Foot ten Inches broad, and the thickneſs of its Sides two Inches and an half ſquare: This Frame is called the *Coffin*, and in it the *Stone* is *Bedded*.

Upon each of the four Corners of this *Coffin* is let in and faſtned down a ſquare Iron Plate as at *a a a a*, with Return Sides about ſix Inches long each ſide, half a quarter of an Inch thick, and two Inches and a quarter broad; upon the upper outer-ſides of each of theſe Plates is faſtned down to them with two or three Rivets through each ſide, another ſtrong Iron half an Inch deep, and whoſe outer Angles only are ſquare, but the Inner Angles are obtuſe, as being ſloped away from the Inner-Angle towards the farther-end of each inner-ſide, ſo as the *Quoins* may do the Office of a Wedge between each inner-ſide and the *Chaſe*.

The Plates of theſe Corners (as I ſaid) are let in on the outer-Angles of the upper-ſide of the Frame of the *Coffin*, ſo as the upper-ſides of the Plates lye even with it, and are Nailed down, or indeed rather Rivetted down through the bottom and top-ſides of the Frame of the *Coffin*, becauſe then the upper-ſides of the Holes in the Iron Plates being ſquare Bored

Bored (that is, made wider on the upper-ſide of the Plate, as I ſhall ſhew when I come to the making of *Mathematical Inſtruments*) the ends of the Shanks of the Iron Pins may be ſo battered into the Square-boring, that the whole Superficies of the Plate when thus Rivetted ſhall be ſmooth, which elſe with the exturberancies of Nail-heads would hinder the free ſliding of the *Quoins*.

At the hinder end of the Frame of the *Coffin* are faſtned either with ſtrong Nails, Rivets, or rather Screws, two Iron *Half-Joynts*, as at *b b*, which having an Iron Pin of almoſt half an Inch over put through them; and two *Match half-Joynts* faſtned on the Frame of the *Tympan*, theſe two *Match-half-Joynts* moving upon the Iron Pin aforeſaid, as on an *Axis*, keeps the *Tinpan* ſo truly gaged, that it always falls down upon the *Form* in the place, and ſo keeps *Regiſter* good, as ſhall further be ſhewed in proper place.

Behind the *Coffin* is Nailed on to its outſide, a Quarter, as at *c c* this Quarter is about three Inches longer than the breadth of the *Coffin*, it hath all its ſides two Inches over, and three of them ſquare; but its upper ſide is hollowed round to a Groove or Gutter an Inch and an half over. This Gutter is ſo Nailed on, that its hither end ſtanding about an Inch higher than its further end, the Water that deſcends from the *Tympan* falling into it is carried away on the farther ſide the *Coffin* by the declivity of the farther end of the Gutter, and ſo keeps the Planck of the *Carriage* neat and cleanly, and preſerves it from rotting.

Parallel to the outer sides of the hind part of the Planck of the *Carriage*, at three Inches distance from either side, is Nailed down on the upper side of the Planck two Female-Duftail Grooves, into which is fitted (so as they may slide) two Male-Duftails made on the two Feet of the *Gallows* (as at *d d*) that the *Tinpan* rests upon; and by the sliding forward or backward of these Duftail Feet, the heighth of the *Tinpan* is raised or depressed according to the Reason or Fancy of the *Press-man*.

At three Inches from the hinder Rail of the *Coffin*, in the middle, between both sides of the Planck, is cut an Hole four Inches square (as at *e e*) and upon the hither and farther side of this Hole is fastned down on each side a *Stud* made of Wood (as at *f f*) and in the middle of these two *Studs* is made a round Hole about half an Inch over, to receive the two round ends of an Iron Pin; which Iron Pin, though its ends be round, is through the middle of the Shank square, and upon that square is fitted a round *Wooden-Rowler* or *Barrel*, with a Shoulder on either side it, to contain so much of the *Girt* as shall be rowled upon it; And to one end of the *Rowler* is fastned an Iron *Circle* or *Wheel*, having on its edge *Teeth* cut to stop against a *Clicker*, when the *Rowler* with an Iron Pin is turned about to strain the *Girt*.

¶. 10. *Of the* Tympan *and* Inner-Tympan, *marked* b *in* Plate 7.

The *Tympan* is a square Frame, three sides whereof are Wood, and the fourth Iron. Its width is one Foot

Foot eight Inches, its length two Foot two Inches; the breadth of the wooden Sides an Inch and an half, and the depth one Inch.

On its short Wooden-side, *viz.* its Hind-end, at the two Corners is Rivetted an Iron *Match-Joynt*, to be pinned on to another *Half joynt* fastned on the *Hind-Rail* of the *Coffin*.

The other end, *viz.* the Fore-end of the *Tympan* is made of Iron, with a square *Socket* at either end for the Wooden ends of the *Tympan* to fit and fasten into. This Iron is somewhat thinner and narrower than an ordinary Window-Casement.

Upon the outer edge of this Iron, about an Inch and an half off the ends of it, is made two Iron *Half-joynts* to contain a Pin of about a quarter of an Inch over, which Pin entring this *half-joynt*, and a *match Half-joynt* made upon the *Frisket*, serves for the *Frisket* to move truly upon.

In the middle of each long *Rail* of the *Tympan*, is made through the top and bottom an Hole half an Inch square, for the square Shanks of the *Point-Screws* to fit into.

The like Holes are also made in the *Tympan*, at one third part of its length from the Fore-end or *Frisket-joynt*, to place the *Point Screws* in; when a *Twelves*, *Eighteens*, &c. is wrought.

Into the Inner-side of this *Tympan* is fitted the *Inner-Tympan*, whose three sides are also made of Wood, and its fourth side of Iron, as the *Tympan*, but without *joynts*; it is made so much shorter than the *Outer-Tympan*, that the outer edge of the Iron of the *Inner Tympan* may lye within the inner edge of the Iron on the *Outer-Tym-*

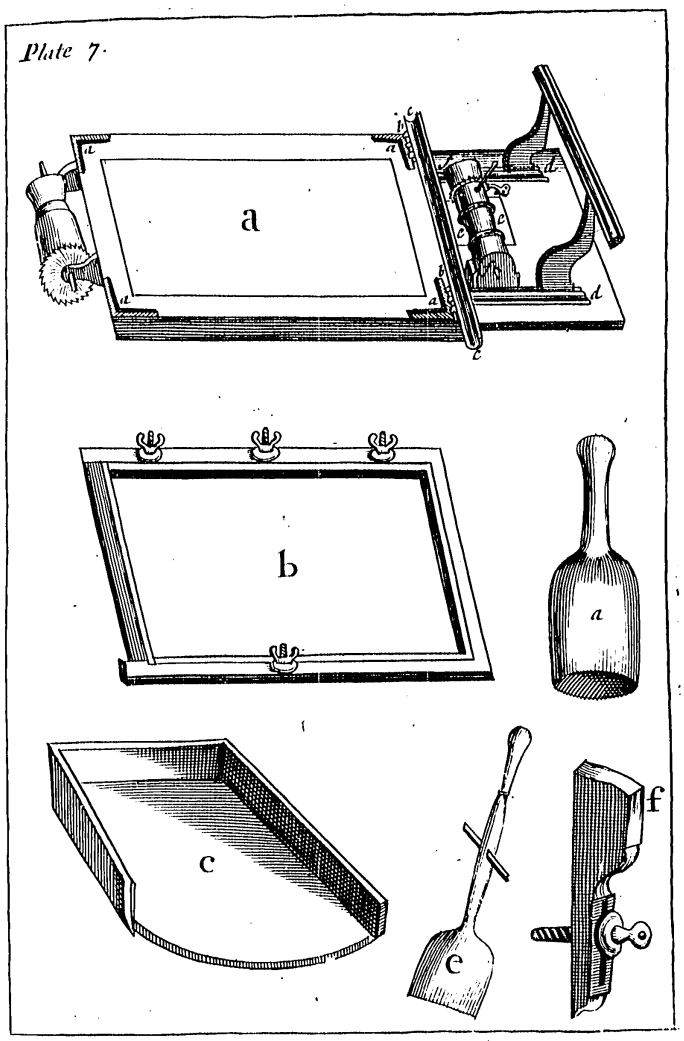
pan; and it is made ſo much narrower than the inſide of the *Tympan*, that a convenient room may be allowed to paſte a *Vellom* betwen the inſide of the *Tympan*, and the outſide of the *Inner Tympan*.

About the middle, through the hither-ſide of the *Inner Tympan*, is let in and faſtned an Iron Pin about a quarter of an Inch over, and ſtands out three quarters of an Inch upon the hither out-ſide of the *Inner-Tympan*, which three quarters of an Inch Pin fits into a round hole made in the inner-ſide of the *Tympan*, to gage and fit the *Inner-Tympan* right into the *Tympan*; for then by the help of an Iron turning *Claſp* on the further ſide the *Tympan*, the *Inner-Tympan* is kept firmly down and in its poſition.

¶. 11. *Of the* Inck-Block, Slice, Brayer, *and* Catch *of the* Bar, *marked* c d e f in Plate 7.

To the *Rail* between the hither *Cheek* and *Hind-Poſt* is faſtned the *Inck-Block*, which is a Beechen-board about thirteen Inches long, nine Inches broad, and commonly about two Inches thick, and hath the left hand outer corner of it cut away; it is Railed in on its farther and hinder-ſides, and a little above half the hither-ſide, with Wainſcot-Board about three quarters of an Inch thick, and two Inches and an half above the upper-ſide the board of the *Inck-Block*. It is deſcribed in Plate 7. at c.

The *Brayer* marked *a* is made of *Beech*: It is turned round on the ſides, and flat on the bottom, its length is



is about three Inches, and its diameter about two Inches and an half; it hath an Handle to it about four Inches long. Its Office is to rub and mingle the *Inck* on the *Inck-Block* well together.

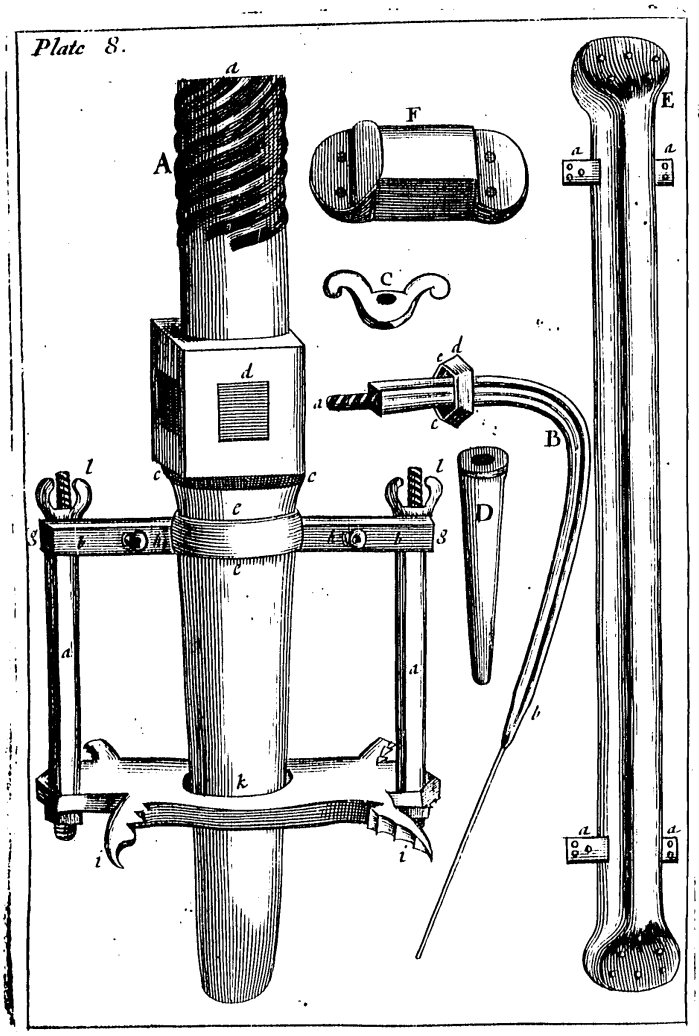
The *Slice* is a little thin Iron *Shovel* about three or four Inches broad, and five Inches long; it hath an Handle to it of about seven Inches long. Near the *Shovel* through the Handle is fitted a small Iron of about two Inches long standing Perpendicular to both the sides of the Handle, and is about the thickness of a small Curtain-Rod. It is described at e.

The *Catch* of the *Bar* described at f is a piece of Wood two Inches thick, four Inches broad, and ten Inches long; The top of it is a little Bevil'd or Slop'd off, that the *Bar* may by its *Spring* fly up the Bevil till it stick. This Bevil projects three Inches over its straight Shank, which reaches down to the bottom; in the middle of this Shank, through the fore and back-side, is a Mortess made from within an Inch of the Rounding to an Inch and an half of the bottom; This Mortess is three quarters of an Inch wide, and hath an Iron Pin with a Shoulder at one end fitted to it, so as it may slide from one end of the Mortess to the other. At the other end of the Iron Pin is made a Male Screw which enters into a Female Iron Screw let into the further *Cheek* of the *Press*; so that the *Catch* may be Screwed close to the *Cheek*, as shall further be spoken to hereafter.

¶. 12. *Of the Iron-work, and first of the* Spindle *marked* A *in Plate* 8.

From the Top to the *Toe* of the *Spindle, viz.* from *a* to *b* is sixteen Inches and a half, the length of the Cilinder the *Worms* are cut upon is three Inches and a quarter, and the diameter of that Cilinder two Inches and a quarter; between the bottom of the *Worms* and top of the Cube one Inch and an half; the Cube marked *c c c c* is two Inches and three quarters, the square *Eye* at *d* in the middle of the Cube is an Inch and a quarter through all the sides of the Cube; one Inch under the Cube at *e* is the *Neck* of the *Spindle*, whose diameter is two Inches, It is one Inch between the two shoulders, *viz.* the upper and under shoulders of the *Neck* at *e e*; so that the Cilinder of the *Neck* is one Inch long; the very bottom of the *Spindle* at *b* is called the *Toe*, it is made of an Hemisperical form, and about one Inch in diameter; This *Toe* should be made of *Steel*, and well Temper'd, that by long or careless usage, the point of pressure wear not towards one side of the *Toe*, but may remain in the Axis of the *Spindle*.

§. 11. *Of*



§. 11. *Of the* Worms *of the* Spindle.

I promiſed at the latter end of *Numb.* 2. to give a more copious account than there I did of making *Worms*, when I came to exerciſe upon *Printing-Preſs Spindles*; and being now arrived to it, I ſhall here make good my promiſe.

¶. 1. The *Worms* for *Printing-Preſs Spindles* muſt be projected with ſuch a declivity, as that they may come down at an aſſigned progreſs of the *Bar*.

The aſſigned progreſs may be various, and yet the *Spindle* do its office: For if the *Cheeks* of the *Preſs* ſtand wide aſſunder, the ſweep or progreſs of the ſame *Bar* will be greater than if they ſtand nearer together.

It is confirm'd upon good conſideration and Reaſon as well as conſtant experience, that in a whole Revolution of the *Spindle*, in the *Nut*, the *Toe* does and ought to come down two Inches and an half; but the *Spindle* in work ſeldom makes above one quarter of a Revolution at one *Pull*, in which ſweep it comes down but half an Inch and half a quarter of an Inch; and the reaſon to be given for this coming down, is the ſqueezing of the ſeveral parts in the *Preſs*, ſubject to ſqueeze between the Morteſſes of the *Winter* and the Morteſſes the *Head* works in; and every Joynt between theſe are ſubject to ſqueeze by the force of a *Pull*. As firſt, The *Winter* may ſqueeze down into its Morteſs one third part of the thickneſs of a *Scabbord*. (Allowing a *Scabbord* to be half a *Nonpareil* thick.) Secondly, The *Ribs* ſqueeze cloſer to

the *Winter* one *Scabbord.* Thirdly, The *Iron-Ribs* to the Wooden *Ribs* one *Scabbord.* Fourthly, The *Cramp-Irons* to the *Planck* of the *Coffin* one *Scabbord.* Fifthly, The *Planck* it self half a *Scabbord.* Sixthly, The *Stone* to the *Planck* one *Scabbord* Seventhly, The *Form* to the *Stone* half a *Scabbord* Eighthly, The *Justifyers* in the Mortes of the *Head* three *Scabbords.* Ninthly, The *Nut* in the *Head* one *Scabbord.* Tenthly, The *Paper*, *Tympans* and *Blankets* two *Scabbords.* Eleventhly, Play for the Irons of the *Tympans* four *Scabbords.* Altogether make fifteen *Scabbords* and one third part of a *Scabbord* thick, which (as aforesaid) by allowing two *Scabbords* to make a *Nomparel,* and as I shewed in *Vol.* 2. *Numb.* 2. §. 2. One hundred and fifty *Nomparels* to make one Foot, gives twelve and an half *Nomparels* for an Inch; and consequently twenty five *Scabbords* for an Inch; so by proportion, fifteen *Scabbords* and one third part of a *Scabbord,* gives five eighth parts of an Inch, and a very small matter more, which is just so much as the *Toe* of the *Spindle* comes down in a quarter of a Revolution.

This is the Reason that the coming down of the *Toe* ought to be just thus much; for should it be less, the natural Spring that all these Joynts have, when they are unsqueez'd, would mount the Irons of the *Tympans* so high, that it would be troublesom and tedious for the *Press-man* to *Run* them under the *Platin,* unless the *Cheeks* stood wider assunder, and consequently every sweep of the *Bar* in a *Pull* exceed a quarter of a Revolution, which would be both laborious for the *Press-man,* and would hinder his usual riddance of Work.

I shew'd

I shew'd in *Numb.* 2. *fol.* 31, 32, 33, 34, 35. the manner of making a Screw in general; but assigned it no particular Rise; which for the aforesaid reason, these *Printing-Press Screws* are strictly bound to have: Therefore its assigned Rise being two Inches and an half in a Revolution, This measure must be set off upon the Cilindrick Shank, from the top towards the Cube of the *Spindle,* on any part of the *Cilinder,* and there make a small mark with a fine *Prick-Punch,* and in an exact Perpendicular to this mark make another small mark on the top of the Cilinder, and laying a straight *Ruler* on these two marks, draw a straight line through them, and continue that line almost as low as the Cube of the *Spindle.* Then devide that portion of the straight line contained between the two marks into eight equal parts, and set off those equal parts from the two Inch and half mark upwards, and then downwards in the line so oft as you can: Devide also the Circumference of the Shank of the Cilinder into eight equal parts, and draw straight lines through each devision, parallel to the first upright line; and describe the *Screw* as you were directed in the afore-quoted place; so will you find that the revolution of every line so carried on about the Shank of the Cilinder, will be just two Inches and an half off the top of the Shank: which measure and manner of working may be continued downward to within an Inch and an half of the Cube of the *Spindle.* This is the Rule and Measure that ought to be observ'd for ordinary *Presses*: But if for some by-reasons the aforesaid Measure of two Inches and an half must be varied, then the varied Measure

must be set off from the top of the Cilinder, and working with that varied Measure as hath been directed, the *Toe* of the *Spindle* will come down lower in a revolution if the varied Measure be longer, or not so low if the varied Measure be shorter.

There is a Notion vulgarly accepted among Workmen, that the *Spindle* will Rise more or less for the number of *Worms* winding about the Cilinder; for they think, or at least by tradition are taught to say, that a *Three-Worm'd Spindle* comes faster and lower down than a *four-Worm'd Spindle*: But the opinion is false; for if a *Spindle* were made but with a *Single-Worm*, and should have this Measure, *viz.* Two Inches and an half set off from the top, and a *Worm* cut to make a Revolution to this Measure, it would come down just as fast, and as low, as if there were two, three, four, five or six *Worms*, &c. cut in the same Measure: For indeed, the numbers of *Worms* are only made to preserve the *Worms* of the *Spindle* and *Nut* from wearing each other out the faster; for if the whole stress of a *Pull* should bear against the Sholder of a single *Worm*, it would wear and shake in the *Nut* sooner by half than if the stress should be borne by the Sholders of two *Worms*; and so proportionably for three, four, five *Worms*, &c.

But the reason why four *Worms* are generally made upon the *Spindle*, is because the Diameters of the *Spindle* are generally of this propos'd size; and therefore a convenient strength of Mettal may be had on this size for four *Worms*; But should the Diameter of the *Spindle* be smaller, as they sometimes are when the *Press* is designed for small Work, only three *Worms* will

will be a properer number than four; because when the Diameter is small, the thickness of the *Worms* would also prove small, and by the stress of a *Pull* would be more subject to break or tear the *Worms* either of the *Spindle* or *Nut*.

And thus I hope I have performed the promise here I made at the latter end of *Numb.* 2. Whether I refer you for the breadth, and reason of the breadth of the *Worm*.

¶. 13. *Of the* Bar *marked* B *in* Plate 8.

This *Bar* is Iron, containing in length about two Foot eight Inches and an half, from *a* to *b*, and its greatest thickness, except the Sholder, an Inch and a quarter; The end *a* hath a Male-Screw about an Inch Diameter and an Inch long, to which a *Nut* with a Female-Screw in it as at C is fitted. The Iron *Nut* in which this Female-Screw is made, must be very strong, *viz.* at least an Inch thick, and an Inch and three quarters in Diameter; in two opposite sides of it is made two Ears, which must also be very strong, because they must with heavy blows be knock't upon to draw the Sholder of the square shank on the *Bar*, when the square Pin is in the *Eye* of the *Spindle* close and steddy up to the Cube on the *Spindle*. The square Pin of the *Bar* marked *c* is made to fit just into the *Eye*, through the middle of the Cube of the *Spindle*, on the hither end of this square Pin is made a Sholder or stop to this square Pin, as at *d*. This Sholder must be Filed exactly Flat on all its four in-sides, that they may be drawn close and tight up

to any flat side of the Cube on the *Spindle*; It is two Inches square, that it may be drawn the firmer, and stop the steddyer against any of the flat sides of the said Cube, when it it is hard drawn by the strength of the Female-Screw in the aforesaid *Nut* at C. The thickness from *d* to *e* of this Sholder is about three quarters of an Inch, and is Bevil'd off towards the *Handle* of the *Bar* with a small Molding.

The substance of this *Bar*, as aforesaid, is about an Inch and a quarter; but its Corners are all the way flatted down till within five Inches of the end: And from these five Inches to the end, it is taper'd away, that the *Wooden-Handle* may be the stronger forced and fastned upon it.

About four Inches off the Sholder, the *Bar* is bowed beyond a right Angle, yet not with an Angle, but a Bow, which therefore lies ready to the *Press-man's* Hand, that he may Catch at it to draw the *Wooden-Handle* of the *Bar* within his reach.

This *Wooden-Handle* with long Working grows oft loose; but then it is with hard blows on the end of it forced on again, which oft splits the *Wooden-Handle* and loosens the square Pin at the other end of the *Bar*, in the *Eye* of the *Spindle*: To remedy which inconvenience, I used this Help, *viz.* To weld a piece of a Curtain-Rod as long as the *Wooden-Handle* of the *Bar*, to the end of the Iron *Bar*, and made a Male-screw at the other end with a Female-screw to fit it; Then I bored an hole quite through the *Wooden-Handle*, and Turn'd the very end of the *Wooden-Handle* with a small hollow in it flat at the bottom, and deep enough to bury the Iron-*Nut* on the end of the Curtain-

tain-Rod, and when this Curtain Rod was put through the Hollow in the *Wooden Handle* and Screwed fast to it at the end, it kept the *Wooden Handle*, from flying off; Or if it loosened, by twisting the *Nut* once or twice more about, it it was fastned again.

¶. 14. *Of the* Hose, Garter, *and* Hose-Hooks.

The *Hose* are the upright Irons in Plate 8. at *a a*, They are about three quarters of an Inch square, both their ends have Male-screws on them; The lower end is fitted into a square Hole made at the parting of the *Hose Hooks*, which by a square *Nut* with a Female-screw in it, is Screwed tight up to them; Their upper ends are let into square Holes made at the ends of the *Garter*, and by *Nuts* with Female-Screws in them, and Ears to turn them about as at *l l* are drawn up higher, if the *Plattin-Cords* are too loose; or else let down lower if they are to tight: These upper Screws are called the *Hose-Screws*.

The *Garter* (but more properly the *Coller*) marked *b b*, is the round Hoop incompassing the flat Groove or Neck in the Shank of the *Spindle* at *e e*; This round Hoop is made of two half round Hoops, having in a Diametrical-line without the Hoop square Irons of the same piece proceeding from them, and standing out as far as *g g*; These Irons are so let into each other, that they comply and run Range with the square Sholders at both ends, wherein square Holes are made at the ends of the *Hose*. They are Screwed together with two small Screws, as at *h h*.

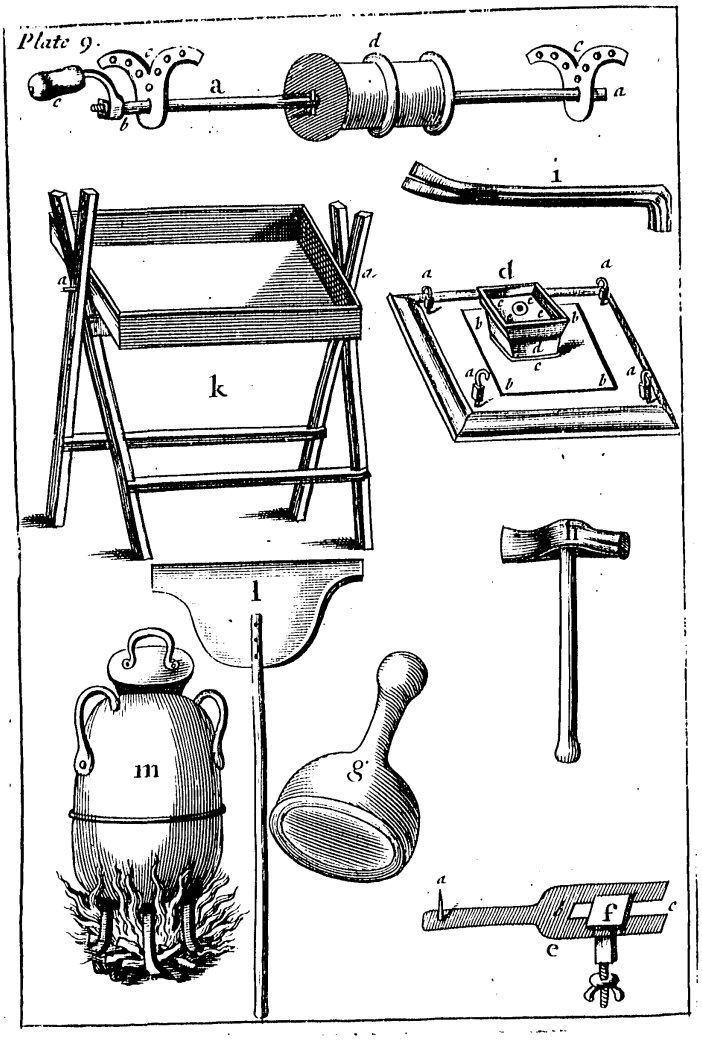
The

The four *Hose-Hooks* are marked *i i i i*, They proceed from two Branches of an Iron Hoop at *k* encompassing the lower-end of the *Spindle*, on either Corner of the Branch, and have notches filled in their outer-sides as in the Figure, which notches are to contain several Turns of *Whip-cord* in each notch, which *Whip-cord* being also fastned to the *Hooks* on the *Plattin*, holds the *Plattin* tight to the *Hooks* of the *Hose*.

¶. 15. *Of the* Ribs, *and* Cramp-Irons.

The *Ribs* are delineated in Plate 8. at E, they are made of four-square Irons the length of the *Wooden-Ribs* and *End-Rails*, *viz.* Four Foot five Inches long, and three quarters of an Inch square, only one end is batter'd to about a quarter of an Inch thick, and about two Inches and an half broad, in which battering four or five holes are Punch't for the nailing it down to the *Hind-Rail* of the *Wooden Ribs*. The Fore-end is also batter'd down as the Hind-end, but bound downwards to a square, that it may be nailed down on the outer-side of the *Fore-Rail* of the *Wooden-Ribs*.

Into the bottom of these *Ribs*, within nine Inches of the middle, on either side is made two Female-Dustails about three quarters of an Inch broad, and half a quarter of an Inch thick, which Female-Dustails have Male-Dustails as at *a a a a* fitted stiff into them; about an Inch and three quarters long; and these Male-Dustails have an hole punched at either end, that when they are fitted into the Female-Dustails in the *Ribs*, they may in these Holes be Nailed down the firmer to the *Wooden-Ribs*. These



These *Ribs* are to be between the upper and the under side exactly of an equal thickness, and both to lye exactly Horizontal in straight lines; For irregularities will both Mount and Sink the *Cramp-Irons*, and make them *Run* rumbling upon the *Ribs*.

The upper-sides of these *Ribs* must be purely Smooth-fil'd and Polliſh'd, and the edges a little Bevil'd roundish away, that they may be somewhat Arching at the top; because then the *Cramp-Irons Run* more easily and tickliſhly over them.

The *Cramp-Irons* are marked F in Plate 8. They are an Inch and an half long besides the Battering down at both ends as the *Ribs* were; They have three holes Punched in each Battering down, to Nail them to the *Planck* of the *Coffin*; They are about half an Inch deep, and one quarter and an half thick; their upper-sides are smoothed and rounded away as the *Ribs*.

¶. 16. *Of the* Spindle *for the* Rounce, *described in Plate 9. at* a.

The *Axis* or *Spindle* is a straight Bar of Iron about three quarters of an Inch square, and is about three Inches longer than the whole breadth of the Frame of the *Ribs*, *viz.* two Foot two Inches: The farther end of it is Filed to a round Pin (as at *a*) three quarters of an Inch long, and three quarters of an Inch in Diameter, the hither end is filed away to such another round Pin, but is two Inches and a quarter long (as at *b*); at an Inch and a quarter from this end is Filed a Square Pin three quarters of an Inch long, and

within half an Inch of the end is Filed another round Pin, which hath another Male-Screw on it, to which is fitted a ſquare Iron *Nut* with a Female-Screw in it.

On the Square Pin is fitted a *Winch* ſomewhat in form like a Jack-winch, but much ſtronger; the *Eye* of which is fitted upon the Square aforeſaid, and Screwed up tight with a Female Screw. On the ſtraight Shank of this Winch is fitted the *Rounce*, marked *e*.

The round ends of this *Axis* are hung up in two Iron-Sockets (as at *c c*) faſtned with Nails (but more properly with Screws) on the outſide the Wooden Frame of the *Ribs*.

The *Girt Barrel* marked *d* is Turned of a Piece of Maple or Alder-wood, of ſuch a length, that it may play eaſily between the two Wooden *Ribs*; and of ſuch a diameter, that in one revolution of it, ſuch a length of *Girt* may wind about it as ſhall be equal to half the length contained between the fore-end Iron of the *Tympan*, and the inſide of the Rail of the *Inner-Tympan*; becauſe two Revolutions of this *Barrel* muſt move the *Carriage* this length of ſpace.

This *Barrel* is fitted and faſtned upon the Iron *Axis*, at ſuch a diſtance from either end, that it may move round between the Wooden *Ribs* aforeſaid.

¶. 17. *Of the* Preſs-Stone.

The *Preſs-Stone* ſhould be Marble, though ſometimes Maſter *Printers* make ſhift with Purbeck, either becauſe they can buy them cheaper, or elſe becauſe they can neither diſtinguiſh them by their appearance, or know their different worths.

Its thickneſs muſt be all the way throughout equal

qual, and ought to be within one half quarter of an Inch the depth of the inſide of the *Coffin*; becauſe the matter it is *Bedded* in will raiſe it high enough. Its length and breadth muſt be about half an Inch leſs than the length and breadth of the inſide of the *Coffin*: Becauſe *Juſtifiers* of Wood, the length of every ſide, and almoſt the depth of the *Stone*, muſt be thruſt between the inſides of the *Coffin* and the outſides of the *Stone*, to Wedge it tight and ſteddy in its place, after the *Preſs-man* has *Bedded* it. Its upper-ſide, or Face muſt be exactly ſtraight and ſmooth.

I have given you this deſcription of the *Preſs-Stone*, becauſe they are thus generally uſed in all *Printing-Houſes*: But I have had ſo much trouble, charge and vexation with the often breaking of *Stones*, either through the careleſneſs or unskilfulneſs (or both) of *Preſs-men*, that neceſſity compell'd me to conſider how I might leave them off; and now by long experience I have found, that a piece of *Lignum vitæ* of the ſame ſize, and truly wrought, performs the office of a *Stone* in all reſpects as well as a *Stone*, and eaſes my mind, of the trouble, charge and vexation aforeſaid, though the firſt coſt of it be greater.

¶. 18. *Of the* Plattin *marked* d *in Plate* 9.

The *Plattin* is commonly made of Beechen Planck, two Inches and an half thick, its length about fourteen Inches, and its breadth about nine Inches. Its ſides are Tryed Square, and the Face or under-ſide of the *Plattin* Plained exactly ſtraight and ſmooth. Near the four Corners on the upper-ſide, it hath

four Iron *Hooks* as at *a a a a*, whose Shanks are Wormed in.

In the middle of the upper side is let in and fastned an Iron Plate called the *Plattin Plate*, as *b b b b*, a quarter of an Inch thick, six Inches long, and four Inches broad; in the middle of this Plate is made a square Iron Frame about half an Inch high, and half an Inch broad, as at *c*. Into this square Frame is fitted the *Stud* of the *Plattin Pan*, so as it may stand steddy, and yet to be taken out and put in as occasion may require.

This *Stud* marked *d*, is about an Inch thick, and then spreads wider and wider to the top (at *eeee*) of it, till it becomes about two Inches and an half wide; and the sides of this spreading being but about half a quarter of an Inch thick makes the *Pan*. In the middle of the bottom of this *Pan* is a small Center hole Punch'd for the *Toe* of the *Spindle* to work in.

¶. 19. *Of the* Points *and* Point-Screws.

The Points are made of Iron Plates about the thickness of a Queen *Elizabeth* Shilling: It is delineated at e in Plate 9. which is sufficient to shew the shape of it, at the end of this Plate, as at *a*, stands upright the Point. This *Point* is made of a piece of small Wyer about a quarter and half quarter of an Inch high, and hath its lower end Filed away to a small Shank about twice the length of the thickness of the Plate; so that a Sholder may remain. This small Shank is fitted into a small Hole made near the end of the Plate, and Revetted on the other side, as was taught

taught *Numb.* 2. *Fol.* 24. At the other end of the Plate is filed a long square notch in the Plate as at *b c* quarter and half quarter Inch wide, to receive the square shank of the *Point-Screws*.

The *Point-Screw* marked f is made of Iron; It hath a thin Head about an Inch square, And a square Shank just under the Head, an Inch deep, and almost quarter and half quarter Inch square, that the square Notch in the hinder end of the Plate may slide on it from end to end of the Notch; Under this square Shank is a round Pin filed with a Male-Screw upon it, to which is fitted a *Nut* with a Female-Screw in it, and Ears on its out-side to twist about, and draw the Head of the Shank close down to the *Tympan*, and so hold the *Point-Plate* fast in its Place.

¶. 20. *Of the* Hammer, *described at* h, *and* Sheeps-Foot *described at* i *in Plate 9.*

The *Hammer* is a common *Hammer* about a quarter of a Pound weight; It hath no *Claws* but a *Pen*, which stands the *Press-man* instead when the *Chase* proves so big, that he is forced to use small *Quoins*.

The Figure of the *Sheeps-Foot* is description sufficient. Its use is to nail and un-nail the *Balls*.

The *Sheeps-Foot* is all made of Iron, with an Hammer-head at one end, to drive the *Ball-Nails* into the *Ball Stocks*, and a Claw at the other end, to draw the *Ball-Nails* out of the *Ball-Stocks*.

¶. 21. *Of*

¶. 21. *Of the* Foot-ſtep, Girts, Stay *of the* Carriage, Stay *of the* Friſket, Ball-Stocks, Paper-Bench, Lye-Trough, Lye-Bruſh, Lye-Kettle, Tray *to* wet Paper *in*, Weights to Preſs Paper, Pelts, *or* Leather, Wool *or* Hair, Ball-Nails *or* Pumping-Nails.

The *Foot Step* is an Inch-Board about a Foot broad, and ſixteen Inches long. This Board is nailed upon a piece of Timber about ſeven or eight Inches high, and is Bevil'd away on its upper-ſide, as is alſo the Board on its under-ſide at its hither end, that the Board may ſtand aſlope upon the Floor. It is placed faſt on the Floor under the Carriage of the Preſs. Its Office ſhall be ſhewed when we come to treat of Exerciſe of the *Preſs-man.*

Girts are Thongs of Leather, cut out of the Back of an Horſe-hide, or a Bulls hide, ſometimes an Hogs-hide. They are about an Inch and an half, or an Inch and three quarters broad. Two of them are uſed to carry the *Carriage* out and in. Theſe two have each of them one of their ends nailed to the *Barrel* on the *Spindle* of the *Rounce*, and the other ends nailed to the *Barrel* behind the *Carriage* in the *Planck* of the *Coffin*, and to the *Barrel* on the fore-end of the Frame of the *Coffin.*

The *Stay* of the *Carriage* is ſometimes a piece of the ſame *Girt* faſtned to the outſide of the further *Cheek*, and

and to the further hinder ſide of the Frame of the *Carriage.* It is faſtned at ſuch a length by the *Preſs man*, that the *Carriage* may ride ſo far out, as that the Irons of the *Tympan* may juſt riſe free and clear off the fore-ſide of the *Plattin.*

Another way to ſtay the *Carriage* is to let an Iron Pin into the upper-ſide of the further Rail of the Frame of the *Ribs*, juſt in the place where the further hinder Rail of the *Carriage* ſtands projecting over the *Rib-Rail*, when the Iron of the *Tympan* may juſt riſe free from the Fore-ſide of the *Plattin*; for then that projecting will ſtop againſt the Iron Pin.

The *Stay* of the *Friſket* is made by faſtning a Batten upon the middle of the Top-ſide of the *Cap*, and by faſtning a Batten to the former Batten perpendicularly downwards, juſt at ſuch a diſtance, that the upper-ſide of the *Friſket* may ſtop againſt it when it is turned up juſt a little beyond a Perpendicular. When a *Preſs* ſtands at a convenient diſtance from a Wall, that Wall performs the office of the aforeſaid *Stay.*

Ball-Stocks are Turn'd of *Alder* or *Maple.* Their Shape is delineated in Plate 9. at g: They are about ſeven Inches in Diameter, and have their under ſide Turned hollow, to contain the greater quantity of *Wool* or *Hair*, to keep the *Ball-Leathers* plump the longer.

The *Lye-Trough* (delineated in Plate 9. at k) is a Square Trough made of Inch-Boards, about four Inches deep, two Foot four Inches long, and one Foot nine Inches broad, and flat in the Bottom. Its inſide is Leaded with Sheet-Lead, which reaches up over the upper Edges of the *Trough.* In the middle of the two ends (for ſo I call the ſhorteſt ſides) on the outer ſides as *a a*, is faſtned a round Iron Pin, which

moves in a round hole made in an Iron Stud with a ſquare Sprig under it, to be drove and faſtned into a *Wooden Horſe*, which *Horſe* I need not deſcribe, becauſe in Plate aforeſaid I have given you the Figure of it.

The *Paper-Bench* is only a common Bench about three Foot eight Inches long, one Foot eight Inches broad, and three Foot four Inches high.

The *Lye-Bruſh* is made of *Hogs-Briſtles* faſtned into a Board with Braſs-Wyer, for durance ſake: Its Board is commonly about nine Inches long, and four and an half Inches broad; and the length of the Briſtles about three Inches.

To perform the Office of a *Lye-Kettle* (which commonly holds about three Gallons) the old-faſhion'd *Chafers* are moſt commodious, as well becauſe they are more handy and manageable than *Kettles* with Bails, as alſo becauſe they keep *Lye* longer hot.

The *Tray* to *Wet Paper* in is only a common Butchers-Tray, large enough to *Wet* the largeſt *Paper* in.

The *Weight* to *Preſs Paper* with, is either Mettal, or Stone, flat on the Bottom, to ly ſteddy on the *Paper-Board*: It muſt be about 50 or 60 pound weight.

For *Pelts* or *Leather*, *Ball-Nails* or *Pumping-Nails*, *Wool* or *Hair*, *Vellom* or *Parchment* or *Forrel*, the *Preſs-man* generally eaſes the *Maſter-Printer* of the trouble of chooſing, though not the charge of paying for them: And for *Paſte*, *Sallad Oyl*, and ſuch accidental Requiſites as the *Preſs-man* in his work may want, the *Devil* commonly fetches for him.

¶. 22. *Of* Racks *to Hang* Paper *on, and of the* Peel.

Our Maſter-*Printer* muſt provide *Racks* to hang *Paper* on to *Dry*. They are made of Deal-board Battens, ſquare,

ſquare, an Inch thick, and an Inch and an half deep, and the length the whole length of the Deal, which is commonly about ten or eleven Foot long, or elſe ſo long as the convenience of the Room will allow: The two upper corners of theſe *Rails* are rounded off that they may not mark the *Paper*.

Theſe *Racks* are Hung over Head, either in the *Printing-Houſe*, or *Ware-houſe*, or both, or any other Room that is moſt convenient to *Dry Paper* in; they are hung a-thwart two *Rails* an Inch thick, and about three or four Inches deep, which *Rails* are faſtned to ſome Joyſts or other Timber in the Ceiling by Stiles perpendicular to the Ceiling; Theſe *Rails* ſtand ſo wide aſſunder, that each end of the *Racks* may hang beyond them about the diſtance of two Foot, and have on their upper edge at ten Inches diſtance from one another, ſo many ſquare Notches cut into them as the whole length of the *Rail* will bear; Into theſe ſquare notches the *Racks* are laid parallel to each other with the flat ſide downwards, and the Rounded off ſide upwards.

The *Peel* is deſcribed in Plate 9. at 1, which Figure ſufficiently ſhews what it is; And therefore I ſhall need ſay no more to it, only its Handle may be longer or ſhorter according as the height of the Room it is to be uſed in may require.

¶. 23. *Of* Inck.

The providing of good *Inck*, or rather good *Varniſh* for *Inck*, is none of the leaſt incumbent cares upon our *Maſter-Printer*, though Cuſtom has almoſt made it ſo here in *England*; for the proceſs of making *Inck* being as well laborious to the Body, as noy-

ſom and ungrateful to the Sence, and by ſeveral odd accidents dangerous of Firing the Place it is made in, Our *Engliſh Maſter Printers* do generally diſcharge themſelves of that trouble; and inſtead of having good *Inck*, content themſelves that they pay an *Inck-maker* for good *Inck*, which may yet be better or worſe according to the Conſcience of the *Inck-maker*.

That our Neighbours the *Hollanders* who exhibit Patterns of good *Printing* to all the World, are careful and induſtrious in all the circumſtances of good *Printing*, is very notorious to all Book-men; yet ſhould they content themſelves with ſuch *Inck* as we do, their Work would appear notwithſtanding the other circumſtances they obſerve, far leſs graceful than it does, as well as ours would appear more beautiful if we uſed ſuch *Inck* as they do: for there is many Reaſons, conſidering how the *Inck* is made with us and with them, why their *Inck* muſt needs be better than ours. As *Firſt*, They make theirs all of good old *Linſeed-Oyl* alone, and perhaps a little *Roſin* in it ſometimes, when as our *Inck-makers* to ſave charges mingle many times *Trane-Oyl* among theirs, and a great deal of *Roſin*; which *Trane-Oyl* by its groſsneſs, Furs and Choaks up a *Form*, and by its fatneſs hinders the *Inck* from drying; ſo that when the Work comes to the *Binders*, it *Sets off*; and beſides is dull, ſmeary and unpleaſant to the Eye. And the *Roſin* if too great a quantity be put in, and the *Form* be not very *Lean Beaten*, makes the *Inck* turn yellow: And the ſame does New *Linſeed-Oyl*.

Secondly, They ſeldom *Boyl* or *Burn* it to that conſiſtence the *Hollanders* do, becauſe they not only ſave labour and Fewel, but have a greater weight of *Inck* out

out of the ſame quantity of *Oyl* when leſs *Burnt* away than when more *Burnt* away; which want of Burning makes the *Inck* alſo, though made of good old *Linſeed Oyl* Fat and Smeary, and hinders its *Drying*; ſo that when it comes to the *Binders* it alſo *Sets off*.

Thirdly, They do not uſe that way of clearing their *Inck* the *Hollanders* do, or indeed any other way than meer Burning it, whereby the *Inck* remains more *Oyly* and *Greaſie* than if it were well clarified.

Fourthly, They to ſave the *Preſs-man* the labour of *Rubbing* the *Blacking* into *Varniſh* on the *Inck-Block*, *Boyl* the *Blacking* in the *Varniſh*, or at leaſt put the *Blacking* in whilſt the *Varniſh* is yet *Boyling-hot*, which ſo *Burns* and *Rubifies* the *Blacking*, that it loſes much much of its briſk and vivid black complexion.

Fifthly, Becauſe *Blacking* is dear, and adds little to the weight of *Inck*, they ſtint themſelves to a quantity which they exceed not; ſo that ſometimes the *Inck* proves ſo unſufferable *Pale*, that the *Preſs-man* is forc'd to *Rub* in more *Blacking* upon the *Block*; yet this he is often ſo loth to do, that he will rather hazard the content the Colour ſhall give, than take the pains to amend it: ſatisfying himſelf that he can lay the blame upon the *Inck-maker*.

Having thus hinted at the difference between the *Dutch* and *Engliſh Inck*, I ſhall now give you the Receipt and manner of making the *Dutch-Varniſh*.

They provide a *Kettle* or a *Caldron*, but a *Caldron* is more proper, ſuch an one as is deſcribed in Plate 9. at m. This Veſſel ſhould hold twice ſo much *Oyl* as they intend to *Boyl*, that the *Scum* may be ſome conſiderable time a *Riſing* from the top of the *Oyl* to the top of the Veſſel to prevent danger. This *Caldron*

dron hath a Copper Cover to fit the Mouth of it, and this Cover hath an Handle at the top of it to take it off and put it on by. This *Caldron* is set upon a good strong Iron *Trevet*, and fill'd half full of old *Linseed-Oyl*, the older the better, and hath a good Fire made under it of solid matter, either *Sea-Coal*, *Charcoal* or pretty big Chumps of Wood that will burn well without much Flame; for should the Flame rise too high, and the *Oyl* be very hot at the taking off the Cover of the *Caldron*, the fume of the *Oyl* might be apt to take Fire at the Flame, and endanger the loss of the *Oyl* and Firing the House: Thus they let *Oyl* heat in the *Caldron* till they think it is Boyling-hot; which to know, they peel the outer Films of an *Oynion* off it, and prick the *Oynion* fast upon the end of a small long Stick, and so put it into the heating *Oyl*: If it be Boyling-hot, or almost Boyling-hot, the *Oynion* will put the *Oyl* into a Fermentation, so that a Scum will gather on the top of the *Oyl*, and rise by degrees, and that more or less according as it is more or less Hot: But if it be so very Hot that the Scum rises apace, they quickly take the *Oynion* out, and by degrees the Scum will fall. But if the *Oyl* be Hot enough, and they intend to put any *Rosin* in, the quantity is to every Gallon of *Oyl* half a Pound, or rarely a whole Pound. The *Rosin* they beat small in a *Mortar*, and with an Iron Ladle, or else by an Handful at a time strew it in gently into the *Oyl* lest it make the Scum rise too fast; but every Ladle-full or Handful they put in so leasurely after one another, that the first must be wholly dissolv'd before they put any more in; for else the Scum will Rise too fast, as aforesaid: So that you

you may perceive a great care is to keep the Scum down: For if it Boyl over into the Fire never so little, the whole Body of *Oyl* will take Fire immediately.

If the *Oyl* be Hot enough to *Burn*, they *Burn* it, and that so often till it be *Hard* enough, which sometimes is six, seven, eight times, or more.

To *Burn* it they take a long small Stick, or double up half a Sheet of Paper, and light one end to set Fire to the *Oyl*; It will presently Take if the *Oyl* be Hot enough, if not, they Boyl it longer, till it be.

To try if it be *Hard* enough, they put the end of a Stick into the *Oyl*, which will lick up about three or four drops, which they put upon an Oyster-shell, or some such thing, and set it by to cool, and when it is cold they touch it with their Fore or Middle-Finger and Thumb, and try its consistence by sticking together of their Finger and Thumb; for if it draw stiff like strong *Turpentine* it is Hard enough, if not, they Boyl it longer, or *Burn* it again till it be so consolidated.

When it is well Boyled they throw in an Ounce of Letharge of Silver to every four Gallons of *Oyl* to Clarifie it, and Boyl it gently once again, and then take it off the Fire to stand and cool, and when it is cool enough to put their Hand in, they Strain it through a Linnen Cloath, and with their Hands wring all the *Varnish* out into a Leaded Stone Pot or Pan, and keeping it covered, set it by for their use; The longer it stands by the better, because it is less subject to turn Yellow on the Paper that is Printed with it.

This is the *Dutch* way of making *Varnish*, and the way the English *Inck-makers* ought to use.

Note, *First*, That the *Varnish* may be made without *Burning* the *Oyl*, *viz.* only with well and long Boyl-

Boyling it; for *Burning* is but a violent way of Boyling, to conſolidate it the ſooner.

Secondly, That an *Apple* or a *Cruſt* of *Bread*, &c. ſtuck upon the end of a Stick inſtead of an *Oynion* will alſo make the Scum of the *Oyl* riſe: For it is only the Air contained in the Pores of the *Apple*, *Cruſt* or *Oynion*, &c. preſſed or forced out by the violent heat of the *Oyl*, that raiſes the many Bubbles on the top of the *Oyl*: And the connection of thoſe Bubbles are vulgarly called *Scum*.

Thirdly, The Engliſh *Inck-makers* that often make *Inck*, and that in great quantities, becauſe one Man may ſerve all *England*, inſtead of ſetting a *Caldron* on a *Trevet*, build a *Furnace* under a great *Caldron*, and Trim it about ſo with Brick, that it Boyls far ſooner and more ſecurely than on a *Trevet*; becauſe if the *Oyl* ſhould chance to Boyl over, yet can it not run into the Fire, being Fenced round about with Brick as aforeſaid, and the *Stoking-hole* lying far under the *Caldron*.

Fourthly, When for want of a *Caldron* the *Maſter-Printer* makes *Varniſh* in a *Kettle*, He provides a great piece of thick *Canvaſs*, big enough when three or four double to cover the *Kettle*, and alſo to hang half round the ſides of the *Kettle*: This *Canvaſs* (to make it more ſoluble) is wet in Water, and the Water well wrung out again, ſo that the *Canvaſs* remains only moiſt: Its uſe is to throw flat over the Mouth of the *Kettle* when the *Oyl* is *Burning*, to keep the ſmoak in, that it may ſtifle the Flame when they ſee cauſe to put it out. But the Water as was ſaid before, muſt be very well wrung out of the *Canvaſs*, for ſhould but a drop or two fall from the ſides of it into the *Oyl* when it is Burning, it will ſo enrage the *Oyl*, and raiſe the Scum, that it might endanger the working over the top of the *Kettle*.

Having ſhewn you the *Maſter-Printers* Office, I account it ſuitable to proper Method, to let you know, how the *Letter-Founder* Cuts the *Punches*, how the *Molds* are made, the *Matrices* Sunck, and the *Letter Caſt* and *Dreſt*, for all theſe Operations precede the *Compoſiters* Trade, as the *Compoſiters* does the *Preſſmans*; wherefore the next *Exerciſes* ſhall be (God willing) upon *Cutting* of the *Steel-Punches*

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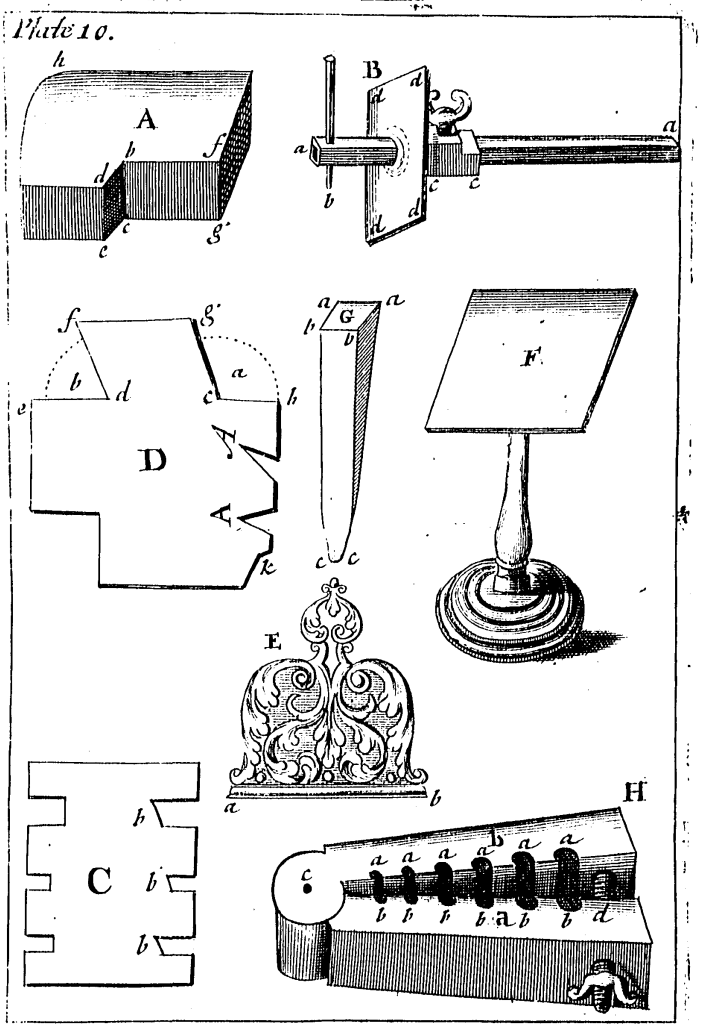

MECHANICK EXERCISES:

Or, the Doctrine of

Handy-works.

Applied to the Art of

Letter-Cutting.

The Second VOLUME.

PREFACE.

LEtter-Cutting *is a Handy-Work hitherto kept so conceal'd among the Artificers of it, that I cannot learn any one hath taught it any other; But every one that has used it, Learnt it of his own Genuine Inclination. Therefore, though I cannot (as in other Trades) describe the general Practice of Work-men, yet the Rules I follow I shall shew here, and have as good an Opinion of these Rules, as those have that are shyest of discovering theirs. For, indeed, by the appearance of some Work done, a judicious Eye may doubt whether they go by any Rule at all, though Geometrick Rules, in no Practice whatever, ought to be more nicely or exactly observed than in this.*

§. 12. ¶. 1. *Of Letter-Cutters Tools.*

THe making of *Steel Punches* is a Branch of the *Smith*'s Trade: For, as I told you in the Preface to *Numb.* 1. The *Black-Smith*'s Trade comprehends all Trades that use either Forge or File, from the *Anchor-Smith*, to the *Watch-maker*: They all working by the same Rules, though not with equal exactness; and all using the same Tools, though of different Sizes from those the Common *Black-Smith* uses; and that according to the various purposes they are applied, *&c.* Therefore, indeed, a *Letter-Cutter* should have a Forge set up, as by *Numb.* 1. But some *Letter-Cutters* may seem to scorn to use a Forge, as accounting it too hard Labour, and Ungenteel for themselves to officiate at. Yet they all well know, that though they may have a common *Black-Smith* perform their much and heavy Work, that many times a Forge of their own at Hand would be very commodious for them in several accidental little and light Jobs, which (in a Train of Work) they must meet withal.

But if our *Letter-Cutter* will have no Forge, yet he must of necessity accommodate himself with a *Vice*, *Hand-Vice*, *Hammers*, *Files*, *Small* and *Fine Files* (commonly called *Watch-makers Files*) of these he saves all, as they wear out, to smooth and burnish the Sides and Face of his Letter with, as shall be shewed; *Gravers*, and *Sculpters* of all sorts, an *Anvil*, or a *Stake*, an *Oyl-stone*, *&c.* And of these, such as are suitable and sizable to the several Letters he

he is to Cut. These, or many of these Tools, being described in *Numb.* 1. I refer my Reader thither, and proceed to give an account of some Tools peculiar to the *Letter-Cutter*, though not of particular use to the Common *Black-Smith*.

¶. 2. *Of the* Using-File.

This *File* is about nine or ten Inches long, and three or four Inches broad, and three quarters of an Inch thick: The two broad sides must be exactly flat and straight: And the one side is commonly cut with a *Bastard-Cut*, the other with a *Fine* or *Smooth Cut*. (See *Numb.* 1. *Fol.* 14, 15.) Its use is to *Rub* a piece of Steel, Iron, or Brass, *&c.* flat and straight upon, as shall be shewed hereafter.

In chusing it, you must see it be exactly Flat and Straight all its Length and Breadth: For if it in any part Belly out, or be Hollow inwards, what is Rubbed upon it will be Hollow, Rubbing on the Bellying part; and Bellying, Rubbing on the Hollow part. You must also see that it be very Hard; and therefore the thickest *Using-Files* are likeliest to prove best, because the thin commonly Warp in Hardning.

¶. 3. *Of the* Flat-Gage.

The *Flat-Gage* is described in *Plate* 10. at A. It is made of a flat piece of Box, or other Hard Wood. Its Length is three Inches and an half, its Breadth two Inches and an half, and its Thickness one Inch and

an half. This is on the Flat, firſt made Square, but afterwards hath one of its Corners (as *b*) a little rounded off, that it may the eaſier comply with the Ball of the Hand. Out of one of its longeſt Sides, *viz.* that not rounded off, is Cut through the thickneſs of it an exact Square, whoſe one ſide *b f*, *c g* is about an Inch and three quarters long; and its other ſide *b d*, *c e* about half an Inch long. The Depth of theſe Sides and their Angle is exactly Square to the top and bottom of the upper and under Superficies of the *Flat-Gage*.

Its Uſe is to hold a Rod of Steel, or Body of a *Mold*, *&c.* exactly perpendicular to the Flat of the *Uſing-File*, that the end of it may rub upon the *Uſing-File*, and be Filed away exactly Square, and that to the Shank; as ſhall more at large be ſhewed in §. 2. ¶. 3.

¶. 4. *Of the* Sliding Gage.

The *Sliding Gage* is deſcribed in *Plate* 10. at *Fig.* B. It is a Tool commonly uſed by *Mathematical Inſtrument-Makers*, and I have found it of great uſe in *Letter-Cutting*, and making of *Molds*, *&c.* *a a* the Beam, *b* the Tooth, *c c* the Sliding Socket, *d d d d* the Shoulder of the Socket.

Its Uſe is to meaſure and ſet off Diſtances between the Sholder and the Tooth, and to mark it off from the end, or elſe from the edge of your Work.

I always uſe two or three of theſe *Gages*, that I need not remove the Sholder when it is ſet to a Diſtance which I may have after-uſe for; as ſhall in Working be ſhewed more fully.

¶. 5.

¶. 5. *Of the* Face-Gages, *marked* C *in Plate* 10.

The *Face-Gage* is a Square Notch cut with a File into the edge of a thin Plate of Steel, Iron, or Braſs, the thickneſs of a piece of common Latton, and the Notch about an *Engliſh* deep. There be three of theſe Gages made, for the Letters to be cut on one Body; but they may be all made upon one thin Plate, the readier to be found, as at D. As firſt, for the Long Letters; Secondly, for the Aſſending Letters; And Thirdly, for the Short Letters. The Length of theſe ſeveral Notches, or Gages, have their Proportions to the Body they are cut to, and are as follows. We ſhall imagine (for in Practice it cannot well be perform'd, unleſs in very large Bodies) that the Length of the whole Body is divided into forty and two equal Parts.

The *Gage* for the Long Letters are the length of the whole Body, *viz.* forty and two equal Parts. The *Gage* for the Aſſending Letters, *Roman* and *Italica*, are five Seventh Parts of the Body, *viz.* thirty Parts of Forty two, and thirty and three Parts for *Engliſh* Face. The *Gage* for the Short Letters are three Seventh Parts of the whole Body, *viz.* eighteen Parts of Forty two for the *Roman* and *Italica*, and twenty two Parts for the *Engliſh* Face.

It may indeed be thought impoſſible to divide a Body into ſeven equal Parts, and much more difficult to divide each of thoſe ſeven equal Parts into ſix equal Parts, which are Forty two, as aforeſaid, eſpecially if the Body be but ſmall; but yet it is

poſſible with curious Working: For ſeven thin Spaces may be Caſt and Rubb'd to do it. And for dividing each of the thin Spaces into ſix equal Parts, you may Caſt and Rub Full Point . to be of the thickneſs of one thin Space, and one ſixth part of a thin Space: And you may Caſt and Rub : to be the thickneſs of one thin Space, and two ſixth parts of a thin Space: And you may Caſt and Rub , to be the thickneſs of one thin Space, and three ſixth parts of a thin Space: And you may Caſt and Rub - to be the thickneſs of one thin Space, and four ſixth parts of a thin Space: And you may Caſt and Rub ; to be the thickneſs of one thin Space, and five ſixth parts of a thin Space.

The reaſon why I propoſe . to be Caſt and Rubb'd one ſixth part thicker than a thin Space, is only that it may be readily diſtinguiſhed from : , - ; which are two ſixth parts, three ſixth parts, four ſixth parts, five ſixth parts thicker than a thin Space. And for ſix ſixth parts thicker than a thin Space, two thin Spaces does it.

The manner of adjuſting theſe ſeveral Sixth Parts of Thickneſſes is as follows. You may try if ſix . exactly agree, and be even with ſeven thin Spaces; (or, which is all one, a Body) for then is each of thoſe ſix . one ſixth part thicker than a thin Space, becauſe it drives out a thin Space in ſix thin Spaces. And you may try if ſix : be equal to a Body and one thin Space; for then is each : two ſixth parts thicker than a thin Space. If ſix , be equal to nine thin Spaces, then each , is three ſixth parts of a thin Space thicker than a thin Space. If ſix -

be equal to ten thin Spaces, then each - is four ſixth parts of a thin Space thicker than a thin Space. If ſix ; be equal to eleven thin Spaces, then each ; is five ſixth parts of a thin Space thicker than a thin Space.

Now, as aforeſaid, a thin Space being one ſeventh part of the Body, and the thin Space thus divided, you have the whole Body actually divided into forty and two equal parts, as I have divided them in my Drafts of Letters down the Sides, and in the Bottom Line.

Though I have thus ſhewed how to divide a thin Space into ſix equal Parts, yet when the Letter to be Cut proves of a ſmall Body, the thin Space divided into two equal Parts may ſerve: If it prove bigger, into three or four equal Parts: And of the the largeſt Bodies, they may be divided into ſix, as aforeſaid.

If now you would make a *Gage* for any number of thin Spaces and Sixth Parts of a thin Space, you muſt take one thin Space leſs than the number of thin Spaces propoſed, and add . : , - ; according as the number of ſixth Parts of a thin Space require; and to thoſe complicated Thickneſſes you may file a ſquare Notch on the edge of the thin Plate aforeſaid, which ſhall be a ſtanding Gage or Meaſure for that number of thin Spaces and ſixth Parts of a thin Space.

All the Exception againſt this way of Meaſuring is, that thin Spaces caſt in Metal may be ſubject to bow, and ſo their Thickneſſes may prove deceitful. But, in Anſwer to that, I ſay, you may, if you will,

Caſt

Cast I for two thin Spaces thick, e for three thin Spaces thick, S for four thin Spaces thick, L for five thin Spaces thick, D for six thin Spaces thick, or any other Letters near these several Thicknesses, as you think fit; only remember, or rather, make a Table of the number of thin Spaces that each Letter on the Shank is Cast for. And by complicating the Letters and Points, as aforesaid, you will have any Thickness, either to make a Gage by, or to use otherwise.

On the other Edge of the *Face-Gage* you may file three other Notches, of the same Width with those on the former Edge, for the Long, the Assending, and Short Letters. But though the two sides of each of these Notches are parallel to each other, yet is not the third side square to them, but hath the same Slope the *Italick* hath from the *Roman*; as you may see in the Figure at *b b b.*

¶. 6. *Of* Italick, *and other* Standing Gages.

These *Gages* are to measure (as aforesaid) the Slope of the *Italick* Stems, by applying the Top and Bottom of the *Gage* to the Top and Bottom Lines of the Letters, and the other Side of the *Gage* to the Stem: for when the Letter complies with these three sides of the *Gage* that Letter hath its true Slope.

The manner of making these *Gages* (and indeed all other *Angular Gages*) is thus.

Place one Point of a Pair of Steel *Dividers* upon the thin Plate aforesaid, at the Point *c* or *d* (in Fig.

Fig. D in *Plate* 10. and with the other Point describe a small fine Arch of a Circle; as, *e f* or *g h.* In this Arch of the Circle must be set off on the *Gage a* 110 Degrees, and on the *Gage b* 70 Degrees, and draw from the Centres *c* and *d* two straight Lines through those numbers of Degrees: Then Filing away the Plate between the two Lines, the *Gages* are finished.

To find the Measure of this, or any other number of Degrees, do thus; Describe a Circle on a piece of Plate-Brass of any Radius (but the larger the better) draw a straight Line exactly through the Centre of this Circle, and another straight Line to cut this straight Line at right Angles in the Centre, through the Circle; so shall the Circle be divided into four Quadrants: Then fix one Foot of your Compasses (being yet unstirr'd) in one of the Points where any of the straight Lines cuts the Circle, and extend the moving Foot of your Compasses where it will fall in the Circle, and make there a Mark, which is 60 Degrees from the fixed Foot of the Compasses: Then fix again one Foot of your Compasses in the Intersection of the straight Line and Circle that is next the Mark that was made before, and extend the moving Foot in the same Quadrant towards the straight Line where you first pitch'd the Foot of your Compasses, and with the moving Foot make another Mark in the Circle. These two Marks divide the Quadrant into three equal Parts: The same way you may divide the other three Quadrants; so shall the whole Circle be divided into twelve equal Parts; and each of these twelve equal parts con-

tain an Arch of thirty Degrees: Then with your Dividers divide each of theſe 30 Degrees into three equal Parts, and each of theſe three equal Parts into two equal Parts, and each of theſe two equal Parts into five equal Parts, ſo ſhall the Circle be divided into 360 equal Parts, for your uſe.

To uſe it, deſcribe on the Centre of the Circle an Arch of almoſt a Semi-Circle: This Arch muſt be exactly of the ſame Radius with that I preſcribed to be made on the *Gages a b*, from *e* to *f*, and from *g* to *h*; then count in your Circle of Degrees from any Diametral Line 110 Degrees; and laying a ſtraight Ruler on the Centre, and on the 110 Degrees aforeſaid, make a ſmall Mark through the the ſmall Arch; and placing one Foot of your Compaſſes at the Interſection of the ſmall Arch, with the Diametral Line, open the other Foot to the Mark made on the ſmall Arch for 110 Degrees, and tranſfer that Diſtance to the ſmall Arch made on the *Gage*: Then through the Marks that the two Points of your Compaſſes make in the ſmall Arch on the *Gage*, draw two ſtraight Lines from the Centre *c*: and the Braſs between thoſe two ſtraight Lines being filed away, that *Gage* is made. In like manner you may ſet off any other number of Degrees, for the making of any other *Gage*.

In like manner, you may meaſure any Angle in the Drafts of Letters, by deſcribing a ſmall Arch on the Angular Point, and an Arch of the ſame Radius on the Centre of your divided Circle: For then, placing one Foot of your Compaſſes at the Interſection of the ſmall Arch with either of the ſtraight Lines

Lines proceeding from the Angle in the Draft, and extending the other Foot to the Interſection of the ſmall Arch, with the other ſtraight Line that proceeds from the Angle, you have between the Feet of your Compaſſes, the Width of the Angle; and by placing one Foot of your Compaſſes at the Interſection of any of the ſtraight Lines that proceed from the Centre of the divided Circle, and the ſmall Arch you made on it, and making a Mark where the other Foot of your Compaſſes falls in the ſaid ſmall Arch, you may, by a ſtraight Ruler laid on the Centre of the divided Circle, and the Mark on the ſmall Arch, ſee in the Limb of the Circle the number of Degrees contained between the Diametral, or ſtraight Line and the Mark.

If you have already a dividing-Plate of 360 Degrees, of a larger Radius than the Arch on your *Gage*, you may ſave your ſelf the labour of dividing a Circle (as aforeſaid,) and work by your dividing-Plate as you were directed to do with the Circle that I ſhewed you to divide.

In theſe Documents I have expoſed my ſelf to a double Cenſure; Firſt, of *Geometricians*: Secondly, of *Letter-Cutters*. *Geometricians* will cenſure me for writing anew that which almoſt every young Beginner knows: And *Letter-Cutters* will cenſure me for propoſing a Rule for that which they dare pretend they can do without Rule.

To the *Geometricians* I croſs the Cudgels: yet I writ this not to them; and I doubt I have written ſuperfluouſly to *Letter-Cutters*, becauſe I think few of them either will or care to take pains to underſtand

theſe ſmall Rudiments of *Geometry*. If they do, and be ingenious, they will thank me for diſcovering this Help in their own Way, which few of them know. For by this Rule they will not only make Letters truer, but alſo quicker, and with leſs care; becauſe they ſhall never need to ſtamp their *Counter-Punch* in Lead, to ſee how it pleaſes them; which they do many times, before they like their *Counter-Punch*, be it of A *A* V v W w *VW*, and ſeveral other Letters) and at laſt finiſh their *Counter-Punch* but with a good Opinion they have that it may do well, though they frequently ſee it does not in many Angular Letters on different Bodies Cut by the ſame Hand. And were *Letter-Cutting* brought to ſo common Practice as *Joynery*, *Cabinet-making*, or *Mathematical Inſtrument-making*, every young Beginner ſhould then be taught by Rules, as they of theſe Trades are; becauſe *Letter-Cutting* depends as much upon Rule and Compaſs as any other Trade does.

You may in other places, where you find moſt Convenience (as at *i*) make a Square, which may ſtand you in ſtead for the Squaring the Face and Stems of the *Punch* in *Roman* Letters, and alſo in many other Uſes.

And you may make *Gages*, as you were taught before to try the *Counter-Punches* of Angular Letters; as, A K M N V X Y Z, *Romans* and *Italicks*, *Capitals* and *Lower-Caſe*. But then, that you may know each diſtinct *Gage*, you may engrave on the ſeveral reſpective *Gages*, at the Angle, A *A* 4 *&c.* For by examining by the Drafts of Letters, what Angle their Inſides make, you may ſet that Angle off, and make

make the *Gage* as you were taught before, in the *Gage* for the Slope of *Italicks*.

¶ 7. *Of the* Liner.

The *Liner* is marked E in *Plate* 10. It is a thin Plate of Iron or Braſs, whoſe Draft is ſufficient to expreſs the Shape. The Uſe of it is on the under-edge *a b* (which is about three Inches long) and is made truly ſtraight, and pretty ſharp or fine; that being applied to the Face of a *Punch*, or other piece of Work, it may ſhew whether it be ſtraight or no.

¶. 8. *Of the* Flat-Table.

The *Flat-Table* at F in *Plate* 10. The Figure is there ſufficient. All its Uſe is the Table F, for that is about one Inch and an half ſquare, and on its Superficies exactly ſtraight and flat. It is made of Iron or Braſs, but Braſs moſt proper. Its Uſe is to try if the Shank of a *Punch* be exactly Perpendicular to its Face, when the Face is ſet upon the *Table*; for if the Shank ſtand then directly upright to the Face of the *Table*, and lean not to any ſide of it, it is concluded to be perpendicular.

It hath ſeveral other Uſes, which, when we come to *Caſting* of *Letters*, and *Juſtifying* of *Matrices*, ſhall be ſhewn.

¶. 9. *Of the* Tach.

The *Tach* is a piece of Hard-Wood, (Box is very good) about three Inches broad, six Inches long, and three quarters of an Inch thick. About half its Length is fastned firm down upon the *Work-Bench*, and its other half projects over the hither Edge of it. It hath three or four Angular Notches on its Fore-end to rest and hold the Shank of a *Punch* steady when the End of the *Punch* is screwed in the *Hand-Vice*, and the *Hand-Vice* held in the Left Hand, while the *Work-man* Files or Graves on it with his Right Hand.

Instead of Fastning the *Tach* to the *Bench*, I *Saw* a square piece out of the further half of the *Tach*, that it may not be too wide for the Chaps of the *Vice* to take and screw that narrow End into the Chaps of the *Vice*, because it should be less cumbersome to my *Work-Bench*.

¶. 10. *Of Furnishing the* Work-Bench.

The *Work-man* hath all his great *Files* placed in Leather Nooses, with their Handles upwards, that he may readily distinguish the *File* he wants from another *File*. These Nooses are nailed on a Board that Cases the Wall on his Right Hand, and as near his *Vice* as Convenience will admit, that he may the readier take any *File* he wants.

He hath also on his Right Hand a Tin Pot, of about a Pint, with small *Files* standing in it, with their

their Handles downwards, that their Blades may be the readier seen. These small *Files* are called *Watch-makers Files*, and the *Letter-Cutter* hath occasion to use these of all Shapes, *viz. Flat, Pillar, Square, Triangular, Round, Half-Round, Knife-Files, &c.*

He also provides a shallow square Box, of about five Inches long, and three Inches broad, to lay his small Instruments in; as, his *Gages*, his *Liner*, some common *Punches*, *&c.* This Box he places before him, at the further side of the *Work-Bench*.

He also provides a good *Oyl-Stone*, to sharpen his *Gravers* and *Sculpters* on. This he places at some distance from the *Vice*, on his Left Hand.

§. 13. ¶. 1. *Of* Letter-Cutting.

The *Letter-Cutter* does either Forge his *Steel-Punches*, or procures them to be forged; as I shewed, *Numb.*1. *Fol.*8,9,10. in *Vol.*I. *&c.* But great care must be taken, that the Steel be sound, and free from Veins of Iron, Cracks and Flaws, which may be discerned; as I shewed in *Numb.* 3. *Vol.* I. For if there be any Veins of Iron in the Steel, when the Letter is Cut and Temper'd, and you would Sink the *Punch* into the Copper, it will batter there: Or it will Crack or Break if there be Flaws.

If there be Iron in it, it must with the Chissel be split upon a good Blood-Red-Heat in that place, and the Iron taken or wrought out; and then with another, or more Welding Heat, or Heats, well doubled up, and laboured together, till the Steel become a sound entire piece. This Operation *Smiths* call *Well Currying of the Steel.*

If

If there be Flaws in it, you muſt alſo take good Welding Heats, ſo hot, that the contiguous ſides of the Flaws may almoſt Run: for then, ſnatching it quickly out of the Fire, you may labour it together till it become cloſe and ſound.

Mr. *Robinſon*, a *Black-Smith* of *Oxford*, told me a way he uſes that is ingenious, and ſeems rational: For if he doubts the Steel may have ſome ſmall Flaws that he can ſcarce diſcern, he takes a good high Blood-Red Heat of it, and then twiſts the Rod or Bar (as I ſhewed, *Numb.* 3. *Vol.* I.) which Twiſting winds the Flaws about the Body of the Rod, and being thus equally diſpoſed, more or leſs, into the Out-ſides of the Rod, according as the Poſition of the Flaw may be, allows an equal Heat on all ſides to be taken, becauſe the Out-ſides heat faſter than the In-ſide; and therefore the Out-ſides of the Steel are not thus ſo ſubject to Burn, or Run, as if it ſhould be kept in the Fire till the Middle, or In-ſide of it ſhould be ready to Run. And when the Steel is thus well welded, and ſoundly laboured and wrought together with proper Heats, he afterwards reduces it to Form.

Now, that I may be the better underſtood by my Reader as he reads further, I have, in *Plate* 10. at *Fig.* G deſcribed the ſeveral Parts of the *Punch*; which I here explain.

G The Face.

a a, *b b* The Thickneſs.

a b, *a b* The Heighth.

a c, *b c*, *b c* The Length of the Shank, about an Inch and three quarters long.

c c c The Hammer-End.

This

This is no ſtrict Length for the Shank, but a convenient Length; for ſhould the Letter Cut on the Face be ſmall, and conſequently, the Shank ſo too, and the Shank much longer, and it (as ſeldom it is) not Temper'd in the middle, it might, with Punching into Copper, bow in the middle, either with the weight of the Hammer, or with light reiterated Blows: And ſhould it be much ſhorter, there might perhaps Finger-room be wanting to manage and command it while it is Punching into the Copper. But this Length is long enough for the biggeſt Letters, and ſhort enough for the ſmalleſt Letters.

The Heighth and Thickneſs cannot be aſſign'd in general, becauſe of the diverſity of Bodies, and Thickneſs of Letters: Beſides, ſome Letters muſt be Cut on a broad Face of Steel, though, when it is Cut, it is of the ſame Body; as all Letters are, to which *Counter-Punches* are uſed; becauſe the Striking the *Counter-Punch* into the Face of the *Punch* will, if it have not ſtrength enough to contain it, break or crack one or more ſides of the *Punch*, and ſo ſpoil it. But if the Letter be wholly to be Cut, and not Counter-Punch'd, as I ſhall hereafter hint in general what Letters are not, then the Face of the *Punch* need be no bigger, or, at leaſt, but a ſmall matter bigger than the Letter that is to be cut upon it.

Now, If the Letter be to be Counter-punch'd, the Face of the *Punch* ought to be about twice the Heighth, and twice the Thickneſs of the Face of the *Counter-Punch*; that ſo, when the *Counter-Punch* is ſtruck juſt on the middle of the Face of the *Punch*, a

convenient Subſtance, and conſequently, Strength of Steel on all its Sides may be contained to reſiſt the Delitation, that the Sholder or Beard of the *Counter-Punch* ſinking into it, would elſe make.

If the *Letter-Cutter* be to Cut a whole Set of *Punches* of the ſame Body of *Roman* and *Italica*, he provides about 240 or 260 of theſe *Punches*, becauſe ſo many will be uſed in the *Roman* and *Italica Capitals* and *Lower-Caſe*, *Double-Letters*, *Swaſh-Letters*, *Accented Letters*, *Figures*, *Points*, *&c.* But this number of *Punches* are to have ſeveral Heighths and Thickneſſes, though the Letters to be Cut on them are all of the ſame Body.

What Heighth and Thickneſs is, I have ſhewed before in this §, but not what Body is; therefore I ſhall here explain it.

By Body is meant, in *Letter-Cutters*, *Founders* and *Printers* Language, the Side of the Space contained between the Top and Bottom Line of a Long Letter. As in the Draft of Letters, the divided Line on the Left Hand of A is divided into forty and two equal Parts; and that Length is the Body, thus: J being an Aſcending and Deſcending Letter, *viz.* a long Letter, ſtands upon forty two Parts, and therefore fills the whole Body.

There is in common Uſe here in *England*, about eleven Bodies, as I ſhewed in §.2.¶.2.of this Volumne.

I told you even now, that all the *Punches* for the ſame Body muſt not have the ſame Heighth and Thickneſs: For ſome are Long; as, J j Q, and ſeveral others; as you may ſee in the Drafts of Letters: and theſe long Letters ſtand upon the whole Heighth of the Body. The

The Aſcending and Deſcending Letters reach from the Foot-Line, up to the Top-Line; as all the Capital Letters are Aſcending Letters, and ſo are many of the Lower-Caſe Letters; as, b d f, and ſeveral others. The Deſcending Letters are of the ſame Length with the Aſcending Letters; as, g p q and ſeveral others. Theſe are contained between the Head-Line and the Bottom-Line. The Short Letters are contained between the Head-Line and the Bottom-line. Theſe are three different Sizes of Heighth the *Punches* are made to, for Letters of the ſame Body. But in proper place I ſhall handle this Subject more large and diſtinctly.

And as there is three Heighths or Sizes to be conſidered in Letters Cut to the ſame Body, ſo is there three Sizes to be conſidered, with reſpect to the Thickneſſes of all theſe Letters, when the *Punches* are to be Forged: For ſome are m thick; by m thick is meant m *Quadrat* thick, which is juſt ſo thick as the Body is high: Some are n thick; that is to ſay, n *Quadrat* thick, *viz.* half ſo thick as the Body is high: And ſome are *Space* thick; that is, one quarter ſo thick as the Body is high; though Spaces are ſeldom Caſt ſo thick, as ſhall be ſhewed when we come to *Caſting*: and therefore, for diſtinction ſake, we ſhall call theſe Spaces, Thick Spaces.

The firſt three Sizes fit exactly in Heighth to all the Letters of the ſame Body; but the laſt three Sizes fit not exactly in Thickneſs to the Letters of the ſame Body; for that ſome few among the Capitals are more than m thick, ſome leſs than m thick, and more than n thick; and ſome leſs than n thick, and

more than Space thick; yet for Forging the *Punches*, theſe three Sizes are only in general Conſidered; with Exception had to Æ Æ Q, and moſt of the Swaſh Letters; which being too thick to ſtand on an m, muſt be Forged thicker, according to the Work-man's Reaſon.

After the Work-man has accounted the exact number of Letters he is to Cut for one Set, he conſiders what number he ſhall uſe of each of theſe ſeveral Sizes in the *Roman*, and of each of theſe ſeveral Sizes in the *Italick*; (for the *Punches* of *Romans* and *Italicks*, if the Body is large, are not to be Forged to the ſame ſhape, as ſhall be ſhewed by and by) and makes of a piece of Wood one Pattern of the ſeveral Sizes that he muſt have each number Forged to. Upon every one of theſe Wooden Patterns I uſe to write with a Pen and Ink the number of *Punches* to be Forged of that Size, leſt afterwards I might be troubled with Recollections.

I ſay (for Example) He conſiders how many long Letters are m thick, how many long Letters are n thick, and how many long Letters are Space thick, in the *Roman*; and alſo conſiders which of theſe muſt be Counter-punch'd, and which not: For (as was ſaid before) thoſe Letters that are to be Counter-punch'd are to have about twice the Heighth and twice the Thickneſs of the Face of the *Counter-Punch*, for the Reaſon aforeſaid. But the Letters not to be Counter-punch'd need no more Subſtance but what will juſt contain the Face of the Letter; and makes of theſe three Sizes three Wooden Patterns, of the exact Length, Heighth and Thickneſs that the Steel *Punches* are to be Forged to. He

He alſo counts how many are Aſcendents and Deſcendents, m-thick, n-thick, and Space thick; ſtill conſidering how many of them are to be Counter-punch'd, and how many not; and makes Wooden Patterns for them.

The like he does for ſhort Letters; and makes Wooden Patterns for them, for Steel *Punches* to be Forged by.

And as he has made his Patterns for the *Roman*, ſo he makes Patterns for the *Italick* Letters alſo; for the ſame ſhap'd *Punches* will not ſerve for *Italick*, unleſs he ſhould create a great deal more Work to himſelf than he need do: For *Italick Punches* are not all to be Forged with their ſides ſquare to one another, as the *Romans* are; but only the higheſt and loweſt ſides muſt ſtand in Line with the higheſt and loweſt ſides of the *Roman*; but the Right and Left Hand ſides ſtand not parallel to the Stems of the *Roman*, but muſt make an Angle of 20 Degrees with the *Roman* Stems: ſo that the Figure of the Face of the *Punch* will become a *Rhomboides*, as it is called by *Geometricians*, and the Figure of this Face is the Slope that the *Italick* Letters have from the *Roman*, as in proper place ſhall be further ſhewed. Now, ſhould the *Punches* for theſe Letters be Forged with each ſide ſquare to one another, the *Letter-Cutter* would be forced to ſpend a great deal of Time, and take great pains to File away the ſuperfluous Steel about the Face of the Letter when he comes to the Finiſhing of it, eſpecially in great Bodied Letters. Yet are not all the *Italick* Letters to be Forged on the Slope; for the *Punches* of ſome of them, as the

n n, and many others, may have all, or, at leaſt, three of their ſides, ſquare to one another, though their Stems have the common Slope, becauſe the ends of their Beaks and Tails lie in the ſame, perpendicular with the Outer Points of the Bottom and Top of their Stems, as is ſhewed in the Drafts of Letters.

Though I have treated thus much on the Forging of Punches, yet muſt all what I have ſaid be underſtood only for great Bodied *Punches*; *viz.* from the *Great Primer*, and upwards. But for ſmaller Bodies; as *Engliſh*, and downwards, the *Letter-Cutter* generally, both for *Romans* and *Italicks*, gets ſo many ſquare Rods of Steel, Forged out of about two or three Foot in Length, as may ſerve his purpoſe; which Rods he elects as near his Body and Sizes as his Judgment will ſerve him to do; and with the edge of a Half-round File, or a Cold-Chiſſel, cuts them into ſo many Lengths as he wants *Punches*. Nay, many of theſe Rods may ſerve for ſome of the ſmall Letters in ſome of the greater Bodies; and alſo, for many of their *Counter-Punches*.

Having thus prepared your *Punches*, you muſt Neal them, as I ſhewed in *Numb.* 3. *Vol.* I.

¶. 2. *Of* Counter-Punches.

The *Counter-Punches* for great Letters are to be Forged as the *Letter-Punches*; but for the ſmaller Letters, they may be cut out of Rods of Steel, as aforeſaid. They muſt alſo be well Neal'd, as the *Punches*. Then muſt one of the ends be Filed away on

on the out-ſide the Shank, to the exact ſhape of the in-ſide of the Letter you intend to Cut. For Example, If it be *A* you would Cut; This *Counter-Punch* is eaſie to make, becauſe it is a Triangle; and by meaſuring the In-ſide of the Angle of *A* in the Draft of Letters, as you were taught, §. 12. ¶. 6. you may make on your Standing *Gage-Plate* a *Gage* for that Angle: So that, let the Letter to be Cut be of what Body you will, from the leaſt, to the biggeſt Body, you have a Standing *Gage* for this *Counter-Punch*, ſo oft as you may have occaſion to Cut A.

The *Counter-Punch* of *A* ought to be Forged Triangularly, eſpecially towards the Punching End, and Tryed by the *A Gage*, as you were taught to uſe the Square, *Numb.* 3. *Vol.* I. Yet, for this and other Triangular *Punches*, I commonly reſerve my worn out three ſquare Files, and make my *Counter-Punch* of a piece of one of them that beſt fits the Body I am to Cut.

Having by your *A-Gage* fitted the Top-Angle and the Sides of this *Counter-Punch*, you muſt adjuſt its Heighth by one of the three *Face-Gages* mentioned in § 12. ¶. 5. *viz.* by the Aſcending *Face-Gage*; for *A* is an Aſcending Letter. By Adjuſting, I do not mean, you muſt make the *Counter-Punch* ſo high, as the Depth of the Aſcending *Face-Gage*; becauſe in this Letter here is to be conſidered the Top and the Footing, which ſtrictly, as by the large Draft of *A*, make both together five ſixth Parts of a thin Space: Therefore five ſixth Parts muſt be abated in the Heighth of your *Counter-Punch*, and it muſt be but four thin Spaces, and one ſixth part of a thin Space

Space high, becauſe the Top above the *Counter-Punch*, and the Footing below, makes five ſixth Parts of a thin Space, as aforeſaid.

Therefore, to meaſure off the Width of four thin Spaces and one ſixth Part of a thin Space, lay three thin Spaces, or, which is better, the Letter e, which is three thin Spaces, as aforeſaid; and . which is one thin Space and one ſixth part of a thin Space, upon one another; for they make together, four thin Spaces, and one ſixth part of a thin Space; and the thickneſs of theſe two Meaſures ſhall be the Heighth of the *Counter-Punch*, between the Footing and the Inner Angle of *A*. And thus, by this Example, you may couple with proper Meaſures either the whole Forty two, which is the whole Body, or any number of its Parts, as I told you before.

This Meaſure of four thin Spaces and one ſixth part of a thin Space is not a Meaſure, perhaps, uſed more in the whole Set of Letters to be Cut to the preſent Body, therefore you need not make a *Standing Gage* for it; yet a preſent *Gage* you muſt have: Therefore uſe the *Sliding Gage* (deſcribed in §. 12. ¶. 4. and *Plate* 10. at B.) and move the Socket *c c* on the Beam *a a*, till the Edge of the Sholder of the Square of the Socket at the under-ſide of the Beam ſtands juſt the Width of four thin Spaces and one ſixth part of a thin Space, from the Point of the Tooth *b*; which you may do by applying the Meaſure aforeſaid juſt to the Square and Point of the Tooth; for then if you Screw down the Screw in the upper ſide of the Sliding Socket, it will faſten the Square at that diſtance from the Point of the Tooth.

Tooth. And by again applying the ſide of the Square to the Foot of the Face of the *Counter-Punch*, you may with the Tooth deſcribe a ſmall race, which will be the exact Heighth of the *Counter-Punch* for *A*. But *A* hath a Fine ſtroak within it, reaching from Side to Side, which by the large Draft of *A*, you may find that the middle of this croſs ſtroak is two Thin Spaces above the bottom of this *Counter-Punch*; and with your common *Sliding-Gage* meaſure that diſtance as before, and ſet off that diſtance alſo on the Face of your *Counter-Punch*. Then with the edge of a Fine *Knife-File*, File ſtraight down in that race, about the depth of a Thin Space, or ſomewhat more; So ſhall the *Counter-Punch* for *A* be finiſht. But you may if you will, take off the Edges or Sholder round about the Face of the *Counter-Punch*, almoſt ſo deep as you intend to ſtrike it into the *Punch*: for then the Face of the *Counter-Punch* being Filed more to a Point, will eaſier enter the *Punch* than the broad Flat-Face.

But note, That if it be a very Small Bodied *A* you would make, the Edge of a Thin *Knife-File* may make too wide a Groove: In this caſe you muſt take a peece of a well-Temper'd broken Knife, and ſtrike its Edge into the Face of the *Counter-Punch*, as aforeſaid.

¶. 3. *Of Sinking the* Counter-Punches.

Having thus finiſht his *Counter-Punch*, he Hardens and Tempers it, as was taught *Numb.* 3. *fol.* 57, 58. *Vol.* I. And having alſo Filed the Face of his Punch

he intends to cut his *A* upon, pretty Flat by gueſs, he Screws the Punch upright, and hard into the Vice: And ſetting the Face of his *Counter-Punch* as exactly as he can, on the middle of the Face of his Punch, he, with an Hammer ſuitable to the Size of his *Counter-Punch*, ſtrikes upon the end of the *Counter-Punch* till he have driven the Face of it about two Thin Spaces deep into the Face of the Punch. So ſhall the *Counter-Punch* have done its Office.

But if the Letter to be *Counter-Puncht* be large, as *Great Primmer*, or upwards, I take a good high Blood red Heat of it, and Screw it quickly into the Vice; And having my *Counter-Punch* Hard, not Temper'd, becauſe the Heat of the Punch ſoftens it too faſt: And alſo having before-hand the *Counter-Punch* Screwed into the *Hand-Vice* with its Shank along the Chaps, I place the Face of the *Counter-Punch* as before, on the middle of the Face of the Punch, and with an Hammer drive it in, as before.

Taking the Punch out of the Vice, he goes about to Flat and Smoothen the Face in earneſt; for it had been to no purpoſe to Flat and Smoothen it exactly before, becauſe the Sinking of the *Counter-Punch* into it, would have put it out of Flat again.

But before he Flats and Smoothens the Face of the Punch, He Files by gueſs the ſuperfluous Steel away about the Face of the Letter, *viz.* ſo much, or near ſo much, as is not to be uſed when he comes to finiſh up the Letter, as in this preſent Letter *A*, which ſtanding upon a Square Face on the Punch, meets in an Angle at the Top of the Letter. Therefore the Sides of that Square muſt be Filed away to

to an Angle at the Top of the Face of the Punch. But great care muſt be taken, that he Files not more away than he ſhould: For he conſiders that the left hand Stroak of *A* is a Fat Stroak, and that both the left-hand and the right-hand Stroak too, have Footings, which he is careful to leave Steel enough in their proper places for.

The reaſon why theſe are now Fil'd thus away, and not after the Letter is finiſht, is, Becauſe in the Flatting the Face there is now a leſs Body of Steel to File away, than if the whole Face of the Punch had remain'd intire: For though the following ways are quick ways to Flatten the Face, yet conſidering how tenderly you go to Work, and with what Smooth Files this Work muſt be done, the riddance made will be far leſs when a broad Face of *Steel* is to be Flatned, than when only ſo much, or very little more than the Face of the *Letter* only is to be Flatned.

To Flat and Smoothen the Face of the Punch, he uſes the *Flat-Gage*, (deſcribed §. 12. ¶. 3. and *Plate* 10. at A.) thus, He fits one convex corner of the Shank of the Punch, into the Concave corner of the *Flat-Gage*, and ſo applies his *Flat-Gage-Punch* and all to the Face of the *Uſing-File*, and lets the *Counter-Puncht* end, *viz.* the Face of the Punch Sink down to the Face of the *Uſing-File*: And then keeping the convex Corner of the Shank of the Punch cloſe and ſteddy againſt the Concave corner of the *Flat-Gage*, and preſſing with one of his Fingers upon the then upper end of the Punch, *viz.* the Hammer-end, he alſo at the ſame time, preſſes

the lower end of the Punch, *viz.* The Face againſt the *Uſing-File*, and thruſts the *Flat-Gage* and *Punch* in it ſo oft forwards, till the extuberant Steel on the Face, be Rub'd or Fil'd away: which he knows partly by the alteration of colour and Fine Furrows made by the *Uſing-File* on the Face of the Punch, and partly by the falling away of the parts of the Face that are not yet toucht by the *Uſing-File:* So that it may be ſaid to be truly Flat: which he knows, when the whole Face of the Punch touches upon the Flat of the *Uſing-File*, or at leaſt, ſo much of the Face as is required in the Letter: For all Counter-Puncht-Letters, as aforeſaid, muſt have a greater Face of Steel than what the bare Letter requires: for the reaſon aforeſaid.

Another way I uſe is thus. After I have Fil'd the Face as true as I can by gueſs, with a *Rough-Cut-File*, I put the Punch into an Hand-Vice, whoſe Chaps are exactly Flat, and ſtraight on the upper Face, and ſink the Shank of the Punch ſo low down in the Chaps of the Hand-Vice, that the low ſide of the Face of the Punch may lye in the ſame Plain with the Chaps; which I try with the Liner. For the Liner will then ſhew if any of the Sides ſtand higher than the Plain of the Chaps: Then I Screw the Punch hard up, and File off the riſing ſide of the Punch, which brings the Face to an exact Level: For the Face of the Chaps being Hard Steel, a File cannot touch them, but only take off the aforeſaid Riſing parts of the Face of the Punch, till the *Smooth-File* has wrought it all over exactly into the ſame Plain with the Face of the Chaps of the *Hand-Vice*.

Some

Some *Letter-Cutters* work them Flat by Hand, which is not only difficult, but tedious, and at the beſt, but done by gueſs.

The inconvenience that this Tool is ſubject to, is, That with much uſing its Face will work out of Flat. Therefore it becomes the Workman to examine it often, and when he finds it faulty to mend it.

When they *File* it Flat by Hand, they Screw the Shank of the Punch perpendicularly upright into the Chaps of the Vice, and with a *Flat-Baſtard-Cut-File*, of about Four Inches long, or if the Punch be large, the File larger, according to diſcretion, and File upon the Face, as was ſhewn *Numb.* I. *fol.* 15, 16. Then they take it out of the Vice again, and holding up the Face Horizontally, between the Sight and the Light, examine by nice obſerving whether none of its Angles or Sides are too high or too low. And then Screwing it in the Vice again, as before, with a *Smooth-Cut-File*, he at once both Files down the Higher Sides or Angles, and Smoothens the Face of the Punch. But yet is not this Face ſo perfectly Flatned, but that perhaps the middle of it riſes more or leſs, above the Sides: And then he Screws it in his *Hand-Vice*, and leans the Shank of the Punch againſt the Tach, pretty near upright, and ſo as he may beſt command it, and with a *Watch-Makers Half-Round-Sharp-Cut-File*, Files upon it with the Flat-Side of his File; But ſo that he ſcarce makes his forward and backward Stroaks longer than the breadth of the Face of his Punch, leſt in a long Stroak, the hither or farther end of his File ſhould Mount or Dip, and

therefore keeps his File, with the Ball of his Finger upon it, close to the Face of the Punch. Then with the Liner he examines how Flat the Face of the Punch is, and if it be not yet Flat, as perhaps it will not be in several Trials, he again reiterates the last process with the *Small-Half-Round-File*, till it be Flat. But he often Files cross the Furrows of the File, as well because it makes more riddance, as because he may better discern how the File bears on the Face of the Punch.

When it is Flat, he takes a Small well-worn Half-Round-File, and working (as before) with the *Sharp-Cut-File*, he Smoothens the Face of the Punch.

Having thus Flatted the Face of the Punch, and brought the Letter to some appearance of Form, He Screws the Punch in the Hand-Vice, but not with the Shank perpendicular to the Chaps, but so as the Side he intends to File upon may stand upwards and aslope too, and make an Angle with the Chaps of the Hand-Vice. And holding the Hand-Vice steddy in his left hand, he rests the Shank of the Punch pretty near its Face upon the Tach: and then with a small *Flat-File*, called a *Pillar-File*, in his right hand, holding the Smooth Thin Side of it towards the Footing of the Stem, he Files that Stem pretty near its due Fatness, and so by several reiterated proffers, left he should File too much of the Stem away, he brings that Stem at last to its true Fatness. Then he measures with the Ascending *Face-Gage*, the Heighth of the Letter; For though the *Counter-Punch* was imagin'd (as

(as aforesaid) to be made to an exact Heighth for the inside of the Letter; yet with deeper or shallower Sinking it into the *Punch*, the inside oft proves higher or lower: Because, as aforesaid, the Superficies of the Face of the *Counter-Punch* is less than the true measure. But as it runs Sholdering into the Shank of the *Counter-Punch* the Figure or Form of the inside becomes bigger than the inside of the Letter ought to be. Therefore the deeper this Sholdering Shank is sunk into the Face of the *Punch*, the higher and broader will the Form of the inside of the Letter be, and the shallower it is Sunk in, the Shorter and Narrower by the Rule of Contraries.

He measures, as I said, with the Assending Face-Gage, and by it finds in what good Size the Letter is. If it be too high, as most commonly it is, because the Footing and Top are yet left Fat, then with several proffers he Files away the Footing and Top, bringing the Heighth nearer and nearer still, considering in his Judgment whether it be properest to File away on the Top or Footing, till at last he fits the Heighth of the Letter by the Assending *Face-Gage*.

But though he have fitted the Heighth of the Letter, yet if the *Counter-Punch* were made a little too little, or Sunk a little too shallow, not only the Footing will prove too Fat, but the Triangle above the Cross-stroke of *A* will be too small; or if too big, the Footing and part of the Top will be Filed away, when it is brought to a due Heighth, and then the Letter is Spoil'd, unless it be so deep Sunk, that

that by working away the Face, as aforesaid, he can regain the Footing and Top through the Slope-sholdering of the *Counter-Punch*, and also keep the inside of the Letter deep enough.

But if the Footing be too *Fat* or the Triangle of the Top too little in the Inside, he uses the Knife-backt Sculpter, and with one of the edges or both, that proceeds from the Belly towards the Point of the Sculpter (which edges we will for distinction sake call *Angular edges*) he by degrees and with several proffers Cuts away the Inside of the Footing, or opens the Triangle at the Top or both, till he hath made the Footing lean enough, and the Triangle big enough.

But if he works on the Triangle of the Top, he is careful not to Cut into the Straight of the Inside lines of the Stems, but to keep the Insides of that Triangle in a perfect straight line with the other part of the Inside of the Stem.

The small arch of a Circle on the Top of *A* is Fil'd away with a Sizable Round-File. And so for all other Letters that have Hollows on their Out-sides; he fits himself with a small File of that shape and Size that will fit the Hollow that he is to work upon: For thus the Tails of Swash Letters in Italick Capitals are Fil'd with half Round Files Sizable to the Hollows of them. But I instead of Round or Half-Round Files, in this Case, be speak Pillar Files of several Thicknesses, and cause the *File-maker* to Round and Hatch the Edges: which renders the File strong and able to endure hard leaning on, without Breaking, which Round or Half-Round Files will not Bear.

I need

I need give no more Examples of Letters that are to be Counter-punched: And for Letters that need neither Counter-punching or Graving, they are made as the Out-sides of *A*, with Files proper to the shapes of their Stroaks.

¶. 4. *Of Graving and Sculping the Insides of* Steel Letters.

The *Letter-Cutter* elects a *Steel Punch* or *Rod*, a small matter bigger than the Size of the Letter he is to Cut; because the Topping or Footing Stroaks will be stronger when they are a little Bevell'd from the Face. The Face of these Letters not being to be Counter-punched are first Flatned and Smoothed, as was shewed, ¶. 3. Then with the proper *Gage*, *viz.* the Long, the Ascending, or else the Short *Face-Gage*, according as the Letter is that he intends to Cut, He measures off the exact Heighth of the Letter, Thus; He first Files one of the Sides of the Face of the *Punch* (*viz.* that Side he intends to make the Foot of his Letter) exactly straight; which to do, he screws his *Punch* pretty near the bottom end, with its intended Foot-side uppermost, aslope into one end of the Chaps of his *Hand-Vice*. So that the Shank of the *Punch* lies over the Chaps of the *Hand-Vice*, and makes an Angle of about 45 Degrees with the Superficies of the Chaps of it: Then he lays the under side of the Shank of his *Punch* aslope upon his *Tache*, in one of the Notches of it, that will best fit the size of his *Punch*, to keep it steady; and so Files the Foot-Line of the *Punch*.

But he Files not athwart the ſides of his *Punch*; for that might make the Foot-Line Roundiſh, by a Mounting and Dipping the Hand is prone to; as I ſhewed, *Vol.* I. *Fol.* 15, 16. But he holds his File ſo as the Length of it may hang over the Length of the Shank of the *Punch*, and dip upon it at the Face of the *Punch*, with a Bevel, or Angle, of about 100 Degrees with the Face of the *Punch*. This Angle you may meaſure with the *Beard-Gage*, deſcribed in *Plate* 10. *Fig.* C. at *k*. Then Filing with the File in this Poſition, the Foot-Line will be made a true ſtraight Line. But yet he examines it too by applying the *Liner* to it; and holding the *Punch* and *Liner* thus to the Light; If the *Liner* touches all the way on the Foot-Line, he concludes it true; if not, he mends it till it do.

Then he uſes his proper *Steel-Gage*, and places the Sholder of it againſt the Shank of the *Punch* at the Foot-Line; and preſſing the Sholder of the *Steel-Gage* cloſe againſt the Foot-Line, he, with the Tooth of the *Gage* makes a Mark or Race on the ſide of the Face, oppoſite to the Foot-line: And that Mark or Race ſhall be from the Foot-Line, the Bounds of the Heighth of that Letter.

Then on the Face he draws or marks the exact ſhape of the Letter, with a Pen and Ink if the Letter be large, or with a ſmooth blunted Point of a Needle if it be ſmall: Then with ſizable and proper ſhaped and Pointed Sculptors and Gravers, digs or Sculps out the Steel between the Stroaks or Marks he made on the Face of the *Punch*, and leaves the Marks ſtanding on the Face.

If

If the Letter be great he is thus to Sculp out, he then, with a Graver, Cuts along the Inſides of the drawn or marked Stroaks, round about all the Hollow he is Cutting in. And having Cut about all the ſides of that Hollow, he Cuts other ſtraight Lines within that Hollow, cloſe to one another (either parallel or aſlope, it matters not) till he have filled the Hollow with ſtraight Lines; and then again, Cuts in the ſame Hollow, athwart theſe ſtraight Lines, till he fill the Hollow with Thwart Lines alſo. Which ſtraight Lines, and the Cuttings athwart them, is only to break the Body of Steel that lies on the Face of the *Punch* where the Hollow muſt be; that ſo the Round-Back'd Sculptor may the eaſier Cut through the Body of the Steel, in the Hollow, on the Face of the *Punch*; even as I told you, *Numb.* 4. *Vol.* I. §. 2. the Fore-Plain makes way for the Fine Plains.

The *Letter-Cutter* does not expect to perform this Digging or Sculping at one ſingle Operation; but, having brought the Inſide of his Letter as near as he can at the firſt Operation, he, with the flat ſide of a Well-worn, Small, Fine-Cut, Half-round File, Files off the Bur that his Sculptors or Gravers made on the Face of the Letter, that he may the better and nicelier diſcern how well he has begun. Then he again falls to work with his Sculptors and Gravers, mending, as well as he can, the faults he finds; and again Files off the Bur as before, and mends ſo oft, till the Inſide of his Letter pleaſes him pretty well. But before every Mending he Files off the Bur, which elſe, as aforeſaid, would obſcure and hide the true ſhape of his Stroaks.

Having well ſhaped the Inſide Stroaks of his Letter, he deepens the Hollows that he made, as well as he can, with his Sculptors and Gravers: And the deeper he makes theſe Hollows, the better the Letter will prove. For if the Letters be not deep enough, in proportion to their Width, they will, when the Letter comes to be Printed on, Print Black, and ſo that Letter is ſpoiled.

How deep theſe Hollows are to be, cannot be well aſſerted, becauſe their Widths are ſo different, both in the ſame Letter, and in ſeveral Letters: Therefore he deepens them according to his Judgment and Reaſon. For Example, O muſt be deeper than A need be, becauſe the Hollow of O is wider than the Hollow of A; A having a Croſs Stroak in it; and the wider the Hollow is, the more apt will the wet Paper be to preſs deeper towards the bottom in Printing. Yet this in General for the Depth of Hollows; You may make them, if you can, ſo deep as the *Counter-Punch* is directed to be ſtruck into the Face of the Punch. See ¶. 3. of this §.

Having with his Gravers and Sculptors deepned them ſo much as he thinks convenient, he, with a *Steel Punch*, pretty near fit to the ſhape and ſize of the Hollow, and Flatted on its Face, Flattens down the Irregularities that the Gravers or Sculptors made, by ſtriking with a proper Hammer, upon the Hammer-end of the *Punch*, with pretty light blows. But he takes great care, that this *Flat-Punch* be not at all too big for the Hollow it is to be ſtruck into, leſt it force the ſides of the Stroaks of the Letter out of their ſhape: And therefore alſo it is, that he ſtrikes but

but eaſily, though often, upon the end of the *Flat-Punch*.

Having finiſhed the Inſide, he works the Outſides with proper Files; as I ſhewed before, in Letter A; and ſmoothens and Polliſhes the Outſide Stroaks and Face with proper worn-out ſmall *Watch-makers* Files.

The Inſide and Outſide of the Face thus finiſhed, he conſiders what Sholdering the Shank of the *Punch* makes now with the Face, round about the Letter. For, as the Shank of the Letter ſtands farther off the Face of any of the Stroaks, the Sholdering will be the greater when the Letter is firſt made; becauſe the Outſides of the Letter, being only ſhaped at firſt with Fine Small Files, which take but little Steel off, they are Cut Obtuſely from the Shank to the Face, and the Steel of the Shank may with Rougher Files afterwards, be Cut down more Tapering to the Shank. For the Sholder of the Shank, as was ſaid before in this ¶, muſt not make an Angle with the Face, of above 100 Degrees; becauſe elſe they would be, firſt, more difficult to Sink into Copper; And Secondly, The broad Sholders would more or leſs (when the Letter is Caſt in ſuch Matrices) and comes to the Preſs, be ſubject, and very likely to be-ſmear the Stroaks of the Letter; eſpecially, with an Hard Pull, and too wet Paper; which ſqueezes the Face of the Letter deep into the Paper, and ſo ſome part of the Broad Sholdering of the Letter, receiving the Ink, and preſſing deep into the Paper, ſlurs the Printed Paper, and ſo makes the whole Work ſhew very naſty and un-beautiful.

For these Reasons it is, that the Shank of the *Punch*, about the Face, must be Filed away (at least, so much as is to be Sunk into Copper) pretty close to the Face of the Letter; yet not so as to make a Right Angle with the Face of the Letter, but an Obtuse Angle of about 100 Degrees: For, should the Shank be Filed away to a Right Angle, *viz.* a Square with the Face, if any Footing or Topping be on the Letter, these fine Stroaks will be more subject to break when the *Punch* is Sunk into Copper, than when the Angle of the Face and Shank is augmented; because then those fine Stroaks stand upon a stronger Foundation. Therefore he uses the *Beard-Gage*, and with that examines round about the Letter, and makes the Face and Shank comply with that.

Yet Swash-Letters, especially Q, whose Swashes come below the Foot-Line, and whose Length reaches under the Foot-Line of the next Letter, or Letters in Composing, ought to have the Upper Sholder of that Swash Sculped down straight, *viz.* to a Right Angle, or Square with the Face; at least, so much of it as is to be Sunk into Copper: Because the Upper Sholder of the Swash would else be so broad, that it would ride upon the Face of the next Letter. Therefore the Swash-Letters being all Long Letters, the lower end of the Swashes reach as low as the Bottom-Line; which cannot be Filed Square enough down from the Head-Line, unless the Steel the Swash stands on, should be Filed from end to end, the length of the whole Shank of the *Punch*, which would be very tedious; and besides, would make

make that part of the Shank the Swash stands on so weak, that it would scarce endure Striking into the Copper. Therefore, as I said before, the Upper Sholder of the Swash ought to be Sculped down: Yet I never heard of any *Letter-Cutters* that had the knack of doing it; but that they only Filed it as straight down as they could, and left the *Letter-Kerner*, after the Letter was Cast, to Kern away the Sholdering. Yet I use a very quick way of doing it; which is only by Resting the Back of a Graver at first, to make way; and afterwards a Sculptor, upon the Shank of the *Punch*, at the end of the Swash, one while; and another while on the Shank, at the Head, that the Swash may be Sculped down from end to end: and Sculping so, Sculp away great Flakes of the Steel at once, till I have Cut it down deep enough, and to a Right Angle.

Then he Hardens and Tempers the Punch; as was shewed, *Numb.* 3. *Vol.* I. *Fol.* 57, 58.

But though the *Punch* be Hardned and Temper'd, yet it is not quite finished: for, in the Hardning, the *Punch* has contracted a Scurf upon it; which Scurf must be taken off the Face, and so much of the sides of the Shank as is to be Sunk into Copper. Some *Letter-Cutters* take this Scurf off with small smooth Files, and afterwards with fine Powder of *Emerick*. The *Emerick*, they use thus. They provide a Stick of Wood about two Handful long, and about a *Great-Primer*, or *Double-Pica* thick: Then in an Oyster-shell, or any sleight Concave thing, they powr a little Sallad-Oyl, and put Powder of *Emerick* to it, till it become of the Consistence of Batter made

made for Pan-cakes. And ſtirring this Oyl and *Emerick* together, ſpread or ſmear the aforeſaid Stick with the Oyl and *Emerick*, and ſo rub hard upon the Face of the *Punch*, and alſo upon part of the the Shank, till they have taken the Scurf clean off.

Mr. *Walberger* of *Oxford* uſes another way. He makes ſuch an Inſtrument as is deſcribed in *Plate* 10. at H, which we will, for diſtinction ſake, call the *Joynt-Flat-Gage*. This Inſtrument conſiſts of two Cheeks about nine Inches long, as a b, and are faſtned together at one end, as the Legs of a *Carpenter's* Joynt-Rule are in the Centre, as at *c*, but with a very ſtrong Joynt; upon which Centre, or Joynt, the Legs move wider, or cloſer together, as occaſion requires. Each Leg is about an Inch and a quarter broad, and an Inch and three quarters deep; *viz.* ſo deep as the Shank of the *Punch* is long. At the farther end of the Shank b (as at *d*) is let in an Iron Pin, with an Head at the farther end, and a ſquare Shank, to reach almoſt through a ſquare Hole in the Shank b, that it twiſts not about; and at the end of that Square, a round Pin, with a Male-Screw made on it, long enough to reach through the Shank a, and about two Inches longer, as at *e*; upon which Male-Screw is fitted a Nut with two Ears, which hath a Female-Screw in it, that draws and holds the Legs together, as occaſion requires a bigger or leſs *Punch* to be held in a proper Hole. Through each of the adjoyning Inſides of the Legs are made, from the Upper to the Lower Side, ſix, ſeven, or eight Semi-Circular Holes (or more or leſs, according to diſcretion) exactly Perpendicular to

to the upper and under Sides of each Leg, marked *a a a a*, *b b b b*. Each of theſe Semicircular Holes is, when joyned to its Match, on the other Leg to make a Circular Hole; and therefore muſt be made on each Leg, at an equal diſtance from the Centre. Theſe Holes are not all of an equal Size, but different Sizes: Thoſe towards the Centre ſmalleſt, *viz.* ſo ſmall, that the *Punch* for the ſmalleſt Bodied Letters may be pinched faſt in them; and the biggeſt Holes big enough to contain, pinch and hold faſt the *Punches* for the great Bodied Letters. The upper and under ſides of this *Joynt-Flat-Gage* is Faced with an Iron Plate, about the thickneſs of an Half Crown, whoſe outer Superficies are both made exactly Flat and Smooth.

When he uſes it, he chuſes an Hole to fit the Size of the *Punch*; and putting the Shank of the *Punch* into that Hole, Sinks it down ſo low, till the Face of the *Punch*, ſtands juſt Level, or rather, above the Face of the *Joynt-Flat-Gage*: Then with a piece of an Hone, wet in Water, rubs upon the Face of the *Punch*, till he have wrought off the Scurf. At laſt, with a Stick and Dry *Putty*, Poliſhes it.

I like my own way better than either of the former: For, to take off the Scurf with Small Files ſpoils the Files; the Face of the *Punch* being Hard, and the Scurf yet Harder: And beſides, endangers the wronging the Face of the *Punch*.

The *Joynt-Flat-Gage* is very troubleſome to uſe, becauſe it is difficult to fit the Face of the *Punch*, to lie in the Plain of the Face of the *Gage*; eſpecially, if, in making the Letter, the Shank be Filed Taper-

ing, as it moſt times is. For then the Hammer-end of the *Punch* being bigger than the Face-end, it will indeed Pinch at the Hammer-end, whilſt the Face-end ſtands unſteady to Work on. But when the *Punch* is fitted in, it is no way more advantagious for Uſe, than the Chaps of the *Hand-Vice* I mentioned in ¶. 3. of this §.

Wherefore, I fit the *Punch* into the Chaps of the *Hand-Vice*, as I ſhewed in the aforeſaid ¶. and with a fine ſmooth Whet-ſtone and Water, take the Scurf lightly off the Face of the *Punch*; and afterwards, with a fine ſmooth Hone and Water, work down to the bare bright Steel. At laſt, drying the *Punch* and Chaps of the *Hand-Vice* with a dry Rag, I poliſh the Face of the *Punch* with Powder of Dry *Brick* and a Stick, as with *Putty*.

¶. 5. *Some Rules he conſiders in uſing the* Gravers, Sculptors, Small Files, *&c.*

1. When he is Graving on the Inſide of the Stroak, either to make it Finer or Smoother, he takes an eſpecial care that he place his Graver or Sculptor ſo, as that neither of its Edges may wrong another Stroak of the Letter, if they chance (as they often do) to ſlip over, or off an extuberant part of the Stroak he is Graving upon. And therefore, I ſay, he well conſiders how he is to manage the edges of his Graver. For there is no great danger of the point of his Graver after the inſide Stroaks are form'd, and the Hollows of the Letter ſomewhat deepned; but in the edges there is: For the point in

in working lies always below the Face of the Letter, and therefore can, at moſt, but ſlip below the Face, againſt the ſide of the next Stroak; but the edges lying above the Face of the Letter, may, in a ſlip, touch upon the Side and Face of the next Stroak, and wrong that more or leſs, according as the force of the Slip was greater or ſmaller. And if that Stroak it jobs againſt were before wholly finiſhed, by that job the whole Letter is in danger to be ſpoiled; at the beſt, it cannot, without Filing the Letter lower, be wrought out; which ſometimes is a great part of doing the Letter anew: For he takes ſpecial care that neither any dawk, or the leaſt extuberant bunching out be upon the inſide of the Face of the Stroak, but that the inſide of the Stroak (whether it be Fat or Lean) have its proper Shape and Proportion, and be purely ſmooth and clean all the way.

If on the inſide of the Stroak the Graver or Sculptor have not run ſtraight and ſmooth on the Stroak, but that an Extuberance lies on the Side, that Extuberance cannot eaſily be taken off, by beginning to Cut with the Edge of the Graver or Sculptor juſt where the Extuberance begins: Therefore he fixes the Point of his Graver or Sculptor in the Bottom of the Hollow, juſt under the Stroak where the Extuberance is, and leans the Edge of his Graver or Sculptor upwards; ſo as in forcing the Point of the Graver or Sculptor forwards, at the Bottom of the Hollow, the Edge of the Graver or Sculptor may ſlide tenderly along, and take along with it a very ſmall, nay, inviſible Chip of the moſt Prominent Part of the Extuberance; and ſo, by this Proceſs reittera-

ted often, he, by ſmall Degrees, Cuts away the Extuberant part of the Stroak.

2. He is careful to keep his Gravers and Sculptors always Sharp, by often Sharpning them on the Oyl-Stone, which for that purpoſe he keeps ready at hand, ſtanding on the Bench: For if a Graver or Sculptor be not ſharp, it will neither make riddance, or Cut ſmooth; but inſtead of Cutting off a ſmall Extuberancy, it will rather ſtick at it, and dig into the Side of the Stroak.

3. He Files very tenderly with the Small Files, eſpecially with the Knife-Files, as well becauſe they are Thin and Hard, not Temper'd, and therefore would ſnap to pieces with ſmall violence; as alſo, leſt with an heavy hand he ſhould take away too much at once of that Stroak he is working upon.

§. 14. ¶. 1. *Some Rules to be obſerved by the* Letter-Cutter, *in the Cutting* Roman, Italick, *and the* Black Engliſh Letter.

1. The Stem and other Fat Stroaks of Capital *Romans* is five Parts of forty and two (the whole Body:) Or, (which is all one) one ſixth part of the Heighth of an Aſcending Letter (as all Capitals are Aſcendents) as has been ſaid before. *Albertus Durer* took his Meaſure from the Heighth of Capitals, and aſſigned but one tenth part for the Stem.

2. The Stem, and other Fat Stroaks of Capitals *Italick*, is four parts of forty and two, (the Body.)

3. The Stem, and other Fat Stroaks of Lower-Caſe *Roman*, is three and an half parts of forty and two, (the Body.)

4. The

4. The Stem, and other Fat Stroaks of Lower-Caſe *Italick*, is three parts of forty and two, (the Body.)

5. Of *Engliſh*, the Short Letters ſtand between nine parts of the Bottom-Line, and nine parts from the Top-Line; *viz.* upon three and thirty parts of forty and two, (the Body.)

6. The Stem of *Engliſh* Capitals is ſix parts of forty and two, (the Body.)

7. The Stem of *Engliſh* Lower-Caſe Letters is four parts of forty and two, (the Body.)

¶. 2. *Of Terms relating to the Face of Letters, and their Explanation.*

The Parts of a *Punch* are already deſcribed in §. 13. ¶. 1. of this Volumne; and ſo is the Body: But the ſeveral Terms that relate to the Face of Letters are not yet defined. Now therefore you muſt note, that the Body of a Letter hath four principal Lines paſſing through it (or at leaſt imagined to paſs through it) at Right Angles to the Body; *viz.* The Top-Line, The Head-Line, The Foot-Line, and The Bottom-Line.

Between two of theſe Lines is contained the Heighth of all Letters.

Theſe are called *Lines*, becauſe the Tops, the Heads, the Feet and the Bottoms of all Letters (when Complicated by the *Compoſitor*) ſtand ranging in theſe imagin'd Lines, according as the Heighth and Depth of each reſpective Letter properly requires.

The Long Letters are (as I told you in §. 13. ¶. 1. of this Volumne) contained between the Top and Bottom-Lines, The Aſcending Letters are contained between the Top and Foot-Lines, The Deſcending Letters are contained between the Head and Bottom-Lines, and The Short Letters are contained between the Head and Foot-Lines.

Through what Parts of the Body all theſe Lines paſs, you may ſee by the Drafts of Letters, and the following Deſcriptions.

What the Long Letters, Aſcending Letters, and Short Letters are, I ſhewed in the afore-cited ¶. Therefore I ſhall now proceed to particular Terms relating to the Face. As,

1. The Topping, is the ſtraight fine Stroak or Stroaks that lie in the Top-Line of Aſcending Letters: In *Roman* Letters they paſs at Right Angles through the Stems; but in *Italicks*, at Oblique Angles to the Stems; as you may ſee in the Drafts of Letters, B, *B*, H, *H*, I, *I*, *&c.*

2. The Footing, is the ſtraight fine Stroak or Stroaks that lie in the Foot-Line of Letters, either Aſcending or Deſcending. In *Romans* they paſs at Right Angles through the Stem, but in *Italicks*, at Oblique Angles; as you may ſee in B, *B*, H, *H*, I, *I*. *&c.*

3. The Bottom-Footing, is the ſtraight fine Stroaks that lie in the Bottom-Line of Deſcending Letters. In *Romans* they paſs at Right Angles through the Stem; but in *Italicks* at Oblique Angles; as you may ſee p, *p*, q, *q*.

4. The

4. The Stem is the ſtraight Fat Stroak of the Letter: as in B, *B*, the ſtraight Stroak on the Left Hand is the Stem; and I, *I*, is all Stem, except the Footing and Topping.

5. Fat-Stroaks. The Stem or broad Stroak in a Letter is called Fat; as the Right Hand Stroak in A, and part of the great Arch in B, are Fat Stroaks.

6. Lean Stroaks, are the narrow fine Stroaks in a Letter; as the Left Hand Stroak of A, and the Right Hand Stroak of V are Lean.

7. Beak of Letters, is the fine Stroak or Touch that ſtands on the Left Hand of the Stem, either in the Top-Line, as b d h, *&c.* or in the Head-Line, as i, m, n, *&c.* Yet f, g, ſ, *f*, *g*, *ſ*, have Beaks on the Right Hand of the Stem.

8. Tails of Letters, is a Stroak proceeding from the Right Hand Side of the Stem, in the Foot-Line; as a d t u: and moſt *Italick* Lower-Caſe Letters have Tails: As alſo have moſt Swaſh Letters. But ſeveral of their Tails reach down to the Bottom-Line.

9. Swaſh Letters are *Italick* Capitals; as you ſee in *Plate* 15.

Thus much of *Letter-Cutting*. The next *Exerciſes* ſhall (God willing) be upon *Making Matrices*, *Making Molds*, *Caſting and Dreſſing of Letters*, &c.

F I N I S.

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Plate 11.

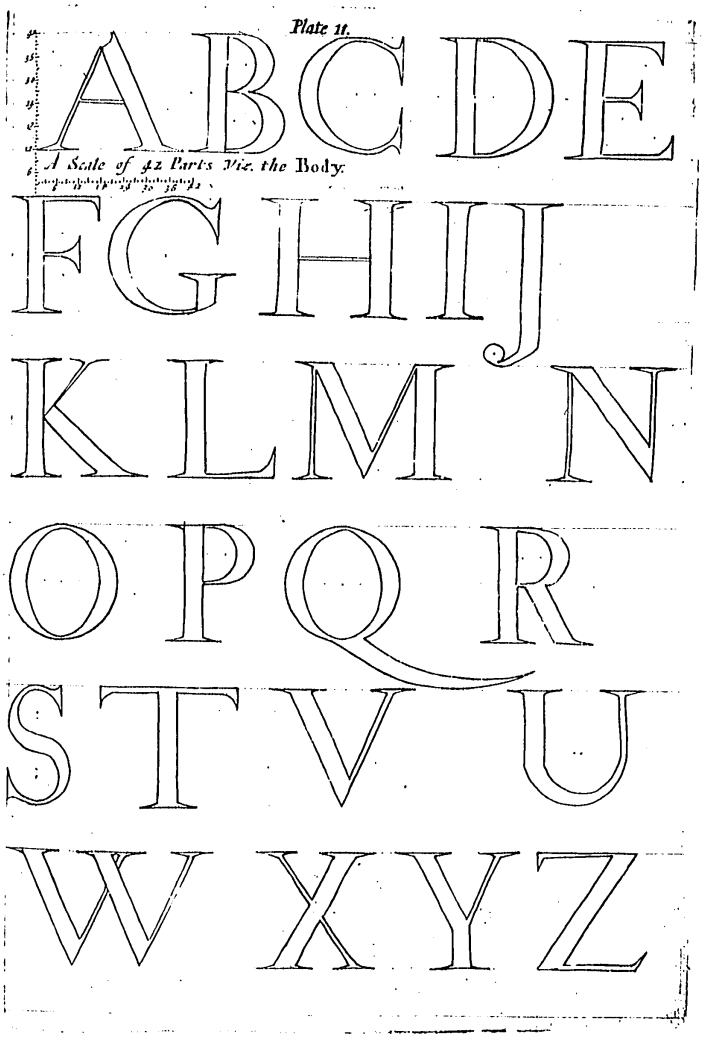
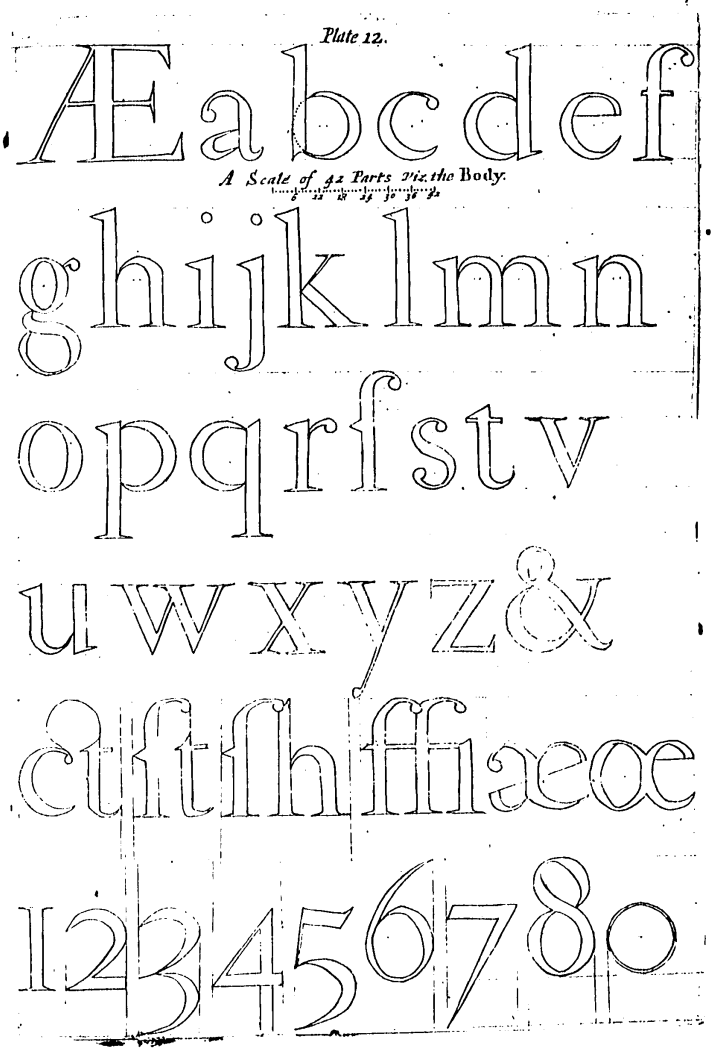


Plate 12.



A Scale of 42 Parts viz. the Body.

Plate 13.

A Scale of 42 Parts Viz. the Body.

Plate 14.

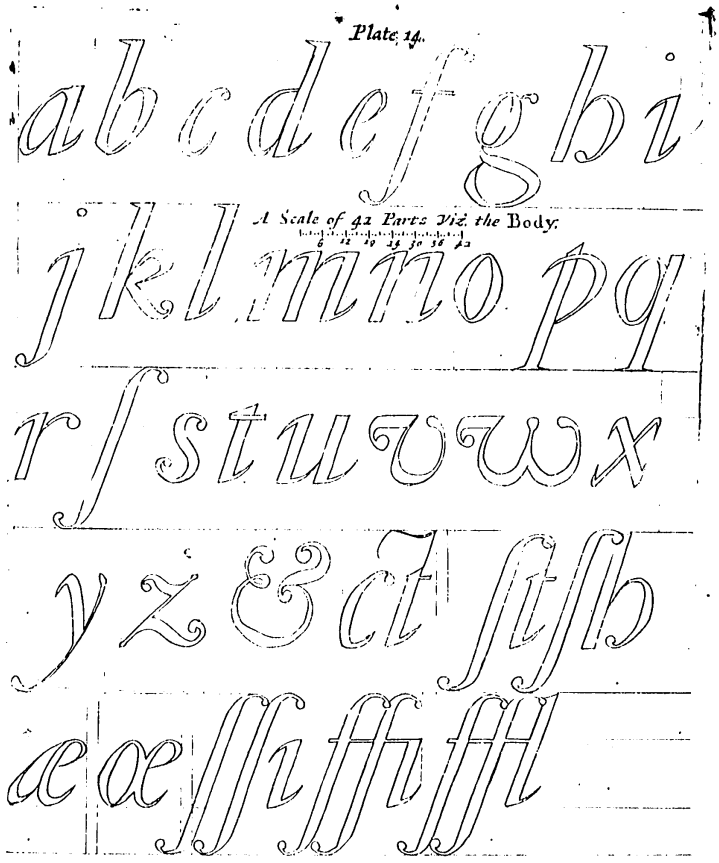


Plate 15.

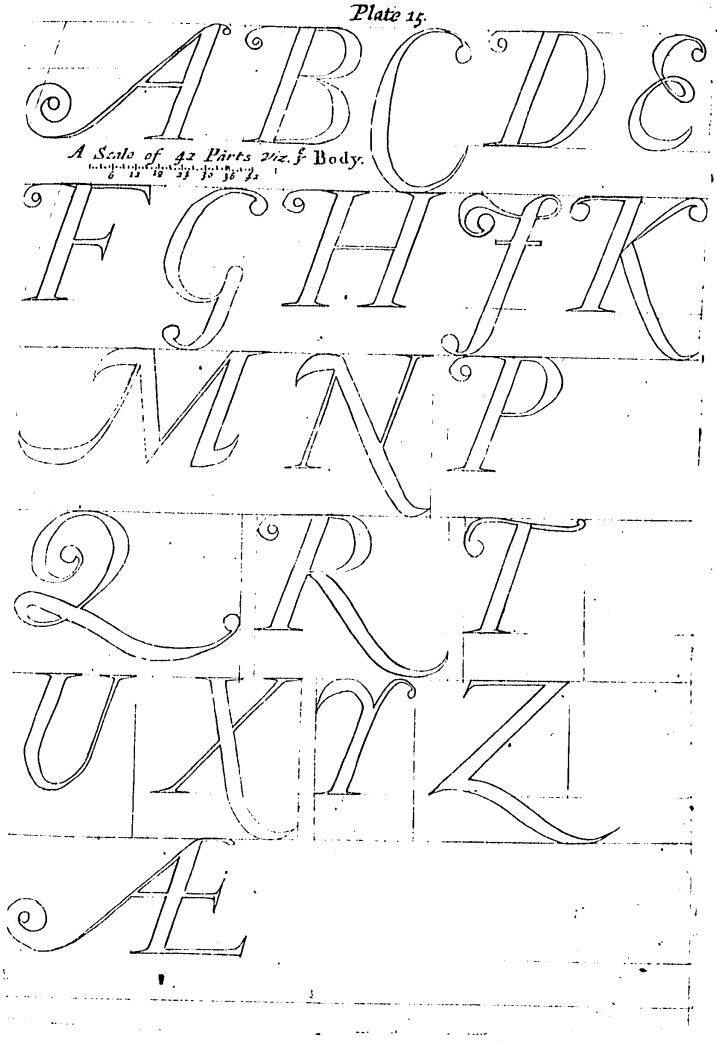


Plate 16.

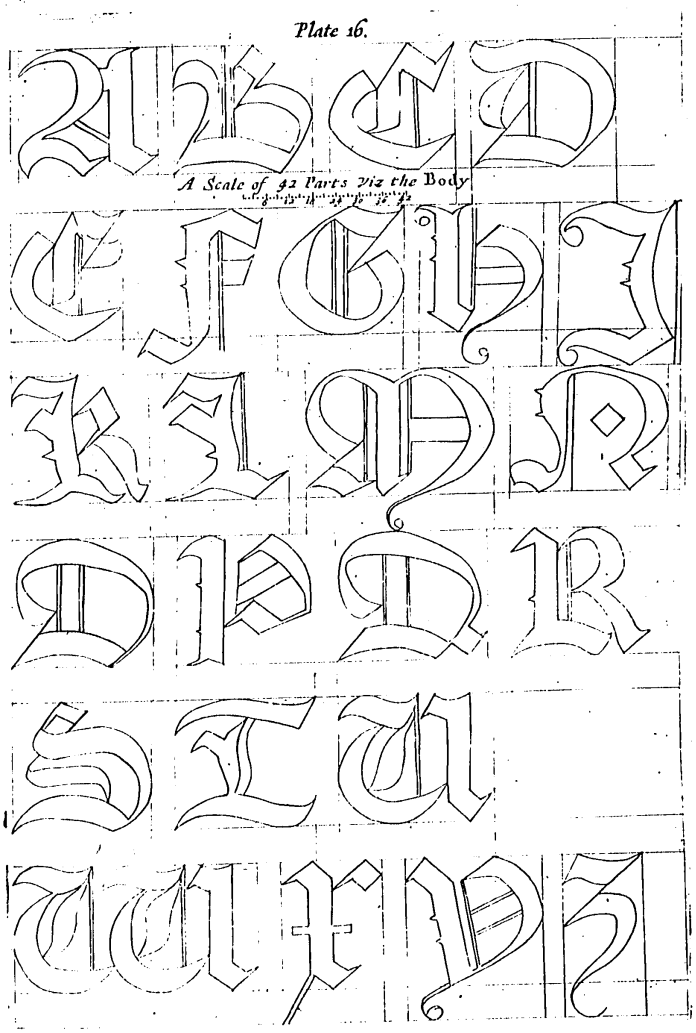



Plate 27.
A Scale of 42 Parts viz the Body.

MECHANICK EXERCISES:

Or the Doctrine of

Handy-works.

Applied to the ART of

Mold-Making, Sinking the *Matrices*, Casting and Dreſſing of

Printing-Letters.

The Second VOLUME.

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§ 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 juſtifie 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

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 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 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 the* Male-Gage.

Through these 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 square from the square *Shanck* to the farther end of the *Body*, as is described at c; but is more particularly described apart at B in the same Plate, where B may be called the *Male-Gage*: For I know no distinct Name that *Founders* have for it, and do therefore coyn this:

a The *square Shanck.*

b The *Male-Screw.*

This *square Shanck* is just so long within half a *Scaboard* thick as to reach through the *Body*, *Carriage*, and another square Hole made through the *Bottom-Plate*, that so when a *square Nut* with a *Female-Screw* in it is turned on that *Pin*, the *Nut* shall draw and fasten the *Body* and *Carriage* down to the *Bottom-Plate.*

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

¶ 6. *Of the* Mouth-Piece.

Close 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 present purpose, I must more nicely distinguish its parts, and take the Freedom to elect Terms for them, as first,

c c e The *Mouth.*

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 *Using 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 slabbering, 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 ſmalneſs of the *Break* at the end of the *Shanck* of the Letter is ſo approvable and neceſſary for the reaſon aforeſaid, then why may 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-Peice* 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* aforeſaid, 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 *Engliſh* 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 lengthned, it may be ſet farther off the *Carriage*, that an *Aſidue*, 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 juſtifie 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 aforeſaid 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 *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 *Cheek* 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 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* Haggs.

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 *Bottome-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 *Fe-*

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 Plyers* 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 finiſht 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 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 I. 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 thicknesses are parallel. But if either the *Head* or *Foot drive-out* the two Sides of the thicknesses 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 *Using File*; and if the Fault be extuberant, he rubs the Extuberancy down, by pressing 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 *Using-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 he *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 tryes, 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 he puts the *Mold* together again: And melting, (or laying aside) his first *Proofs*, lest they should make him mistake, he again *Casts* about twenty New *Proofs*, and examins 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 finisht.

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

Then he examins 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 designed 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 tryes 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 somwhat 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 *Carriage* and *Body* are thus together rub'd upon the *Using-File*, till the *Carriage* be brought to an exact length.

Having thus (as he hopes) finisht 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 *Right Side* of the *Matrice.*
d The *Left Side* of the *Matrice.*
f g The *Face* of the *Matrice.*
h i The *Leather Grove* 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 Ink 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 *Using-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 yet I have many times *Sunk Punches* indifferently into every ſort of *Copper*. Nay, even caſt *Copper*, which is generally accounted the Hardeſt: 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 aſſignable, becauſe of the Different Thickneſſes in *Letters*, both of the ſame 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 ſo 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 ſooner 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* juſt under the *Face* of the *Punch*, as well the hardneſs of the ſmall (thus hardned) *Body* of *Copper* juſt under the *Face* of the *Puuch*, as the Hardneſs of the *Face* of the *Stake* contribute a complycated 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 entred 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 *Uſing-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* ſizable 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 careleſneſs of Running the *Carriage* of the *Preſs* to a conſidered Mark they would be. But they are ſeldom *Sunk* any deeper then 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 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 *Caſts* 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-Ledg*, 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 faſtned on it. The *Lining-Stick* is about two *Inches* long for ſmall Letters; but longer for Big-*Bodyed 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* faſted 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 aforeſaid, 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 *Uſing-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 *Uſing-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* be-

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 aforesaid, which is a convenient distance for two *Letters* to stand asunder 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 said) hard screw'd, so as to stand 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* close against the *Register*, and observes how much too thick that side of the *Matrice* is: For so much as the right-hand edge of the *Orifice* of the *Matrice* stands on the left hand side of the *Body*, so much is the right side of the *Matrice* too thick, and must by several offers be *Filed* away with a *Bastard-Cut-File*, not all at once, least (ere he be aware) he makes that side of the *Matrice* too thin, which will be a great dammage to the *Matrice*, and cannot be mended but with a *Botch*, as shall in proper place be shewed.

Having by several proffers wrought the right-side of the *Matrice* thus near its thickness, he proceeds to *Justifie* the left-side also. But this side must 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) against the *Register*, and works away the left-side in all respects as he did the right-side; still being very cautious he takes not to much *Copper* away at once.

To *Justifie* the *Letter* in *Line* he examins the *Proof-Letter* (yet standing in the *Lining-Stick*) and applies 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 in *Line*. He *Casts* 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 asunder: But yet *Founders* sometimes to *Get in* or *Drive out*, *Cast* the *Letters* thinner or thicker, and consequently their *Faces* stand closer or wider asun-

der

der, which is unseemly 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* examins 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 *Casts* 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 propereſt 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 equevalent 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.

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 *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 *Brims* 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* ſizable 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 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 Fire to be Hotter or Cooler, that they may be the more aſſured it is all throughly 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 Poot*, the *Handle* of which *Stirring Poot* is alſo about two Yards long or more, and the *Poot* it ſelf almoſt twice the length of the depth of the Melting *Pot*. This *Poot* is nothing but a piece of the ſame *Iron* turned to a ſquare with the Handle: And this *Poot* 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 *Poot* 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*

¶ 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 *Bodyed-Letter* he *Caſts*, 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 *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, leſt it might hinder the *Foot* of the *Matrice* from *Sinking* cloſe down upon the *Stool* in a train of Work. Then laying a little Roſin on the upper *Wood* of the *Mold*, and having his *Caſting Ladle* hot, he with the bolling ſide of it Melts the Roſin; And when it is yet *Melted* preſſes the broad end of the *Leather* hard down on the *Wood*, and ſo faſtens it to the *Wood*. All this is Preparation.

Now he comes to *Caſting*. 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 of the *Mold* upon the under half, ſo as the *Male-Gages* may fall into the *Female-Gages*, and at the ſame time the *Foot* of the *Matrice* place it ſelf upon the *Stool*. And claſping his left-hand Thumb ſtrong 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 againſt the middle of the *Notch* in the backſide of the *Matrice*, preſſing it as well forwards towards the *Mold*, as downwards by the *Sholder* of the *Notch* cloſe upon the *Stool*, while at the ſame time with his hinder-Fingers as aforeſaid, he draws the under-half of the *Mold* towards the *Ball* of his Thumb, and thruſts 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 cleer 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 be-

fore, and alſo the whole number that is to be *Caſt* with that *Matrice.*

But ſometimes it happens that by a *Shake*, or too big a *Ladle*, the Mettal may ſpill or ſlabber over the *Mouth* of the upper Half of the *Mold*, ſo that the ſpilt *Mettal* ſticking about the out-ſides 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 ſometimes ſticks in the under Half of the *Mold* by the ſame cauſe, 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 alſo ſometimes ſticks when any of the Joynts of the *Mold* open never ſo little, the *Mettal* thus getting in between thoſe Joynts: But this fault is not to be indured, for before he can *Caſt* any more, this fault muſt be mended.

But beſides *Letters*, there is to be *Caſt* for a perfect *Fount* (properly a Fund) *Spaces* Thick and Thin, n *Quadrats*, m *Quadrats* and *Quadrats*. Theſe are not *Caſt* with *Matrices* but with *Stops* (as we may call them) Becauſe when theſe are *Caſt* 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-Braſs* 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-Braſs* 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 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 p ut 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 examins, 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 examins, 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-Sholder* 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 ſo much as to put the Letter out of Line. This muſt be mended with a *Botch*, *viz.* by knocking up the *Foot* of the *Matrice*, as I ſhew'd § 5. ¶ 3.

A Work-man will *Caſt* about four thouſand of theſe 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 Thickneſs, not its *Body* (unleſs its Thickneſs be equal to its Body) with the fore Finger and Thumb of his right Hand as cloſe to the *Break* as he can, leſt if when the *Break* be between the fore-Finger and Thumb of his left Hand, the force of *Breaking* off the *Break* ſhould bow the *Shanck* of the *Letter*.

¶ 4. *Of* Rubbing *of* Letters.

Rubbing of *Letters* is alſo moſt commonly Boys-work: But when they do it, they provide *Finger-ſtalls* for the two fore-Fingers of the right-Hand: For elſe the Skin of their Fingers would quickly rub off with the ſharp greet of the Stone. Theſe *Finger-ſtalls* are made of old *Ball-Leather* or *Pelts* that *Printers* have done with: Then having an heap of one ſort 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 pret-

ty well rounded away, leſt with long uſage and hard Cutting they Gall the Hand. The upper ſide of this *Kerning-Stick* is flatted 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-ſtick* 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-ſtick* with the *Foot* of the *Letter* againſt the bottom *Sholder*, and the ſide of the *Letter* againſt the ſide *Sholder* of the *Kerning-ſtick*.

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-ſtone*. Then he takes a piece of a Broom-ſtick 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

he 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 *Caſting* 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* ſteddy 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* ſmoothens that end of the *Letter* alſo.

If the other ſide of the *Letter* be notto be *Kern'd*

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 *Skolder* 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 *Metal* 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 fils 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

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 ſ 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* 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. ¶ 1. *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

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

Then he goes as near the Light as he can with the *Letters* in his *Dreſſing-ſtick*, and examins what *Letters Come not well* either in the *Face* or *Shanck*: So that then holding the *Dreſſing-ſtick* 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 *Dreſſing-Bench*: and thus he does to all the *Letters* in that *Stick* that are to be *Thrown out*.

Then taking again the *Dreſſing-Stick* in his left-Hand at or near the handle of it, he takes the *Dreſſing-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 ſlips 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 *Baſil*-edge may *Cut* or *Scraped* 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 *Let-*

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 *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 reitterates 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 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 *Dreſs* all big Bodyed *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 *Bodyed-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 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.

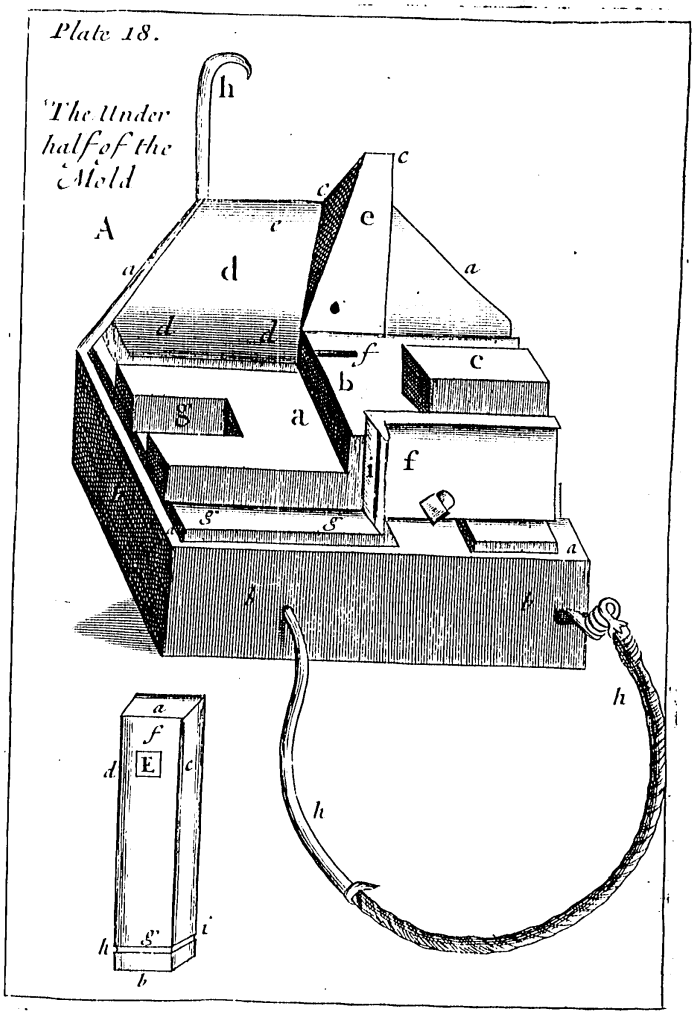
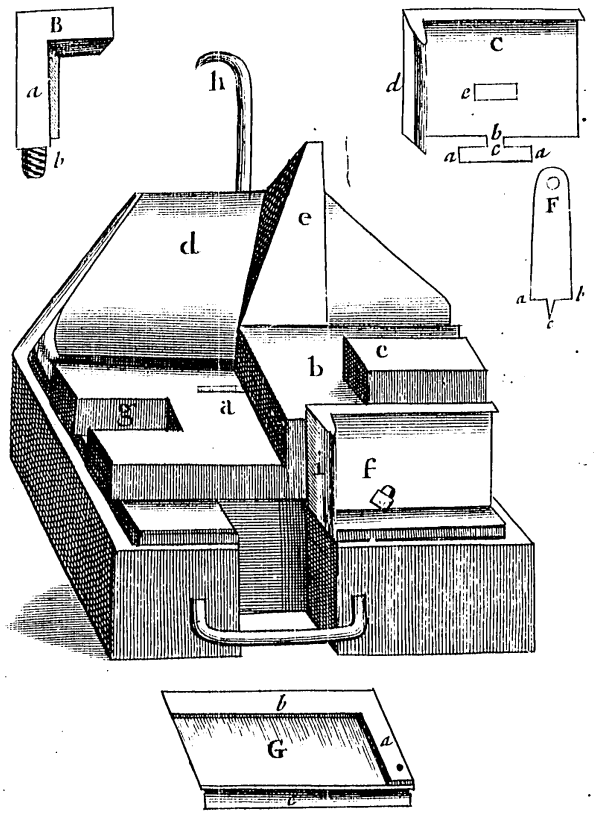


Plate 19.

The Upper half of the Mold



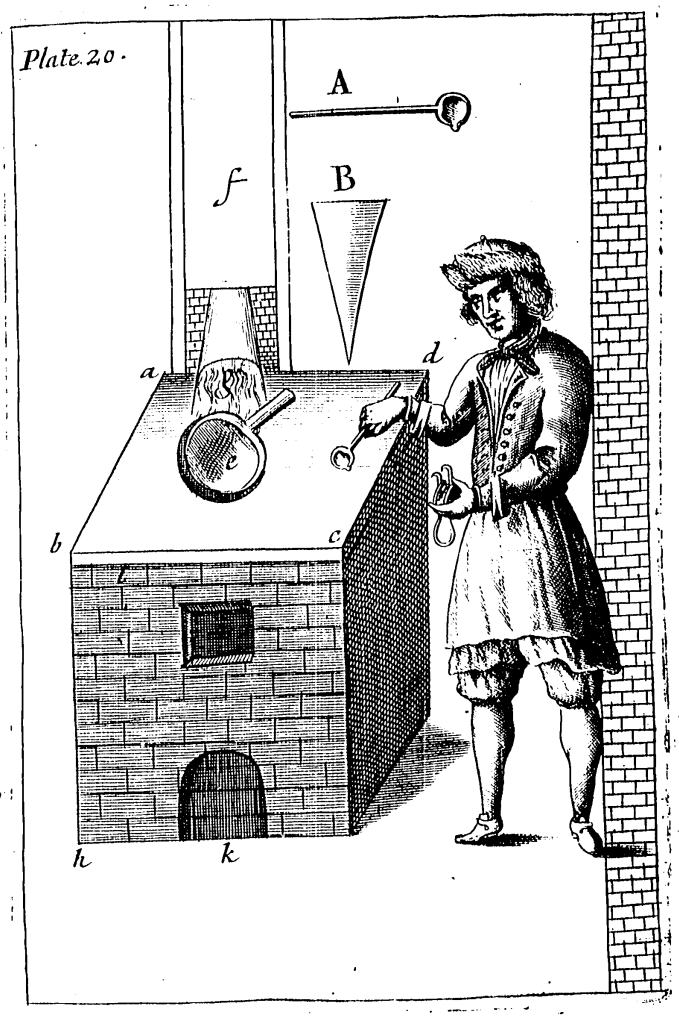


Plate 20.
A
B
f
a
d
e
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h
k

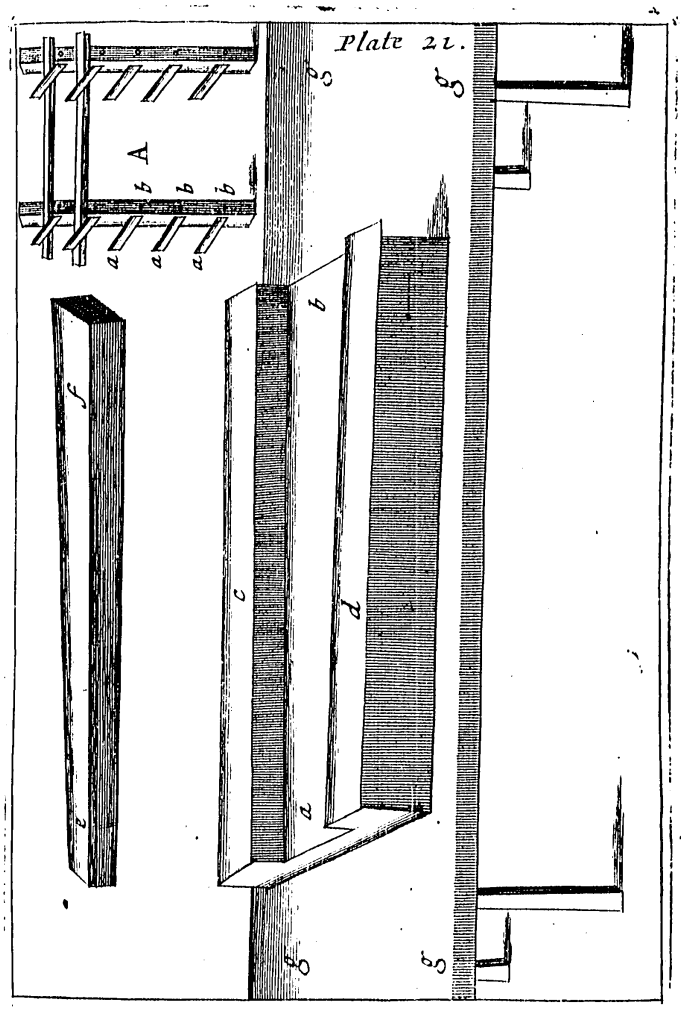
Plate 21.
A
a
b
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d
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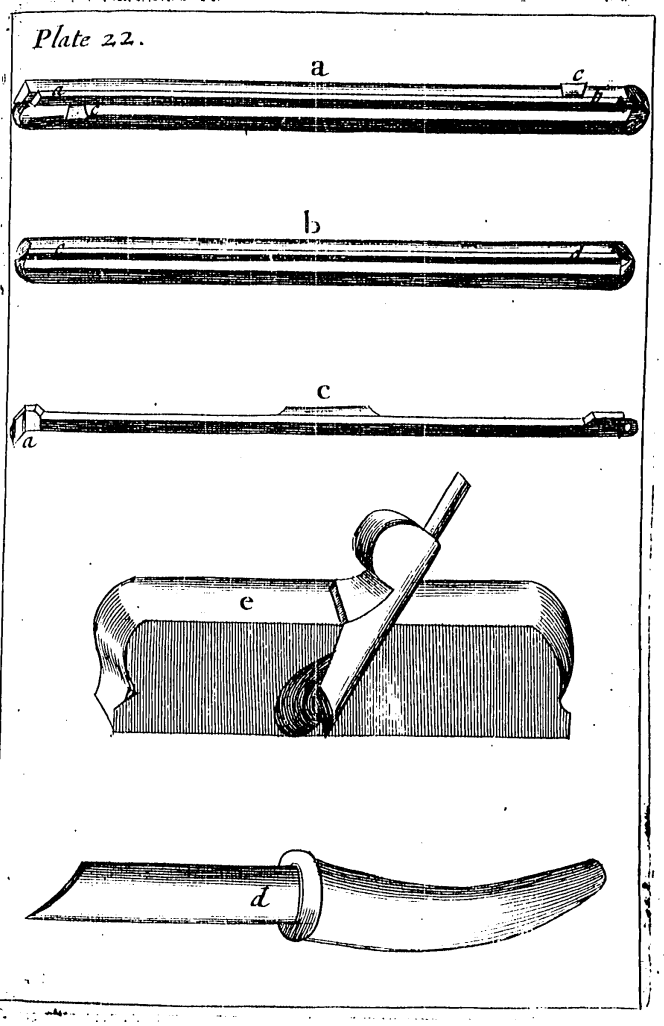
Plate 22.



MECHANICK EXERCISES:

Or, the Doctrine of

Handy-works.

Applied to the

Compositers Trade.

The Second VOLUMNE.

PREFACE.

IN a ſtrict ſence, a good Compoſiter *need be no more than an Engliſh Scholler, or indeed ſcarce ſo much; for if he knows but his Letters and Characters he ſhall meet with in his* Printed *or* Written Copy, *and have otherwiſe a good natural capacity, he may be a better* Compoſiter *than another Man whoſe Education has adorn'd him with* Latin, Greek, Hebrew, *and other Languages, and ſhall want a good natural Genius: For by the Laws of* Printing, *a*

Compoſiter *is ſtrictly to follow his* Copy, *viz. to obſerve and do juſt ſo much and no more than his* Copy *will bear him out for; ſo that his* Copy *is to be his Rule and Authority: But the careleſneſs of ſome good Authors, and the ignorance of other Authors, has forc'd* Printers *to introduce a Cuſtom, which among them is look'd upon as a task and duty incumbent on the* Compoſiter, *viz. to diſcern and amend the bad* Spelling *and* Pointing *of his* Copy, *if it be Engliſh; But if it be in any Forrain Language, the Author is wholy left to his own Skill and Judgement in* Spelling *and* Pointing, *&c. his* Copy, *and* Correcting *the* Prooves, *unleſs they be* Latine, Greek *or* Hebrew, *for to thoſe Languages there is generally a* Corrector *belongs to the* Printing-Houſe: *And how well other Forrain Languages are* Corrected *by the Author, we may perceive by the Engliſh that is* Printed *in Forrain Countries.*

Therefore upon conſideration of theſe accidental circumſtances that attend Copy, *it is neceſſary that a* Compoſiter *be a good Engliſh Schollar at leaſt; and that he know the preſent traditional* Spelling *of all Engliſh Words, and that he have ſo much Sence and Reaſon, as to* Point *his Sentences properly: when to begin a Word with a* Capital Letter, *when (to render the Sence of the Author more intelligent to the Reader) to* Set *ſome Words or Sentences in* Italick *or* Engliſh Letters, *&c. But of this more at large in* ¶. 6.

Thus much of his qualifications: Now to his Taask.

The Maſter-Printer *gives him his* Copy, *and directs him to his ſtanding Place or* Caſe, *and orders him* Letter *to Work withal.*

If his Caſe *want* Papering, *as all* New Caſes *do, and many times old, He muſt* Paper *his* Caſe. §. 22.

§. 22. ¶. 1. *Of* Papering *and* Laying *the* CASE.

THE *Compoſiter* ſends the Boy to the *Maſter-Printer*, or to him that attends the Warehouſe, for *Half a Quire*, or a *Quire*, or ſo much as he gueſſes he ſhall want, of good ſtrong *Waſt-Paper*, and cuts it into ſo many ſeveral Scantlins as the number of each Scantlin of his *Boxes* in his *Caſe* are; but he cuts his *Papers* ſo large, as each *Paper* may ly double in its *Box*, and have enough beſides to fold almoſt half way towards the middle of each *Paper*, and alſo enough to turn up again againſt the ſides of each *Box*, about the thickneſs of a *Pica*, or an *Engliſh*, above the bottom of the *Box*; and its *Paper* on all its ſides, except the upper ſide of the *Box*, which, as near as he can, he leaves no turning up of *Paper* to, becauſe the tendency the whole *Caſe* has downwards by its a-ſlope poſition, the *Letter* in each *Box* tends alſo downwards, and therefore is not ſo apt to get between the *Paper* and that ſide of the *Box*, as between the *Paper* and the other ſides of each *Box*: But yet that upper ſide, and all the other ſides of the *Box*, he *Papers* ſo ſmooth and tight, that he leaves no wrinckles in the turnings up againſt the ſides of the *Box*; but if there be any, drives them carefully into the corners of the *Box*, leſt his *Letter*, eſpecially if it be Small, ſhould get into the openings of thoſe

Wrinckles, and in time work their way under the *Paper*.

Having *Paper'd* his *Case*, he considers how the rest of the *Cases* in that *House* ly, *viz.* into what *Boxes* the several *Letters* are to be disposed; for they are not in every *Printing-House* disposed alike, and accordingly he applies himself to fill his *Case* with *Letter*.

If a *Fount* of *New Letter* be brought home from the *Founders*, the *Compositer* has no more to do, but to fill each *Box* in his *Case* with so many of each sort as each *Box* will hold, and fall to *Composing* till he has emptied his *Case*; which the same way he fills again, and *Composes* on again till the whole *Fount* be *Set up*: But when he has no longer any *New Letter* to work upon, he must *Destribute* some former *Set Forms* to fill his *Case* withal.

And before I shew you the Rules and Method of *Destributing* and *Composing*, it will be necessary I say somewhat of the *Case*, and *Laying* it.

By the *Case* is meant, in *Printers* common diolect, a *Pair of Cases*, viz. the *Upper* and the *Lower-Case*: They are described with the most common way of *Laying* them, in Plate 2. A the *Upper Case*, B the *Lower Case*. The *Upper Case* is devided into Ninety eight *Boxes* all of equal size; but the *Lower Case* in devided into but Fifty six *Boxes*, and those of four different sizes (as you may see in the Figure) by the Frame and Black streight Lines representing the several Partitions. The manner how the several sorts of *Letters* are disposed in the several *Boxes*, is called, *Laying of the Case*, where in the *Upper Case* you see *Capital*:

Capital A Ly in the uppermost *Box* on the Left hand, B C D E F G succeeding it in that Row to the Right hand; as far as the broad Partition in the middle of the *Case*; under *Capital* A lies *Capital* H, I K L M N O orderly succeeding it to the right hand, as far as the great Partition in the middle of the *Case*: But the Figure being plain, I refer you to it.

The *Lower Case* is not devided according to an orderly succession of the *Alphabet*, in Ranks; for those *Letters* that are most used are laid in the biggest *Boxes*, about the middle of the *Case*, That the *Compositers* hand may have the quicker access to them. See the Figure.

¶. 2. *Of* Rincing a Form of Letter, *in order to* Destributing *it.*

After the *Press-man* has *Wash'd a Form*, he brings it to the *Rincing-Trough*, and rears it a little a-slope on one of the ends of the *Chase*, either against a convenient place of the *Frame* of the *Rincing-Trough*, or towards the Wall; for so plac'd, the *Face of the Letter* runs less hazzard of receiving dammage, and the *Form* stands in a proper position for the *Compositer* to rear a *Letter-board* against the backside of it.

The *Compositer* therefore brings a *Letter-board*, and puts the Face of it against the back-side of the *Form*, and draws *Form* and *Letter-board* toward him, leaning them against his Knee till he can conveniently grasp about the middle of the sides of the *Chase* and *Letter-board* between his Fingers under the *Board*, and his Thumb upon the *Chase* and *Furniture*: And

if the *Form* be not too heavy, in this position he lifts it up to the *Rincing Trough*; but if it be too heavy, as most commonly it is, He lifts it up in this position till he brings the upper edge of one of the long sides of the *Letter-board* to rest between his Belly and Stomach, and then sets *Letter board Form* and all in the *Rincing-Trough*, letting the hither side of the *Board* rest upon the hither Ledge of the *Rincing-Trough*, that the *Form* may tilt downwards.

When it is on the *Rincing Trough*, he gets the *Mallet* and *Shooting-stick*, and holding the *Mallet* in his Right hand, and the *Shooting-stick* in his Left, he places the Foot of the *Shooting-stick* (that is the thin end of it) against the narrow ends of each *Quoin*, and knocking with the *Mallet* upon the *Head* of the *Shooting-stick* as gently as he can to drive them back, he loosens every *Quoin*; and this is call'd *Opening of the Quoins*, *Unlocking of the Quoins*, *Opening of the Form*, *and Unlocking of the Form*.

But in the *Unlocking of the Form*, he observes these three Circumstances:

First, He begins at the *Foot-Quoins* of a *Quarter*, and loosens them; then with his Fingers and Thumb he puts them up again pretty stiff; yet not so stiff, but that he can again with his Fingers and Thumb loosen them.

The Reason why he opens the *Foot-Quoins* first, is, because the *Letter* is less subject to *Squabble* between *Line* and *Line* (that is *Head* and *Foot*, the length of the *Page*) than it is between side and side (the breadth of the *Page*): For all the *Letters* of a *Line* being of the same *Body*, are all of the same size in

in their parallel bounds; and the two sides of the *Letter* being generally considerably broader than the Thickness of the *Letter*, are held by their breadth and flatness faster and closer together in a motion towards the *Head* or *Foot* of the *Page*, than they are a-thwart the *Lines*, there being generally many thin *Letters* and *Spaces* in a *Line*, whose thickness is very little considerable to their *Body* or parallel bounds: So that if the *Form* be loose, those Thin *Letters* and *Spaces* not having a Thickness proportionable to their *Body* to keep them in their proper Square, their Thin Edges twist them about; and one *Letter* very seldom twists alone, but forces many others (perhaps in some *Lines* above and below it, and on each side of it) out of its square position.

But the *Foot-Quoin* being thrust up again with the Fingers, that the *Lines* may joyn again after they were knock'd open with the *Mallet* and *Shooting-stick*, make the Thin *Letters* in the *Lines* less subject to *Squabble* (as not having the room to twist about) because *Opening* the *Foot-Quoins* afterwards with the Fingers, offers less violence than the smart knock of a *Mallet*.

Secondly, He holds the *Shooting-stick* much aslant to the *Letter-board*, so as the Foot of it touch not the Face of the *Letter-board*, lest with knocking upon the *Shooting-stick* (it being hard Wood, and the grain running downwards) the Foot should batter and spoil the Face of the *Letter-board*.

Thirdly, He *Unlocks* the outermost, *viz.* the broadest *Quoins* first, and then with his Fingers thrusts them pretty close up again, unless the *Form* he *Un-*

lock

lock be a great *Letter*, for then he obſerves not this Circumſtance ſo nicely; then the other *Quoin*, or (according to the bigneſs of the *Form*) *Quoins*.

Having *Unlock'd* the *Foot-Quoins*, he *Unlocks* the *Side Quoins* in the ſame manner and order; and being provided with a Pail, or a great Pan full of fair Water, and a *Wooden Diſh*; he takes a Diſh full of fair Water, or more, if the *Form* require it, and throws it upon the *Form*, till he have ſo well wetted it, that the Water may ſink between the *Letters* in the *Form*, to hold and keep every *Letter* contiguous to its next.

Then he *Opens* the *Quoins* pretty looſe, the *Foot Quoins* firſt, and in *Opening* them he conſiders the *Body* of the *Letter*, whether it be Great or Small, and accordingly he *Opens* them; for at the *Foot* he *Opens* them about the thickneſs of the *Body* of the *Letter*: But on the *Sides* not above half the *Body*.

By *Opening*, you muſt now underſtand removing the *Quoins*, till they ſtand looſe, or diſtant from the *Furniture*, the *Body*, or half the *Body* of the *Letter*.

He *Opens* but one *Quarter* at a time, *viz.* one of the hithermoſt *Quarters*, till he have well *Rinc'd* that, which when he has done, with his Fingers he thruſts the *Quoins* of that *Quarter* ſtiff up again, aſwell that it may be the leſs ſubject to *Squabble* or *Break*, as that the Water may the better be ſqueezed out from between the *Letter*; when he comes to *Deſtribute* it.

Having thus *Opened* the *Quoins*, He alſo *Opens* the *Furniture*, viz. the *Head ſticks*, and the *Inner Side-ſticks* and *Gutter-ſticks*, if the *Form* have any, to make himſelf the more room to *Open* the *Letter*: The Balls of the three firſt Fingers of each Hand he places near

near the ends of the *Head-ſtick*, and *Opens* it by taking as good hold as he can of ſo much of it as ſtands above the *Croſs* of the *Chaſe*, drawing the *Head-ſtick* towards him about half the *Body* of the *Letter*. And in the like manner he *Opens* the inner *Side-ſticks*, but draws them towards him about a quarter of the *Body* of the *Letter*. Yet ſometimes this Office is not perform'd with the three Fore-fingers of each Hand, but with the two Thumbs; and this is when the *Quarter* of *Letter* ſtands between the *Head* or *Side-ſticks*, and then he places his two Thumbs near the ends of the *Sticks*, as before he did his Fingers, and thruſts the *Sticks*, *Letter* and all, from him.

And having *Opened* the *Quoins* and *Furniture* of one *Quarter*, he alſo *Opens* the *Letter*, that it may receive the Water more plentifully: He *Opens* the *Letter*, by fixing the Balls of his Fingers of both his Hands upon the *Face*, and ſo thruſting and joggling it from him, and drawing it towards him from *Head* to *Foot*, and from *Side* to *Side*, and then throws a good Diſh full or two of Water upon it, and with the Balls of his Fingers ſtill rubs upon the *Face* of the *Letter*, that by ſhaking and joggling the *Letter*, the Water (e're it ſink through the *Letter*) may the better *Rince* away that *Ly* that by the *Preſſmans* waſhing ſoak'd into it: And this joggling the *Letter*, and throwing on freſh Water he continues till the Water that ſpurts out from between the *Letters* by this joggling, be as clear as it was when it was thrown on, and then, and not till then, he knows his *Quarter* is well *Rinc'd*: Then with his two Thumbs, one

placed on the ſide of the *Foot-ſtick* and the other on the ſide of the *Side-ſtick*, as near as he can, he thruſts both at once towards their oppoſite *Croſs*, and ſo thruſts the *Letter* and *Furniture* cloſe up again: And that the *Letter* may not be in danger of *Squabbling* or *Breaking*, he thruſts the *Quoins* looſly up again alſo.

As he *Open'd* and *Rinc'd* this firſt *Quarter*, he *Opens* and *Rinces* the others.

The reaſon why he *Opens* and *Rinces* the hithermoſt *Quarter* firſt, is, becauſe the Water that deſcends from the hithermoſt *Quarters* does in a degree help to Rince the nethermoſt alſo.

Having thus *Rinced* the whole *Form*, and with his Fingers ſhut it up again, he lets it ſtand a little while to drain; then graſping the two ends of the *Letter-board* a little beyond the middle, with his Fingers underneath, and the Thumb-balls of his two Hands upon it, he ſets one ſide of the *Letter-board* againſt the bottom of his Stomach, and carries *Letter-board*, *Form*, and all to the *Deſtributing Frame*.

Then he falls to *Stripping* of one *Quarter* firſt: Taking the *Quoins* quite out, and laying them upon the *Face* of the *Letter*, either on the ſame or another *Quarter* (if he *Strips* but one *Quarter* at once) with their ends ſtanding the ſame way they ſtood in the *Chaſe*, and in the ſame order of ſucceſſion; then he removes the *Side* and *Foot-ſticks* to their reſpective ſides, cloſe to the inſide of the *Chaſe*, and again removes the *Quoins*, laying them in the ſame order he laid them upon the *Face* of the *Letter*, upon the upper ſides of the *Side* and *Foot-ſticks*, and *Chaſe*; then

then, as I told you before, how he *Opened* the Inner *Side-ſticks*, juſt ſo again he not only opens them, but by the *Side* and *Head-ſticks* he draws or ſlides the *Letter* from the *Croſſes*, that he eaſily takes them out if he pleaſes; or if he have room enough to come at the *Letter* without, he lets them ſtay in.

Thus the firſt *Quarter* is *Stript*, and ſo the other *Quarters* ſucceſſively, in order to be *Deſtributed*.

¶ 3. *Of* Deſtributing.

The *Compoſiter* ſeeks among the *Furniture* for a *Riglet*, a little longer (about a *Pica* or *Engliſh*) than the *Line* of the *Page* he is to *Deſtribute*; or elſe he cuts a *Riglet* to that length (this *Riglet* is called a *Deſtributing-ſtick*) and coming to his *Stript Form*, or *Quarter* of the *Form* he is to *Deſtribute*, he places one flat ſide of the *Riglet* againſt the Head of the *Page*, and claps the Balls of his two Fore-fingers behind it, and the inner Joints (next his Fore-fingers) of his middle Fingers he claps againſt the ends of ſo many *Lines* as he intends to *Take up*, ſuppoſing it *Pica*, about Seven; and preſſes them pretty cloſe to the ſides of the *Lines*: Then with the ends of the Balls of his two Thumbs he parts that number of *Lines* from the reſt of the *Page*, by preſſing gently towards his *Riglet* or *Deſtributing-ſtick* upon the *Face* of the *Letter* of the fartheſt *Line*, which, if the Joints of his middle Fingers preſs pretty hard towards each other at firſt, eaſily part, and he may open that number of *Lines* ſo far from the reſt of the *Page*, that he may get the Balls of his Thumbs

far enough upon the ſhank of the *Letter*: So that the preſſing the *Lines* yet a little harder between the Joints of his middle Fingers, and pinching with his Thumbs the *Letter* hard againſt the *Riglet*, with a quick jerk he rears that *Taking-up* upon his *Deſtributing-ſtick*. *See Plate* 23. *at* A.

Having it upon his *Deſtributing-ſtick* between both his Hands, with the *Face* of the *Letter* from him, he diſingages his middle Fingers, and with his fore Fingers and Thumbs holding the *Riglet*, and now the Top of his *Taking-up* pretty looſly between them, he turns (as on two moving Axiſes) the ends of the *Lines* that were towards his Right Hand, and guides them to the Thumb-ball of his Left Hand: Thus the *Face* of the *Letter* is turn'd towards him; then bowing the inner Joynt of the middle Finger of his Left Hand (which before preſt the left ſide of the *Line*) under the middle of the *Riglet* he takes the weight of the *Taking-up* upon it, which yet he eaſes as he liſts, by mounting the now Right Hand end of the *Lines* a little above an Horizontal level, and depreſſing the Left Hand ends a little below; ſo that now he he has his *Taking up* in his Hand, with the *Face* of his *Letter* towards him, and the *Notches* upwards, he goes with it to his *Caſe*, and places himſelf againſt the middle of it. *See Plate* 23. *at* B.

Then clapping the Ball (or if he will take off more than the length of the Ball) of his middle Finger of his Right Hand, of the ſecond Joint of that Finger, againſt the bottom of the uppermoſt *Line* of his *Taking up* towards his Right Hand, and his fore Finger about the middle of the ſhank of the *Letter*, he

he ſlides or draws towards him about an Inch or an Inch and an half of that *Line* upon the Ball of his Thumb, which is placed at the *Face* of the *Letter* to receive it: And as it comes off the *Taking up*, he with his aforeſaid two Fingers and Thumb diſpoſes it ſo among his Fingers that he gathers the Ball of his fourth Finger under the bottom of the *Letter*, and then he brings what he has taken off towards his Sight to read; then with a ſleight thruſting the Ball of his Thumb outwards, and drawing inwards the Balls of his fore and middle Fingers, he ſpreads and *ſquabbles* the ſhanks of the *Letters* between his Fingers askew; and remembring what *Letters* he read, he nimbly addreſſes his Hand with a continued motion to every reſpective *Box*, which his Fingers, as they paſs by, lets a *Letter* drop into, till his *Taking off* be quite *Deſtributed*.

Having *Deſtributed* that *Taking off* he makes another *Taking off* as before, and ſo continues his *Takings off* till his whole *Taking up* be Diſtributed: And thus he *Takes up* and *Deſtributes* till his *Caſe* is full.

If the *Form* were not well *Rinc'd*, the ſhanks of of the *Letters* will be more or leſs ſlippery, and with long *Deſtributing* will make the Balls of the Fingers and Thumb ſupple, by the wetneſs of the *Letter* and ſharpneſs of the *Ly*; and conſequently the grain of the skin will be made clumſie, and thoſe Joints feeble; ſo that they will not ſo well faſten upon the ſides of the Shank to command the *Letter*, and draw it askew, or be ſo nimble at diſpoſing them into their ſeveral *Boxes*.

This

This happens moſt if they work upon ſmall *Letter*, and that old, and the *Ly* old too, for then the *Ly* will have much *Inck* mingled in it: And the *Compoſiter* will have much ado to *Rince* his *Form* ſo clean but that the *Letter* will be ſlippery, and conſequently not ſpread, as aforeſaid. But againſt it they may uſe a remedy, which is, to have a piece of Allom about the bigneſs of a Haſel-nut, lye in one of the *Boxes* of the *Caſe*; for by feeling that now and then, the dilated pores of their Fingers are again contracted, and fit to do their office: For by the greaſineſs of the *Letter*, the grain of the Skin of the Fingers were ſo dilated, that the *Compoſiter* could not ſo actively draw the Shanks of the *Letters* askew, as aforeſaid.

The *Compoſiter*, if conveniences ſuit, chuſes to *Deſtribute* his *Letter* over Night, that he may have a *dry Caſe* (as he calls it) to work at in the Morning, becauſe Wet *Letters* are not ſo ready and pleaſant to pick up as Dry; and beſides are apt to make the Fingers ſore, eſpecially if the *Ly* be not ſo well *Rinc'd* from the *Letter* as it ſhould be. In the Winter, when he *Deſtributes* in the Day time, he commonly brings the *Lower Caſe*, when full of *Letter*, to the Fire to dry, rearing the farther ſide of the *Caſe* a little upwards: And when it is well dryed, he ſets it again upon the *Frame*.

¶ 4.

¶4. *Of* Compoſing.

The *Compoſiter* now addreſſes himſelf to *Compoſing*: And looking a little over his *Copy*, to ſee how it pleaſes him, for he runs different fortunes, either of good or bad *Copy*, viz. well or ill writ, if it be a *Written Copy*, or much *Italick*, *Latin* or *Greek*, or *Marginal Notes*, or few *Breaks*, &c. for this he likes not in his *Copy*: But a *Printed Copy*, or a fair Written Hand, and full of *Breaks* pleaſes him well, and is by *Compoſiters* call'd *Good Copy*, *Light*, *Eaſie Work*; when the former they call *Bad*, *Heavy*, *Hard Work*: And if a Price be already made for a whole Book, the Good and Bad is done at the ſame Price.

If the *Meaſure* be already made, that is, if he was already upon that *Work* before, and his *Compoſing-ſtick* be ſet to the *Meaſure* of that *Work*, he needs not, or muſt nor alter his *Compoſing-ſtick*: But if his *Meaſure* be not made, he muſt unskrew the *Skrew* of his *Compoſing-ſtick*, and ſlide the *Cheeks* nearer to, or farther off the *Head* of his *Compoſing-ſtick*, till he have exactly fitted his given *Meaſure*.

If it be a *Printed Copy* he is to Work on, and his Work muſt run *Line for Line* with his *Copy*, he then without more ado, *Sets* or *Compoſes* the fulleſt *Line* he finds in his *Copy*, and ſlides up the *Cheeks* of his *Compoſing-ſtick*, and pinches that *Line* between the *Cheeks* and the *Head*, till it ſtands as ſtiff or hard in the *Stick* as he intends to *Juſtifie* all the reſt of his *Lines*: Then ſcrews up the *Compoſing-ſtick*.

Juſti-

Justifying (in *Compositers* Language) is the stiff or loose filling of his *Stick*, for if it be fill'd very stiff with *Letters* or *Spaces*, they say it is *hard Justified*, if loosly, they say it is *loose Justified.*

Having the *Measure* fitted, he places the *Galley* on his *Upper Case* on the Right Hand, for those *Boxes* are seldomest used, because in them are placed only the *Latin sorts*, or sometimes the *Small Capitals*, *Astronomical Signs*, &c.

He places his *Galley* so, that the Left Hand corner of the bottom of its Frame stands lower upon the *Case* than any of the other Corners, for in that position the *Letters* at the end of every *Line* stand safest from falling, as leaning towards the rest of the *Page.*

Some *Compositers* use *Visorums*, as is described in *Plate* 2. at i. Therefore pricking the point of the *Visorum* most commonly upon the Border or Frame of the *Case* on the Left Hand about the *&-Box*, they fold the *Leaf* of *Copy* they *Compose* by, so as the bottom of it may rest upon the Square-Shoulder near the bottom of the *Visorum*; then with two pieces of *Scaboard* tyed together at one end, they clasp both the *Copy* and *Visorum* between these two *Scaboards*, which two *Scaboards* pinch the *Copy* and *Visorum* fast enough to keep the *Copy* in its place, and at the same time also serves for an *Index* to direct the Eye to every *Line*, as the *Compositer* moves it downward.

After this preparation, the *Compositer* falls to *Composing.* But first reads so much of his *Copy* as he thinks he can retain in his memory till he have *Composed* it, as commonly is five or six words, or sometimes a longer Sentence. And having read, he falls

falls a Spelling in his mind; yet so, that his Thoughts run no faster than his Fingers: For as he spells A, he takes up A out of the A *Box*, as he names n in his thoughts, he takes up n out of the n *Box*, as he names d in his thoughts he takes up d out of the d *Box*; which three *Letters* set together make a Word, viz. And; so that after the d he sets a *Space*: Then he goes on to the next *Word*, and so *Composes* on, *Setting* a *Space* after every *Word* till the *Words* come to the end of the *Line*, for then he sets no *Space.*

When he *Composes* the *Letters* he holds the *Composing stick* in his Left Hand, placing the Second Joynt of his Thumb over the moving *Cheek* of the *Stick*, and the end of the Ball of his Thumb reaches down to the bottom of the *Cheek* and *Stick*; so that with the end of the Ball of his Thumb he gently presses the *Letter* close to the *Cheek*, and keeps the *Letters* tight and square together, as he places them in the *Stick* successively. *See Plate* 24. *at* A.

And as his Eyes are very quick in reading his *Copy*, and in shifting its Visual Ray to the several *Boxes* he is to have a *Letter* out of, so is his choice what *Letter* to take up very sudden; for though the *Box* be full of *Lettets*, yet in an instant he resolves and pitches his Fingers upon that one, which for its posture and position his Fancy reckons lyes most commodious for his immediate seizing. For position, he generally chuses that which lies uppermost, because it is readiest at Hand to snatch up: And for posture, that which lies with its *Face* towards his Right Hand, because catching at the *Letter* near the *Face*-end of the *Shank*, he by an accustomed sleight in his Fingers

while it is coming to the *Stick*, diſpoſes it ſo, that as the bottom of the Shank goes directly forwards, towards the bottom of the *Stick*, ſo the *Notch* of the *Letter* ſhall alſo be placed upwards.

Moſt *Compoſiters* uſe a *Compoſing-Rule*, which is only a piece of a *Braſs-Rule* cut to the length of the *Meaſure*, with a ſmall Ear left at either end, to take it out by when the *Line* is full, and to lay it upon the *Compos'd Line*, to *Set* ſucceſſively a ſucceſſion of *Lines* upon, till the *Stick* be full.

This *Rule* is very commodious to Work with, becauſe the *Letter* ſlides eaſier and ſmoother down to the *Back* of the *Stick*, than it will upon a *Line* of *Letters:* Beſides, the *Letters Compos'd* on it ſtand ſtreighter and truer in *Line*, and are leſs ſubject to *Hang*, than thoſe *Compos'd* on a *Line* of *Matter*; unleſs with a *Riglet* (as that they many times do) they rub pretty ſtrongly along the *Line* they have *Compos'd*, which is a labour more than needs, and the loſs of ſome time to make the Work more unpleaſant.

Having *Compoſed* one *Line*, if it ends with a *Word* or a *Syllable* and a *Diviſion*, and juſt fill the *Meaſure*, it needs no more *Juſtifying*; but if the *Line* conclude not as aforeſaid, then he puts a *Space* more between every Word, or ſo many Words as will fill up the *Meaſure* pretty ſtiff, viz. *Juſtifie* the *Line*. But if the *Line* be not yet *Juſtified*, he puts another *Space* between every Word, or between ſeveral Words, till the *Line* be *Juſtified:* So that here is now three *Spaces*, and ſtrictly, good Workmanſhip will not allow more, unleſs the *Meaſure* be ſo ſhort, that by reaſon

reaſon of few *Words* in a *Line*, neceſſity compells him to put more *Spaces* between the *Words*. This often happens in *Marginal Notes*, where the *White* between *Words* is often as great or greater than between *Line* and *Line*.

Theſe wide *Whites* are by *Compoſiters* (in way of Scandal) call'd *Pidgeon-holes*, and are by none accounted good Workmanſhip, unleſs in ſuch caſes of neceſſity, as aforeſaid.

And as *Lines* may be too much *Spaced-out*, ſo may they be too cloſe *Set:* It may be accounted too cloſe *Set* when only a *Thin-ſpace* is ſet between Words, eſpecially if no *Capital Letter* follows the *Thin-ſpace* or *Point* go before it. *Thin-ſpaces* being intended and *Caſt* only that the *Compoſiter* may *Juſtifie* his *Lines* the Truer, and not to ſerve for convenient diſtinction between Words; yet do ſome *Compoſiters* too often commit this error, rather than put themſelves to the trouble of *Spacing* out a *Line*, where many *Spaces* muſt be uſed to *Space* it out.

A good *Compoſiter* takes care not to *Set* too Cloſe, or too Wide; for if he *Set* too Cloſe, and ſhould happen to leave out a Word or two, it will give him a great deal of trouble to get thoſe Words in; Nay perhaps when he comes to a *Break* he drives out a *Line*, for which *Line* perchance he may be forc'd to *Over-run* all the *Pages* that are *Set* forwards upon that *Matter*. And if he *Sets* too Wide, and he chance to *Set* a Word or two twice over, he may be forc'd to make *Pidgeon-holes* e're he come to a *Break*, and then perhaps his *Break* is got in too, and his *Page* a *Line* too ſhort, and he forc'd to *Over-run* ſeve-

ral *Pages* e're he can drive that *Line* out. As I ſhall farther ſhew you when I come to the ¶ of *Correcting.*

In *Juſtifying* his *Line* he takes great care that it do not *Hang*: It is an unproper Term, yet grown into Uſe, for when the *Letter* ſtands askew, and not directly Square, they ſay it *Hangs*. New *Letter* is moſt ſubject to *Hang*, eſpecially if not very ſmoothly *Dreſt*; Becauſe the leaſt Bur, or ſharpneſs of its Angles, may catch in the Burs or Angles of the *Letters* that ſtand next them, and ſo make them ſtand aſlope, and one *Letter* ſtanding aſlope is very ſubject to make all the other *Letters* in that *Line* ſtand aſlope too. Therefore if he find his *Letter Hang*, while his *Line* is yet *looſe*, viz. Unjuſtified, he gently with the Ball of the Thumb of his Left Hand, thruſts the top of the ſhank of the *Line* where it *Hangs*, moving the *Letter* ſomewhat from him, towards the farther end of the *Stick*, and with the Balls of the two Fore-fingers of his Right Hand pats upon the *Face* of the *Letter*, till he have got them into an upright poſition. He moves or drives the top of the Shank of the *Letter* from him, becauſe generally the placing the Ball of his Thumb on the top of the ſhank of the *Letter* when he *Compoſes* (as was ſhewn before) is ſubject to draw the *Letter* askew towards him, but that his care commonly prevents it: Yet if by chance the *Line* ſhould *Hang* from him, then he with the Ball of his Thumb as aforeſaid, draws the *Letter* towards him, to ſet it upright.

Here

Here is now one *Line Compos'd*: And as he *Compos'd* that *Line*, ſo he *Compoſes Line* upon *Line* till his *Stick* be full: When his *Stick* is full, he *Empties* thus; He lays his *Stick* down upon his *Lower Caſe*, with the bottom of his *Stick* againſt the hither *Ledge* of the *Caſe*, and the *Face* of the *Letter* upwards; being provided of a *Riglet* juſt the Length of his *Line*, he lays his *Riglet* againſt his laſt *Line*, and places the Balls of his two Fore-fingers behind the *Riglet*, near the middle of it, if the *Line* be not too long, and then only as near the middle as he can to command it with his Fore-fingers; and he places the Balls of his Thumbs againſt the firſt *Line* in his *Stick* as far below the *Face* of the *Letter* as he can, and he places firſt the Joints of his middle-fingers againſt the Sides of the *Letter* at the two ends of the *Line*, ſo as I ſhewed you he did when he was *Taking up* his *Letter* to *Deſtribute* it; and in this poſture pinching the *Letter* between his Thumbs and his Fore-fingers, and and ſqueezing his two middle fingers towards each other, he leans the *Letter* in the *Stick* almoſt flat upon the *Riglet*: But if his *Lines* were *Hard Juſtified*, he cannot perhaps with the firſt leaning the *Letter* back get them clear out of the *Stick*, therefore he again wriggles the *Stick* of *Letter* forwards and backwards, till he gets them quite out. *See Plate* 24. *at* B.

Having gotten them out, and in this poſture faſt between his Thumbs and Fingers, and the *Letter* leaning almoſt flat upon his *Riglet*, he directs both his hands together to his *Galley*, and nimbly claps that *Stick* of *Letter* down into the *Galley*; placing the

firſt *Line* cloſe and upright againſt the lower ledge of the *Galley*, and the begining of his *Lines* cloſe and upright againſt the left hand *Ledge* of the *Galley*, and then diſingages his Fingers and Thumbs, and leaves his *Riglet* ſtanding in its place till he have occaſion to uſe it in like manner for the next *Stick* of *Letter*.

As he *Set* this *Stick* of *Letter*, ſo he *Sets* on till his *Page* is *Out*, Remembring after the laſt *Line* of every *Page* to ſet a *Direction:* That is, he *Sets* a *Line* of *Quadrats* and at the end of it the firſt word of the next *Page*, or if the Word be very long and the *Line* very ſhort, two *Syllables*, or ſometimes but one of that *Word*. And if it be the *Firſt Page*, viz. the firſt *Page* of that *Sheet*, he *Sets* a *Signature* about the middle of the *Line*, or rather a ſmall matter nearer the end than the middle is, (becauſe when the *Sheets* are wrought off and gather'd, they *Collation* ſomething quicker: The *Collationer* not being forced to prick up with his *Bodkin* the corners of the *Sheet* ſo high to ſee the *Signature:* which in a long train of work ſaves time.

If it be the *Firſt Page* of the firſt *Sheet* of a *Book* the *Signature* is A, if the firſt of the ſecond *Sheet* B, if the firſt of the third C, and ſo ſucceſſively till he come to W, which is always skipt, becauſe the *Latin Alphabet* has not that *Letter* in it; but next V follows X Y Z, ſo that if the *Book* contain above three and twenty *Sheets*, the *Signature* of the four and twentieth *Sheet* muſt be A a, if five and twenty B b; till in like manner he run through the *Second Alphabet*, and comes to the third, fourth, &c. ſtill as he begins a new *Alphabet* adding an a.

To

To the ſecond *Page*, or any other *Even Page*, he *Sets* no *Signature*, but to the Third which is an *Odd Page* he does, viz. A 2. The *Figure* of 2 is no part of the *Signature*, but is only an adjunct to ſhew the *Book-binder* the Second *Leaf* of that *Sheet*, that he may the ſurer *Fold* the *Sheet* right.

If it be a *Folio Sheet* he cannot ſet A 3 in a ſingle *Sheet*, becauſe it has but two *Odd Pages* in it; but if they be *Quir'd Sheets*, that is, two, three, or four *Sheets Quir'd* together, he muſt ſet A 3 in a *Folio*, though not in the Firſt, but Third *Sheet* of that *Quire*. But no wiſe *Compoſiter*, except he work on *Printed Copy* that runs *Sheet* for *Sheet*, will be willing to *Compoſe* more *Sheets* to a *Quire* than he ſhall have a *Fount* of *Letter* large enough to ſet out, unleſs he will take upon him the trouble of *Counting off* his *Copy:* becauſe he cannot *Impoſe* till he has *Set* to the laſt *Page* of that *Quire*; all the other *Sheets* being *Quired* within the firſt *Sheet*, and the laſt *Page* of the *Quire* comes in the firſt *Sheet*. But when he *Compoſes Quir'd Work*, the *Signature* of the firſt *Page* is A, the *Signature* of the *Sheet Quir'd* next within the firſt *Sheet* is A 2, the firſt *Page* of the next *Quir'd-Sheet* A 3: So that the *Signatures* of all the *Sheets* in the firſt *Quire* is A, A 2, A 3, &c. according to the number of *Sheets Quired* together. The ſecond *Quire* begins B, B 2, B 3, &c. The Third *Sheet* C, &c. according to the number of *Quires*. This is called *Printing* in *Quires*. Now to return.

If the *Form* be *Quarto*, he *Sets* under the Fifth *Page Signature* 3. If *Octavo*, he ſets alſo under the Fifth *Page Signature* 3. and under the Seventh *Page*

Signa-

Signature 4. If *Twelves*, he sets also under the Fifth *Page Signature* 3, and under the Seventh *Page Signature* 4, and under the Ninth *Page Signature* 5, and under the Eleventh *Page Signature* 6. The Rule is, that all *Odd Pages* should have a *Signature*, if they stand on the *Out-side* of the *Sheet*; and the reason for the Rule is, that the *Gatherer*, *Collater* and *Book-binder* may the readier lay *Sheets* right, if they be turned wrong. This Rule is not among *Compositers* so well observed as it ought to be: For in *Quarto's* they not only leave the *Signature* 4 out, but rarely put in *Signature* 3.

¶ 5. *Some Circumstances a good* Compositer *considers and observes in* Composing.

A good *Compositer* is ambitious as well to make the meaning of his *Author* intelligent to the *Reader*, as to make his Work shew graceful to the Eye, and pleasant in Reading: Therefore if his *Copy* be Written in a Language he understands, he reads his *Copy* with consideration; that so he may get himself into the meaning of the *Author*, and consequently considers how to order his Work the better both in the *Title Page*, and in the matter of the *Book*: As how to make his *Indenting*, *Pointing*, *Breaking*, *Italicking*, *&c.* the better sympathize with the *Authors* Genius, and also with the capacity of the Reader.

Nor does a *Compositer* the least shew his skill in the well ordering and humouring of a *Title Page*, which, because it is the first *Page* of a *Book*, we shall begin the *Compositers* Considerations at.

He

He, as aforesaid, judiciously reads his *Title Page*, and considers what *Word* or *Words* have the greatest Emphasis in it. If many *Words* precede the Emphasis, he considers whether it be best to make one or two *Lines*, or more of them, by electing a *Body* bigger or less to *Set* the precedent *Matter* in, and whether any of these *Lines* ought to be *Indented*, either at one end or both, viz. *Set* in the middle of the *Line*. And what Words of Emphasis come in that precedent *Matter*; that he may *Set* them either in *Capitals*, *Roman*, *Italick*, or *English*; and at last bring the great Emphasis, which is generally the *Title* or *Name* of the *Book* in a *Line* by it self, and just fill it if he can; which he has some helps to do, by the great *Bodied Letters* of the *Lower Case*, or else by *Capitals*, *Roman*, *Italick* or *English*, of a proper *Body*, which best pleases his fancy, or is in present mode.

If this *Word*, of great Emphasis be *Set* in the *Lower Case*, yet he *Sets* the first *Letter* a *Capital*, and he *Sets* no *Space* between *Letter* and *Letter*, but between *Word* and *Word* he does, if there happens more than one *Word* in that *Line*: But if that *Word* be *Set* in *Capitals*, he chuses to *Set* a *Space* between every *Letter*, and sometimes he *Sets* two *Spaces*, yet that is rather to drive out the *Line*.

If he *Sets* but one *Space* between the *Letters* in a *Word*, he *Sets* three *Spaces* between *Word* and *Word*: And if he *Set* two *Spaces* between *Letter* and *Letter*, he *Sets* four *Spaces* betwen *Word* and *Word*, as well to give a graceful appearance to the Eye, as to make a Visible and proportionable distinction between *Word* and *Word*.

He alſo conſiders what *Whites* to *Set* between his *Lines*; as either a *Line* of *Quadrats*, and of what *Body*; or (if his *Title Page* be large) but a *Scaboard*: and at laſt *Juſtifies* his *Page* in *Length*, either by adding more *Whites* (where they may be proper) if his *Page* be too ſhort, or by taking out or diminiſhing *Whites* if the *Page* be too long: And this he does by altering the *Body* of *Whites*, for if a *White-line* be *Engliſh*, he may take it out, and in its room put in *Pica*, *Long-primmer* or *Brevier*, according as he finds he has *Run out*; yet this he does with Conſideration, where more or leſs *White* is propereſt.

But the mode of ordering *Titles* varies; as may be ſeen by comparing the *Title Pages* of every twenty years: Therefore a Laſting Rule cannot be given for the ordering them: only what has been ſaid in general concerning Emphaſis, and in particular to humour the Eye, the *Compoſiter* has a conſtant regard to.

When he is to Work upon a continued Series of *Matter*, he *Sets* the *Title* of the *Chapter* or *Section* in a bigger *Body* and different Character than his *Matter* is *Set* in; as if the *Matter* be *Set* in *Engliſh Roman*, he *Sets* the *Title* in *Great Primer* or *Double Pica Italick*, but the *Words* of *Emphaſis* he will *Set* in *Roman*, and varies the Character for them as well in the *Title*, as he does in the *Matter*.

If his *Title* be ſhort, he *Sets* it in the middle of the *Line*, by *Setting Quadrats* on both ſides: If his *Title* be long, he *Sets* the middle *Line* in the middle: If it make three or more *Lines*, he *Indents* the firſt with an m *Quadrat*, and the other with two m *Quadrats*.

Before his *Title* he ſets a *White-line*, viz. a *Line* of *Quadrats*, and ſo he does after it; but with regard to what the bigneſs of the *Body* of the *Letter* the *Title* is *Set* in, *Runs out*; for theſe *Whites* muſt be ſet of ſuch *Bodies* (bigger or leſs) as will make the difference of the *Body* the *Title* is *Set* in, a juſt number of *Lines* with thoſe of the *Body* the *Matter* is *Set* in, becauſe the length of the *Page*, as aforeſaid, muſt be *Juſtified*. And he always forecaſts to put rather more than leſs *White* before the *Title* than after it; becauſe the *Title* has relation to the *Matter* of the *Chapter* or *Section* it is *Set* to, and therefore ought not to be ſo diſtinct, as from the precedent *Chapter* or *Section*.

After his *Title*, he begins his *Chapter* or *Section* with a *Two-lin'd Letter*, or *Three* or *Four-lin'd Letter*, but *Indents* it not. He begins his *Chapter* or *Section* with the firſt *Line* in the *Stick*, unleſs his *Stick* be very Deep, or his *Two* or *Three-lin'd Letter* ſmall, becauſe it may elſe reach above the top of the *Stick*, and ſo hinder him from filling up *Lines* to the *Body* of the *Two* or *Three-lin'd Letter*.

After the *Two* or *Three-lin'd Letter*, he *Sets* a *Capital Letter* of the *Body* his *Matter* is of, and *Indents* all, thoſe *Lines* that are to fill up the *Great Letter* with an n *Quadrat*.

He cannot uſe his *Compoſing-Rule* (mentioned in the foregoing part of this ¶) till he have filled up *Lines* to the *Body* of the ſaid *Great Letter*; becauſe his *Compoſing-Rule* is too long to go between the *Great Letter* and the *Head* of the *Stick*: but then he uſes the end of a *Riglet* to rub along the *Lines* he has

has *Composed* to smoothen them, and so *Set* on till he has filled up the whole *Body* of the *Great Letter*, and most times somewhat above it; which *Letter* he afterwards *Justifies* with *Small Bodied Quadrats*, or with *Scabards* or *Cards*, or with any or all of them till the *Great-letter* stands even with the number of *Lines* that it *Indents*, and afterwards uses his *Composing Rule*, and *Sets* the succeeding *Lines* to their full Length.

If it be a great *Wooden Letter*, he begins his *Chapter* or *Section* with, it is most times too *Deep* for the height of the *Cheeks* of his *Stick*; therefore he *Justifies* his *Stick-full* just to the breadth of the *Wooden Letter* with *Quadrats* or *Quotations*, and *Sets* on between those *Quadrats* or *Quotations* and the *Head* of his *Stick*, as I shewed before, till his *Stick* be full of *Lines*; which *Lines* he *Empties*, leaving the *Quadrats* or *Quotations* in his *Stick*, to serve, as before, for the succeeding *Stick* or *Sticks*, till he have *Composed Lines* enough for the *Depth* of the *Wooden Letter*.

As he *Sets* on, he considers how to *Point* his Work, viz. when to *Set*, where ; where : and where . where to make ( ) where [ ] ? ! and when a *Break*. But the Rules for these having been taught in many School-books, I need say nothing to them here, but refer you to them.

And as he considers how to *Point*, so he considers what proper Names, either of Persons or Places, he meets with in his *Copy*, as also what Words of great Emphasis, and what Words of smaller Emphasis, what Obsolete Words, and what Foreign, *&c.*

When

When he meets with proper Names of Persons or Places he *Sets* them in *Italick*, if the Series of his *Matter* be *Set* in *Roman*; or in *Roman* if the Series of his *Matter* be *Set* in *Italick*, and *Sets* the first *Letter* with a *Capital*, or as the Person or Place he finds the purpose of the Author to dignifie, all *Capitals*; but then, if conveniently he can, he will *Set* a *Space* between every *Letter*, and two or three before and after that Name, to make it shew more Graceful and Stately. For *Capitals* express Dignity where-ever they are *Set*, and Space and Distance also implies statelinesse.

Words of great Emphasis are also *Set* in *Italick*, and sometimes begin with a *Capital Letter*: If the Emphasis bear hard upon the Word to be expresst as well as the Thing to be expresst, it ought to begin with a *Capital*. I shall bring for instance an Observation I made above forty years ago on the Word *that*, viz. that that Word may be reitterated five times, and make good Sense: If it be set thus it will seem nonsense, that that that that that; but if it be *Set* thus, that that That that that Man would have stand at the beginning of the *Line* should stand at the end; it will, by toning and laying Emphasis on the middlemost That become good Sense. Now all the thats ought to be *Set* in *Italick*, and the middlemost That ought to begin with a *Capital*, because it is both the Thing and Word.

Words of a smaller Emphasis may be *Set* in the running Character, viz. *Roman*, if it be the Series of the *Matter*; or *Italick*, if *Italick*, but begun with a *Capital*: Instance in the last Sentence, That which expresses both the Thing and Word, *&c.* Here Thing and Word

both bear Emphasis, though not very great, and therefore ought to be dignified more than those Words that precede or follow those Words. Yet I know some Authors are now so nice to mark both the Word Thing and the Word Word in *Italick*.

After a . though not at the end of a *Break* he begins with a *Capital*.

When in *Composing* he comes near a *Break*, he for some *Lines* before he comes to it considers whether that *Break* will end with some reasonable *White*; If he finds it will, he is pleas'd, but if he finds he shall have but a little single *Word* in his *Break*, he either *Sets* wide to drive a Word or two more into the *Break-line*, or else he *Sets* close to get in that little Word, because a *Line* with only a little Word in it, shews almost like a *White-line*, which unless it be properly plac'd, is not pleasing to a curious Eye.

Nor do good *Compositers* account it good Workmanship to begin a *Page* with a *Break-line*, unless it be a very short *Break*, and cannot be gotten in in the foregoing *Page*; but if it be a long *Break*, he will let it be the *Direction-line* of the fore-going *Page*, and *Set* his *Direction* at the end of it.

Indenting after a *Break* (unless it be the end of a *Chapter* or *Section*) is an m *Quadrat*, (more or less is not proper) *Set* at the beginning of the *Line*: But when Verses are *Indented*, two, three or four m *Quadrats* are used, according to the number of the Feet of the Verses, but most times according to the fancy of the Author.

English obsolete Words he *Sets* in the *English* Character,

racter, the first *Letter*, if the dignity of the Word require it, as aforesaid, with a *Capital*.

Foreign Languages he meets with in his *Copy*, if the *Master Printer* have them in his House, he *Sets* them in the proper Character; if not, the Author must write them in the common Character, and the *Compositer Sets* them as they are written.

That I may be the less unintelligent to the Reader, I will inform him that in *Printers* Dialect (as in this last Paragraph it is used) *Language* is understood *Letter*: For the *Compositer* does say, I shall use a Word or two of *Greek Letter*, or *Hebrew Letter*, or *Saxon Letter*, &c. but I shall use a word or two of *Greek*, a Word or two of *Hebrew*, *Saxon*, &c. so that the Word *Letter*, is in *Compositers* Dialect, understood by naming the Language.

If *Indentures* instead of *Marginal Notes* come in a number of *Lines*, he *Indents* his *Stick*, as I shewed you he did for a *Wooden Letter*, leaving a convenient *White* between his *Matter* and *Indenture*, and then again *Indents* his *Stick* to *Set* the *Matter* that comes in those *Indentures*, allowing a reasonable *White* between the Top and the Bottom of his *Indenture*, and then *Justifies* it up to an exact number of *Lines*, as he did the *Wooden Letter*.

If *Marginal Notes* come down the side (or sides, If the *Page* have two Columns) he chuses to *Set* them in on the *Stone*, rather than in his *Galley*; because both his *Page* and *Notes* stand safer, being cloathed with the *Furniture*, than they do when they stand Naked in the *Galley*. Therefore I shall say nothing of *Marginal Notes* till I come to *Imposing*.

Some

Some other Circumstances (according as variety of Work does happen) a *Compositer* may meet with; but by what has been said upon this and several other Trades, the Ingenious (as they occur) may easily consider how they are to be performed.

Nor (as afore was hinted) is a *Compositer* bound to all these Circumstances and Punctilio's, because, in a strict sense, the Author is to discharge him of them in his *Copy:* Yet it is necessary the *Compositers* Judgment should know where the Author has been deficient, that so his care may not suffer such Work to go out of his Hands as may bring Scandal upon himself, and Scandal and prejudice upon the *Master Printer.*

¶ 6. *Of Tying up a* Page.

We may remember the *Compositer* has yet a *Page* in his *Galley:* This *Page* must be *Tyed up* with a *Packthred Cord*, courser or finer according to the bigness of his *Letter* and *Page*: For *Small Letter*, which rarely is used to great *Pages*, he chuses a fine *Packthred*, strong and limber; but for *great Letter* and *great Pages* a stronger that will better endure hard pulling at: Wherefore he seeks a *Cord* for his purpose, or else takes so much off the whole *Quoil* as will serve his turn, and taking the end on't in his Right Hand, lays that end about an Inch within the *Direction-line*, and a little lower than the middle of the *Shank* of the *Letter*, and holds that end there close with the two Fore-fingers of his Left Hand, then he slides his Right Hand along the *Cord*,

Cord, straining it as stiff as he can along the right side of the *Page*, and turns it about the *Head* of the *Page* as close down to the *Ledge* of the *Galley* as he can, and so slides his Hand over the *Cord* till he draws it about all the sides of the *Page:* and when he comes to the first end of the *Cord*, he doubles up that end so as it stand above the *Face* of the *Letter*, and whips the *Cord* over that end, that the end may not slip; then he twists part of the remaining *Cord* about his Right Hand, and grasping his Left Hand Fingers about the *Direction* Corner of the *Page*, as well to hold the end of the *Cord* from slipping, as to keep the *Page* tight in its position, with his Right Hand he pulls the *Cord* as hard down the side of the *Page* as he can; and keeping the *Cord* straining, whips it again about the *Head* and other sides of the *Page*, and so again about all the sides of the *Page*, keeping it still straining; and always as he comes to the Right Hand side of the *Page*, pulling hard, and taking care that it slip not: Having whipt the *Cord* twice about the *Page*, he holding two of his Left Hand Fingers against the *Direction*-corner upon the *Cord*, that it slip not, with the Ball of his Thumb of his Right Hand, and the Balls of his Fingers to assist, thrusts against the opposite diagonal corner of the *Page*, and removes it a little from the *Ledges* of the *Galley*, that he may with the Nail of the Thumb of his Right Hand have room to thrust the *Cord* whipt about the *Page*, lower down upon the *Shank* of the *Letter*, (to make room for succeeding whippings of the Cord, and then thrusts or draws the *Page*

close to the *Ledges* of the *Galley* again; then whips the *Cord* again about the *Page* (as before) till he has whipt it four or five times about the *Page*, taking care that the several whippings lye parallel to each other, not lapping over any of the former whippings.

Having whipt the *Cord* four or five times about the *Page*, he with his *Bodkin* or the corner of a *Brass Rule* (which lies best at hand) fastens the *Cord*, by thrusting a noose of it between the several whippings and the Right Hand side of the *Page*, close up to the *Direction-line*, then draws the lower part of that Noose close up to the very corner of the *Direction-line*, that it may be the better fastned between the *Page* and the Whippings: Then, if his *Cord* be not of a just length, he cuts it off from the rest of the Quoil, leaving so much length to it as that the end of it may stand upright an Inch or two above the *Face* of the *Letter*; the reason will shew it self when we come to *Imposing*. Then he removes the *Page* pretty far from the *Ledges* of the *Galley*, to see if the Whippings lye about the middle of the *Shank* of the *Letter*; if they lye too high, as most commonly they do, he thrusts them lower with the Nail or Nails of his Thumbs. Then (if the *Page* be not too broad) he places his Fore or Middle Finger, or both, of his Right Hand on the Right Hand Side of the *Page*, and his Thumb on the Left; and bowing his other Finger or Fingers under the *Head* of the *Page*, he rears up the *Handle-end* of his *Galley* with his Left Hand almost upright, and so discharges the *Galley* of the *Page*, by delivering it upright into his Right Hand. Having his *Page* upright

upright in his Right Hand, at the *Head*, he claps the Fingers of his *Left Hand* about the *Foot* of the *Page*, upon the ends of the *Lines* on the Right Hand Side of the *Page*, and his Thumb on the Left Hand side of the *Page*, with the Palm of his Hands towards the *Face* of the *Letter*, and such Fingers as he can spare bowed under the Foot of the *Page*, turning the *Page* with the *Face* of the *Letter* from him, and letting it rest upon the inside of his Fingers, under the Right Hand Side of the *Page*, and so goes with it to the *Correcting-stone*.

But if the *Correcting-stone* be full of *Forms* or other *Letter*, as many times it is, then before he begins to *Tye* up his *Page* he provides a *Sheet* of *Waste Paper*, supposing it a *Quarto Page*, and doubles that Sheet in four, and while he has the *Page* upright in that Hand (as aforesaid) he takes that doubled Sheet into the Palm of his *Left Hand*, and claps it against the bottom of the *Page*, and turning his Left Hand outward, receives the *Page* flat upon the Paper on the Palm of his Hand: Then with his Right Hand grasps the Sides of the *Page* and the Sides of the Paper, which turn up again above the bottom of the *Page*, and sets it on a *Letter Board*, or some other board in a convenient place under his *Case*. He places that *Page* on the Left Hand the Board with the Foot of the *Page* towards him, that the other *Pages* that are in like manner set on the Board afterwards, may stand by it in an orderly succession against he comes to *Impose* them.

If it be a large *Folio Page*, or a *Broad-side* he has *Tyed up*, he cannot take that into his Hands, be-

cause it is too broad for his Grasp; therefore he carries his *Galley*, *Page* and all to the *Correcting-stone*, and turns the Handle of the *Galley* towards him, and taking hold of the Handle with his Right Hand, he places his Thumb and Ball of his Thumb on his Left Hand, against the inside the *Head-ledge* of the *Galley*, to hold it and keep it steady, and by the *Handle* draws the *Slice* with the *Page* upon it, out of the *Galley*, letting the *Slice* rest upon the *Correcting-stone*: Then he thrusts the *Head-end* of the *Slice* so far upon the *Correcting-stone*, that the *Foot* of the *Page* may stand an Inch or two within the outer edge of the *Correcting-stone*; and placing his Left Hand against the *Foot* of the *Page*, in the same posture he last plac'd it against the *Head-ledge* of the *Galley*, he draws the *Slice* from under the bottom of the *Page*, and leaves it upon the *Correcting-stone*. *See Plate* 25. *at* A.

¶ 7. *Of* Imposing.

Imposing is the placing of the *Pages* that belong to a *Sheet*, with the *Chase* and *Furniture* about them, in such an order as when the *Sheet* is wrought off at the *Press*, all the *Pages* may be Folded into an orderly succession.

There are four *Volumns* in use that are differently *Imposed*, viz. *Folio*, *Quarto*, *Octavo* and *Twelves*.

The manner of *Imposing* these *Sheets* will be plainer represented in a Table than by many words; therefore in *Plates* 26, 27, 28. I have given you Drafts of each *Volumn*, both *First* and *Second Form*, viz. *White Paper* and *Reteration*; as you may see noted over each *Form* in the Plates. For Example, the two *Forms* in the *Folio Sheet*: In the *First Form* you

you may see 1 on the Left Hand and 4 on the Right, which shews that the *First Page* must stand on the *Correcting-stone* on that Hand, and the *Fourth* on the Right Hand, with the *Foots* of the *Pages* towards you; and so for all the other *Forms*. The number of the *Page* belonging to each *Sheet* is marked in what place it is to stand on the *Stone* in the *Chase*, and the Figures of those Numbers are placed with their *Head* and *Foot* upwards and downwards, as the *Heads* and *Foots* of the *Pages* must stand in the *Chase*.

The places of these *Pages* for all *Volumns* the *Compositer* has always in his memory, yet has he a help if he remember the places of but the first half of the number of *Pages* of each *Volumn*: For if he knows the place of the first *Page*, the *Page* that stands next it must be that number which makes one more than the number of all the *Pages* in the *Sheet*. For Example, in the *Folio*; next the *First Page* stands the *Fourth Page*, 1 and 4 added makes 5, viz. one more than the number of *Pages* in the whole *Sheet*. *See Plate* 26. Again, In the *Twelves Volumn* next the *First Page* stands the *Twenty Fourth*, 1 and 24 added makes 25: Next 2 stands 23, which added makes 25, *viz.* one more than the number of *Pages* in the whole *Sheet*. This is a help, and a certain Rule for placing the *Pages* of any Volumn, if he knows but by memory the places of the first half number. *See Plate* 27. Thus you will find an *Even* and an *Odd Page* stand together.

The other *Volumns*, viz. *Sixteens*, *Twenty-fours*, *Thirty-two's*, are but the *Octavo's* and *Twelves* doubled, or twice doubled and *Imposed* in *Half-Sheets*. For Example, The *Sixteens* is two *Octavo's Imposed*

on each ſide the *Short Croſs*; the *Twenty-fours* is two *Twelves Impoſed* on each ſide the *Long Croſs*, and a *Thirty-two's* is four *Octavo's Impoſed* in each *Quarter* of the *Chaſe*. And thus they double a Volumn as oft as they think fit. But as was ſaid before, they are *Impoſed* on each ſide the *Croſs*, or in each *Quarter* of the *Chaſe*, as the Volumn that is doubled or re-doubled is *Impoſed* in the whole *Chaſe*.

In *Half-ſheets*, all the *Pages* belonging to the *White Paper* and *Reteration* are *Impoſed* in one *Chaſe*, and are plac'd, as you ſee by the Drafts (in *Plate* 28.) of *Half-ſheet Forms*. So that when a *Sheet* of *Paper* is Printed on both ſides with the ſame *Form*, that *Sheet* cut in two in the *Short Croſs*, if *Quarto* or *Octavo*, and in the *Short* and *Long Croſs*, if *Twelves*, and folded as *Octavo* or *Twelves*; the *Pages* (I ſay) of each *Half-ſheet* ſhall follow in an orderly ſucceſſion.

Having premiſed thus much, he takes up the *Pages* he ſet by on Papers in an orderly ſucceſſion when he *Tyed* them up, graſping the edges of the Papers that ſtick up on both ſides the *Page* tight, that ſo the bottom of the Paper may ſtand the ſtronger againſt the bottom of the *Letter*, to keep it from falling out; and bringing it thus to the *Correcting-ſtone*, he gets the two laſt Fingers of his Right Hand under the *Head* of the *Page*, but not under the Paper ſticking up about the *Head* of the *Page*, keeping his other two Fingers and Thumb on the ſides of the *Page*, and ſlips or ſlides his Left Hand, ſo as the Palm of it may turn towards the bottom of the *Page*; and rearing the *Page* up on end

end on his Right Hand, he diſcharges his Left to take away the Paper behind the *Page*; then he graſps his Left Hand about the *Foot-end* of the *Page* in the ſame poſture that his Right Hand graſps the *Head-end*. And having the *Page* thus between his Hands with the bottom of the *Letter* towards him, he directs both his Hands to the place on the *Stone* where the *Page* muſt ſtand, and claps it down on the *Stone* ſo nimbly, that the whole bottom of the *Page* comes all at once to the Face of the *Stone*, leſt otherwiſe he endanger the *Breaking*, *Squabbling*, or *Hanging*, &c. of the *Page*. And thus he ſets down all the *Pages* of the *Form*: which having plac'd in order and rank, as before I have ſhew'd in the Drafts of each reſpective Volumn, he lays the *Chaſe* about them; and (if he have not a *Form* already *Dreſt*) ſeeks out *Inner Side* and *Head-ſticks* of ſuch a thickneſs, as with the *Croſs* may make a *Margin* between the adjoyning *Pages* convenient to the Volumn and ſize of the Paper.

If his *Side* or *Head-ſticks* be a little too thin, and and he cannot find any to his intended thickneſs, he puts a *Scaboard* or two between the *Head* or *Side-ſtick* and the *Croſs*, as well to have more *Margin* as to commode the *Preſs-man* (if occaſion be) when he makes *Regiſter*, as I ſhall further ſhew when I come to the Section of the *Preſs-man*.

Then he ſeeks outer *Side* and *Foot-ſticks*, his *Side-ſticks* of the exact length of the *Page*, or a *Scaboard* ſhorter, or he cuts them to that length, that the *Foot-ſtick* Bear not againſt the end of the *Side-ſtick*, becauſe then the *Letter* will not *Riſe*; for the

Foot-

Foot-ſtick muſt be a little longer than the breadth of the *Page*, that it may ſhoot beyond the end of the *Side-ſtick*.

Then he fits the *Chaſe* and *Furniture* at *Side* and *Foot*, with *Fore* and *Hind Quoins*, and takes off the *Cords* from the *Pages*, as ſhall be ſhew'd by and by.

But if *Marginal Notes* come down the Side or or Sides of the *Pages* (for if there be two *Columns* in a *Page*, the *Marginal Notes* may come down both ſides) then, before he fits his *Foot-ſticks* he ſets a *Seaboard* the length of the *Page*, againſt the ſide of the *Page* the *Notes* come on, and a row of *Quotations* almoſt down the length of the *Page*, or ſometimes but one or two in a place at convenient diſtances, to keep the *Letter* of the Side of the *Page* upright, according as he finds his particular *Notes* ſtand near or far aſunder, and afterwards fits his *Foot-ſtick*. Then he *Sets* his *Notes*, commonly between the *Cheeks* of his *Stick*, which for that purpoſe are fitted to the *Meaſure* of the *Quotation*: And having *Set* them, he places them in the proper places where they muſt come in, and with *Quotation Quadrats* of proper *Bodies*, *Juſtifies* them up, feeling (at laſt) carefully and cautiouſly at the *Foot*, that they be neither too ſoft nor too hard *Juſtified* to the length of the *Page*.

Now if he have a *Chaſe*, or *Form*, or *Furniture* already *Dreſt* (theſe ſeveral phraſes are uſed, though they all ſignifie the ſame thing.) If he have (I ſay) a *Form Dreſt*, that is, if he or other Workmen have been Working on the ſame *Work*, i. e. *Book*, before he uſes one of the *Wrought-off Forms*, and having it on

on a *Letter-board*, *Rinc'd*, as was ſhew'd in ¶ 2. of this Section, he places it on a Bench or Joint-ſtool, on that Hand that ſtands moſt commodious with that end of the *Stone* he *Impoſes* on, and ſo as there may be a correſponding poſition, with the *Form Wrought off* and that *Impoſing*, viz. that the *Firſt Page* (and conſequently all the reſt) of the *Wrought off Form* ſtands on the ſame Hand with the *Firſt Page* of that *Form* that is *Impoſing*.

Then taking out and laying the *Quoins* in their proper places, as I ſhew'd when he *Stript* the *Form*, at the latter end of ¶ 2. he a little wriggles the *Chaſe* from one Side to the other, and forward and backwards to Looſen it, and the *Croſs* or *Croſſes* from the cloſe pinching of the *Letter* and *Furniture*: then takes it off the *Chaſe*, and lays it a bout thoſe *Pages* he is *Impoſing*: Then with his two fore-fingers and Thumbs he takes away the *Inner Side-ſtick* and the *Head-ſtick* at once, and at once removes them to the reſponding *Quarter* of the *Form Impoſing*, into the reſponding places from whence he took them in the *Wrought off Form*. And as he does by the *Inner Side-ſticks*, ſo he does by the outer *Side-ſticks*, and by the *Quoins*; placing them in their reſpective proper places between the *Furniture* and *Chaſe*, or ſo many of the foremoſt *Quoins*, as will go in before the *Cords* are unwhipt from the *Pages*. Thus the *Wrought off Form* is *Stript* and *Naked*; and ſtands by to *Deſtribute*.

Having thus tranſlated the whole *Furniture* of the *Wrought off Form* to the *Form Impoſing*, he finds the end of the *Cord* that he left ſticking up above the

Face of the *Letter* (which perhaps by this time is got between the *Furniture* and the *Page*) and laying the Ball of his left Thumb, on the *Face* of the *Letter* at the *Direction* corner of the *Page*, to keep it from *Rising*, he takes the aforesaid end of the *Cord*, between the Fore-finger and Thumb of his Right Hand, and pulls gently to loosen the Noose that fastned the *Cord* when he *Tyed* up the *Page*, till he draws the Noose out, and after it successively all the several Whippings; which done, he places the Balls of his Thumbs, one against the middle of the *Side-stick*, and the other against the middle of the *Foot-stick*, and at once thrusts the *Page* close against the *Inner-Side* and *Head-stick*, and so makes room to get in all the *Quoins*. But if there be more than one *Page* in a *Quarter*, as in *Octavo's* and *Twelves*, then he unties all the *Pages* of that *Quarter*, beginning with the *Inner Pages* first, before he can put in the *Quoins*. Then again, thrusting hard with his Thumbs, against the outer Sides of the *Side* and *Foot-sticks* of the several *Quarters*, to thrust the *Letter* up tight and Square, he looks over the *Form* as nicely as he can, to see what *Letter* or *Letters* may *Rise* in the *Form*, (that is, stand higher than the rest) and with the Balls of his Fingers of both his Hands, (the *Quoins* being close and hard thrust up) pats upon the *Face* of the *Letter* to beat them down: But this is not enough to smoothen the *Form*, but only to smoothen it so as the edges of the *Dressing-block* (when it comes to smoothen it quite) may not job against them. Then he takes the *Dressing-block*, described Section 9. ¶ 3. in his left Hand, and lays the

the smooth side of it upon the *Face* of the *Letter*, at the bottom of the *Quarter* next him; or he takes the *Shooting stick*, or sometimes the lower part of the clutched Fist of his right Hand, and knocks either with the Head of the *Shooting-stick* (or his Fist, as aforesaid) gently upon the upper Side of the *Dressing-block*, with quick knocks, removing the *Dressing-block* in a lineal rank upwards, and knocking still quick upon it, as it goes along and comes down again with the *Dressing-block*, in another lineal rank parallel to the first: Then in the same order goes up again and down again, till he have run over the whole *Form*, still knocking with quick knocks upon the *Dressing-block*, that so he may be sure to press down every *Rising Letter* in the whole *Form*, if he see any *Spaces* or *Quadrats* stick up, he thrust them down with his *Bodkin*.

Then to *Lock* up the *Form*, he takes the *Shooting-stick* in his Left Hand and the *Mallet* in his Right, and placing the *Foot* of the *Shooting-stick* against the small *Quoin* between the *Side stick* and the *Chase*, drives that a little gently up, and then removes the *Shooting-stick* to the next *Quoin*, and so to the third *Quoin* (if there be so many) between the *Side-stick* and the *Chase*; Then removes his knocking to the thick end of the *Foot-stick*, and afterwards knocks the *Foot Quoins* gently up: Then knocks pretty strongly with the *Shooting-stick* against the thick end of the *Side stick*, and *Drives* the *Quoins* yet harder up: Then to the thick end of the *Foot stick*, and and *Drives* those *Quoins* also harder up. Then at last knocking again, against the thick ends of the *Side*

and *Foot-ſticks*, he knocks up the *Quoins* ſo hard, as that he thinks the *Form* may *Riſe*: To try if it will, he draws the hither Side of the long Side of the *Chaſe*, about an Inch or two over the edge of the *Stone*; and putting his two hands under the *Chaſe*, Dances the *Form* three or four times ſo as it may juſt *Riſe* off the *Face* of the *Stone*: but not ſo high as that any looſe *Letters* or *Spaces* may drop out, if there be any in; but only ſo high as he may ſee if there be any in or no. If he finds there are many in that do not *Riſe* with the *Form*, he ſays the *Form Dances*, wherefore he looks carefully upon his *Pages* of *Letter*, to find out the Cauſe: For generally, either the *Letter Hangs* or the *Lines*, are ill *Juſtified*: or elſe it is not *Hard* enough *Lockt up*.

If he finds by his Eye the *Letter Hangs*: he muſt *Un-lock* and *Looſen* the *Form*, or that *Quarter* that *Hangs* pretty *Looſe*, that the *Letter* may be ſet to Right; which he does with patting upon the *Face* of the *Letter* where it *Hangs*, with the *Balls* of the *Fingers* of both his *Hands*, to twiſt or turn them into a Square Poſition.

If it be only a *Single Letter* or two that drops, he thruſts the end of his *Bodkin* between every *Letter* of that Word, till he comes to a *Space*: and then perhaps by forcing thoſe *Letters* cloſer, he may have room to put in another *Space* or a *Thin Space*; which if he cannot do, and he finds the *Space* ſtand *Looſe* in the *Form*; he with the *Point* of his *Bodkin* picks the *Space* up and bows it a little; which bowing makes the *Letters* on each ſide the *Space* keep their parallel diſtance; For by its Spring it thruſts the *Letters*

Letters that were cloſed with the end of the *Bodkin* to their adjunct *Letters*, that needed no cloſing. Or ſometimes he chews a ſmall bit of *Paper*, and with the *Point* of his *Bodkin* forces that in on one ſide of the *Space*: and ſo fills up the Vacancy between the *Space* and the *Letter*. But both theſe ways are meer preſent Helps, and (in plain terms) accounted Botches, as being an Argument that his *Lines* were not well *Juſtified* in his *Stick*.

If he finds the *Form* or any part of it, was not hard enough *Lockt* up, he *Locks* all, or part harder up, as was ſhew'd before.

But now his *Form Riſes*; Wherefore he draws the Long *Side* of the *Chaſe* (as before) a little over the edge of the *Correcting-Stone*, and putting two or three of his Fingers into the Vacancy between the *Quoins*, or elſe into the Vacancy at the ends of the *Chaſe*; he rears the *Form* upon the farther *Side* of the *Chaſe*, and removing his right Hand to the Short end of the *Chaſe*, graſps it near the upper corner, and then diſcharges his left Hand alſo; and removes it to the diagonal corner of the *Chaſe*; and ſo ſlides the long *Side* of the *Chaſe* off the hither Edge of the *Correcting-Stone*: Then ſlipping his Hands to the bottom of the *Chaſe*, about two or three Inches within the corners, with the inſides of his Hands towards the *Face* of the *Letter*, and leaning the upper *Side* of the *Chaſe* againſt the upper part of his Breaſt, and clutching the Brawn of the inſide of the upper Joynt of his Arm over the upper corners of the *Chaſe*, he carries the *Form* ſo before him to the *Preſs*, and lays it upon the *Stone*, for the *Preſs-man* to make a *Proof*

of. The *Proof* being made, the *Press-man* brings the *Proof*, and layes it on the *Compositers Case*: and he brings the *Form* again and layes it on the *Correcting-Stone*, and rubs it over with the *Ly-Brush*, as shall be shew'd in proper place. And the *Compositer* gives the *Corrector* the *Proof* and his *Copy* to *Correct* it by: which being *Corrected*, the *Corrector* gives it again to the *Compositer* to *Correct* the *Form* by.

¶ 8. *Of* Correcting.

If there be but few *Faults*, and those easie ones, the *Compositer Gathers* the *Corrections* in his *Stick*, beginning at the bottom of every *Page*, and so ascending upwards: Because when he is *Correcting*, the *Corrections* of the top of the *Page* stand then first in the *Stick*, and therefore are readiest to his Hand. But if there be many *Faults* he brings the *Lower-Case* to the *Correcting Stone*, and takes his *Corrections* as he uses them.

Then with the *Mallet* and *Shooting-stick* he *Unlocks* the *Form*, as was shew'd in ¶ 3 of this Section. But keeps the *Quoins* pretty tight up, to secure the *Letter* from *Squabbling* or *Hanging*.

Then he Folds his *Proof* so oft double, till all the *Pages*, except that he intends to *Correct* first are Folded out of Sight, and he also Folds down the Left Hand *Margin* of that *Page* under the *Proof*, and then lays that Folded Side of the *Page* along, and close to the same *Page* in the *Mettle*: So that the *Head-line* in the *Proof* lye in the same range with the *Head-line* on the *Mettle*, and the *Foot-line* even with

with the *Foot-line* on the *Mettal*, and consequently all the *Lines* of that *Page* both on the *Proof* and *Mettal* agree, and stand in a mutual range.

Now therefore he looks in the *Proof*, to see where the *Corrector* has markt a *Fault*, and having found it in the *Proof*, he runs along that *Line* with his Eye to the same *Line* on the *Mettle*, which he easily does, because the *Line* of *Mettle* stands in the same range with that in the *Proof*, and finding the *Fault* in the *Mettle* also, he having now his *Bodkin* in his right Hand, with the *Blade* of it between his Fore-finger and Thumb, within half an Inch or three quarters of the *Point*, and the middle of the *Bodkin* within his clutched Hand to guide and command it, he sticks the *Point* of his *Bodkin* into the *Neck* of the *Letter*, viz. between the *Beard* and the *Face*, and lifts it with the *Point* of the *Bodkin* so high up above the *Face* of the other *Letters*, that he can lay hold of it with the Fore-finger and Thumb of his left Hand to take it quite out.

I must a little digress, to paraphrase on the posture he holds the *Bodkin* in: For in the sticking his *Bodkin* into the *Letter*, he holds the *Blade* of it, so that it may make as small an angle with the *Face* of the *Letter* in the *Form* as he can, viz. as flat towards the *Face* of the *Letter* as he can, without touching the *Face* of any of the adjacent *Letters* with the *Blade* of the *Bodkin*; For if he touches the *Face* though lightly, yet it may more or less *Batter* and spoil the *Face* of those *Letters* it touches, and so he creates himself a fresh trouble to mend them.

The reason why he holds the *Blade* of the *Bodkin* as

as flat to the *Form* as he can, is, Becauſe a ſmall Horizontaliſh entrance of the *Point* of the *Bodkin* into the *Neck* of the *Letter*, will raiſe the *Letter* up above the *Face* of the *Form*, the *Blade* of the *Bodkin* being faſtned in the little Hole it makes in the *Neck* of the *Letter*: But if he ſhould ſtick the *Point* of the *Bodkin* ſtraight or ſtraightiſh down upon any part of the *Letter*, it would indeed make an Hole, but not faſten in the *Mettle*, to draw it up; for the weight of the *Letter* would make it ſlip off the round and ſmooth *Point* of the *Bodkin*. Beſides the preſſing the *Point* of the *Bodkin* with his right Hand againſt the ſide of the next *Letter* on his left Hand, keeps the *Point* of the *Bodkin* faſt in the little Hole it makes in the *Neck* of the *Letter*, and therefore though the *Bodkin* have but a little entrance, yet it has hold enough to draw it up by. Now to return.

Having taken the Fault out, he puts the *Letter* that the *Corrector* markt in the *Margin* of the *Proof* in the room of it. Suppoſe an o were markt and n daſht out, therefore when he has taken the n out he puts an o in the room: Theſe two *Letters* being of equal thickneſs, gives him no trouble to *Juſtifie* the *Line* again after the Fault is *Corrected*; but if they had been of unequal thickneſſes, as ſuppoſe an m to come out, and an ת to be put in; in this caſe he puts in a *Space* between two words (where he finds moſt convenient) to *Juſtifie* the *Line* again: Or ſuppoſe an n to come out, and an m to be put in; now he muſt take out a *Space* where he finds moſt convenient to make room for the m, as being thicker by a *Space* than an n. Thus as he *Corrects* he

he ſtill has a care to keep his *Lines* true *Juſtified*; which he tries by preſſing the Balls of his two middle Fingers pretty hard againſt the ends of three *Lines*, to make them riſe a little above the *Face* of the *Form*, whereof the *Line* he examines is the middlemoſt; for if that *Line* is not hard enough *Juſtified*, he will between the Balls of his Fingers find it hollow, or it will not *Riſe* with the other two: And if it be too hard *Juſtified*, he will find the Balls of his Fingers *Bear* only or hardeſt againſt that *Line*, and the *Line* on each ſide it will not *Riſe*.

If there be a long *word* or more left out, he cannot expect to *Get* that in into that *Line*, wherefore he muſt now *Over-run*; that is, he muſt put ſo much of the fore-part of the *Line* into the *Line* above it, or ſo much of the hinder part of the *Line* into the next *Line* under it, as will make room for what is *Left out*: Therefore he conſiders how *Wide* he has *Set*, that ſo by *Over-runing* the fewer *Lines* backwards or forwards, or both, (as he finds his help) he may take out ſo many *Spaces*, or other *Whites* as will amount to the *Thickneſs* of what he has *Left out*: Thus if he have *Set wide*, he may perhaps *Get* a ſmall *Word* or a *Syllable* into the foregoing *Line*; and perhaps another ſmall *Word* or *Syllable* in the following *Line*, which if his *Leaving out* is not much, may *Get* it in: But if he *Left out* much, he muſt *Over-run* many *Lines*, either backwards or forwards, or both, till he come to a *Break*: And if when he comes at a *Break* it be not *Gotten in*; he *Drives* out a *Line*. In this caſe if he cannot *Get in* a *Line*, by *Getting in* the *Words* of that *Break* (as I juſt now ſhew'd you

how he *Gets-in* what was left out in the *Proof*) or by making less *White* to the *Title* of a *Section* or *Chapter* (if any happen in that *Page*) he must *Over-run* the next *Page* backwards or forwards, till that *Line Comes in*: Thus sometimes he *Over-runs* all the succeeding *Pages* of the *Sheet*, and at last perhaps *Drives* out a *Line* to *Come in* in the next *Sheet*.

If he have *Set* a word or small sentence twice, he must take that out, and *Drive-out* his *Matter*. If he be near a *Break*, and the *White* of that *Break* not very long, he may perhaps *Drive it Out* at the *Break* by putting in part of the next *Line* to fill up almost so much as he took out; but not quite so much, unless his *Matter* was at first so *Wide Set* that he can *Space* out no more, or unless the *Break-line* he comes to have so much *White* in it that he fears *Getting-in* that *Line*: If either of these inconveniences happen, he *Drives-out* as much as he can backwards in the *Matter*; that is, he takes out so much as he thinks he cannot *Drive-out* when he is at the *Break*: He takes it out at the beginning of the *Line*, and puts it in at the latter end of the *Line* before it: But first he takes out almost so much of the beginning of his Second upper *Line*, to make room for it: I say almost so much, because he intends to *Space-out* the rest if it were not too *Wide Set* at first. And thus he runs on from *Line* to *Line*, still taking out less and less at the beginning of every former *Line*, and putting it into the *Line* above that, that he may *Space-out* his *Matter* as he *Over-runs*, till his *Double-Setting* is *Driven-out*.

But if he have *Set* a *Line* or *Lines* twice, and cannot

cannot *Drive* it or them *Out* at a *Break* or *Breaks*; or that he cannot *Set* more *Whites* at the beginning of a *Section* or *Chapter*, he must *Over-run* the next *Page* or more, or the whole *Sheet* till it be *Driven-out*: And if in *Over-runing* the whole *Sheet* it be not *Driven-out*, he must *Set* so many *Lines*, of the following *Matter* as will make up the last *Page*.

Many times either for *Getting-in* or *Driving-out*, the *Compositer* will chuse to *Over-run* in his *Stick*, and then he *Wets* the *Page* he is to *Over-run*, with the *Sponge* (that the *Letter* may the better stick together) and he separates so much of the former part of the *Page* as he intends to *Over-run*, from the rest of the *Page*, and places himself before the *Notches* of the *Letter*, and takes up about an Inch and an half or two Inches of the first Separated *Line*, and brings it to the *Stick*; and as it it is coming along he turns the *Notches* upwards, and places that *Taking up* in the *Stick*. When he *Takes-up*, he places the Inside of the first Joynt of his middle Finger of his right Hand against the beginning of that *Line*, and the Ball of his Thumb against the other end of that *Taking-up*, and the Ball of his Fore-finger behind the *Taking-up*, about the middle of it, and so pinching it lightly brings it to his *Stick*, as aforesaid. And having thus by several *Takings-up*, gotten a *Line* into his *Stick*, he looks it over to see what *Spaces* or other *White* he can take out or put in, according as he has either *Left-out* or *Set-twice*, and then he *Justifies* the *Line* again, as was shew'd in ¶ 5. of this Section. And thus he *Over-runs Line* after *Line*,

till he has *Gotten-in* or *Drove-out* his *Leaving-out*, or his Twice *Set Matter*.

If the *Compositer* is not firmly resolv'd to keep himself strictly to the Rules of good Workmanship, he is now tempted to make *Botches*; viz. *Pidgeon-holes*, *Thin-Spaces*, no *Space* before a *Capital*, *Short* &s, *Abbreviations* or *Titled Letters*, *Abbreviate Words*, &c. And if Botching is in any Case excusable, it is in this; for with too great *Spacing-out* or too *Close Setting*, he many times may save himself a great deal of Labour, besides the vexation of mind, and other accidental mischiefs that attend *Over-running*.

It sometimes chances that a *Compositer*, by having two or more *Pages* in his *Sheet* with the same *Direction-line*, or by mistaking the right place of his *Page* when he set it by on a Paper under his *Case*, as was shew'd ¶ 7. of this Section, or by some other accident that may happen; I say it sometimes happens (but seldom through too much care) that he *Transposes* two *Pages*, or more, in his *Sheet*: In this case he *Unlocks* that *Quarter*, or those *Quarters* the *Pages* are in, and loosning the *Cross* or *Cresses* from those *Pages* and their *Furniture*, takes the rest off the *Correcting-stone* with their *Furniture* about them: And if it be a *Folio* or *Quarto* he does not wet the *Pages*, because those *Forms* have *Furniture* about every side of the *Page*, which will keep up the *Letter* from falling down; But he only places the Balls of his two Thumbs against the outside of the *Furniture*, about the middle of the *Head* and *Foot* of the *Page*, and the insides of his two middle Fingers, assisted by his Fourth and Little Fingers,

gers, in a parallel position to his middle Fingers, (to strengthen them against the *Furniture*) about the middle of the *Sides* of the *Page*, letting the length of his Fingers reach as far from each corner of the *Page* towards the middle of it as he can, and so by a steady pressing the Balls of his Thumbs and the Balls of his Fingers on each Hand towards each other, he draws, or as he sees most convenience, thrusts the whole *Page* out of its wrong place, and sets it by on the *Stone*, till in the same manner he removes the other *Transpos'd Page* into the place of the first remov'd *Page*: And thus if there be more than two *Transpos'd Pages* in the *Sheet*, he removes them all, and *Sets* the right *Pages* in their right places.

But if it be an *Octavo* or *Twelves*, or any other *Form* that has *Gutter-sticks* between two *Pages*, he must Wet those *Pages* he leaves on the *Stone*, because when he removes one *Page*, by the help of the *Gutter-stick*, one side of the other *Page* will stand *Naked*; and consequently with the Shaking, Jogging, or Trembling of the *Stone* or Floor, the *Letters* on that side will be in great hazard of falling down, especially if the *Face* of the *Stone* happens not to be truly Horizontal: I say, happens not to be truly Horizontal, because the *Stone* is seldom laid with any caution, but only by guess.

Having placed the *Pages* in their right places, he again lays the *Chase* about them, and *Locks* them up again, as was shew'd in ¶ 7. of this Section: Then he carries the *Form* to the *Press*, and lays it on the *Stone* for a *Second Proof*, and sometimes for

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a *Third Proof*; which having *Corrected*, he at last brings the *Form* to the *Press*, and again lays it on the *Stone* Right, viz. in *Folio's* and *Octavo's* with the *Foot* of the *First* or *Third Page* (which he easily knows by their *Signatures*) towards him, and the side of it next the *Plattin*: And in *Quarto's* and *Twelves*, with the *Foot* of the *First* or *Third Page* next the *Tympan*.

After all this *Correcting* a *Revise* is made, and if any *Faults* are found in any *Quarter* of it, or in all the *Quarters*, he calls to the *Press-man* to *Unlock* that *Quarter*, or the whole *Form*, that he may *Correct* those *Faults*: For when the *Form* is on the *Press* it is not the *Compositers* task to *Un-lock* the *Form*: Neither would a good *Press-man* be content he should make a knocking on his *Press*, especially if the *Press-man* have *Made-ready* his *Form*, as shall be shewed in the next Section.

¶ 9. *Of* Counting *or* Casting off Copy.

Counting or *Casting off Copy* (for both Phrases are indifferently us'd) is to examine and find how much either of *Printed Copy* will *Come-in* into any intended number of *Sheets* of a different *Body* or *Measure* from the *Copy*; or how much *Written Copy* will make an intended number of *Sheets* of any assigned *Body* and *Measure*.

The Rule and Method of *Counting off* either *Printed* or *Written Copy* is the same, only *Written Copy* is more difficult, because subject to be irregularly Writ: Therefore if I shew you how the *Compositer Casts off Written Copy*, I do at the same time inform you how to *Count off Printed Copy*.

The *Compositer* therefore first considers what *Bodied Letter* his Work is to be wrought on: then he carefully peruses the *Copy*, considering with himself whether it be evenly Written or unevenly Written, *viz.* whether it be throughout of an equal siz'd Hand, or whether part be close Written and part wide Written; if it be an equal siz'd Hand, that is, equally close Written in general, as well between *Letter* and *Letter*, *Word* and *Word*, as between *Line* and *Line*, he has scarce more trouble to *Count it off* than *Printed Copy*.

Wherefore, the *Measure* being given, he *Composes* one *Line* in his *Measure*: The *Matter* he *Composes* he chuses out of that part of his *Copy* that in his Judgement he admits is most indifferently Written, between Wide and Close, as being such as his whole *Copy*, one part with another, will likeliest *Come-in* like with. This *Line* being *Compos'd*, he considers how much of his *Copy* it takes up, *viz.* whether it runs *Line* for *Line*, or whether two *Lines* of his *Copy* make one *Line* in his *Stick*; or whether a *Line* or an half, or a quarter, or half quarter of his *Copy*, &c. make one *Line* in his *Stick*; or whether two of his *Copy* make two *Lines* in his *Stick*, or two and a half, or a quarter, or half a quarter, &c. and accordingly calculates what just number of *Lines* will make another just number of *Lines* in his *Stick*. For Example.

If his *Copy* and *Measure* run *Line* for *Line*, then consequently 10, 20, 30 *Lines* of the *Copy* will make

10,

10,20, 30 *Lines* in the *Measure*; and accordingly he counts what number of *Lines* in his *Copy* will make a *Page*; and by that, what number of *Lines* will make two *Pages*, four *Pages*, eight *Pages*, and consequently so many *Pages* and *Sheets* as he is to *Count off*.

If two *Lines* of *Copy* make one *Line* in the *Stick*, then consequently ten *Lines* in the *Copy* will make five *Lines* in the *Stick*; twenty *Lines* in the *Copy* ten *Lines* in the *Stick*, &c.

If a *Line* and a half of the *Copy* make one *Line* in the *Stick*, then fifteen *Lines* of *Copy* makes ten *Lines* in the *Stick*, thirty makes twenty, &c.

But a pair of *Compasses* makes the best expedition in *Counting off* of *Copy*, and (by my experience) I have found the surest way. I *Compose* one *Line* as aforesaid; if the *Line* I *Compos'd Gets-in* part of the next *Line*, viz. the second *Line* of the *Copy*, I place one Foot of a pair of *Compasses* at the beginning of the *First Line*, and open the other Foot to what was *Got-in* of the *Second Line*, and turn the *Compasses* about upon the Foot in the Second *Line*, till the other Foot reach the *Third Line* of the *Copy*; then turn about the Foot in the *Third Line* of the *Copy* till the other Foot falls in the *Fourth Line* of the *Copy*; and so from the *Fourth*, to the *Fifth*, *Sixth*, &c. till the *Compasses* end with a *Line* in the *Copy*, or near the end of a *Line*, remembring as I go along, how oft I turn'd the *Compasses* about. Suppose, for Example, seven times: Then I number the *Lines* of *Copy*, beginning with the first *Line* and ending with the last *Line*, that the Points of the

the *Compasses* were turn'd over, and find them Eight, Nine, Ten, &c. and say Eight, Nine, Ten, &c. *Lines* of the *Copy*, makes Seven *Lines* of the *Measure*.

As now I have shew'd you how I *Count off Copy* if it come in more than *Line* for *Line*, so I shall shew you how I proceed if a *Line* in the *Copy Drive out* in the *Measure*.

It is but placing one Foot of a pair of *Compasses* at the farther end of the first *Line*, and opening the other Foot to the place where the *Compos'd Line* ended, and by turning about the *Compasses*, as before, to the Second, Third, Fourth *Lines*, &c. till they end in the beginning of a *Line* in the *Copy*; for then (as before) counting the number of *Lines*, beginning with the first, and ending with the last; Suppose Eight, Nine, Ten, &c. I say Eight, Nine, Ten, &c. *Lines* of the *Copy* makes so many *Lines* as is the number of times the Feet of the *Compasses* were turned about, between the first *Line* and the last *Line*.

Another way Arithmetically perform'd.

Suppose it be requir'd to know how many *Sheets* 127 *Pages* of *Written Copy* will make? I count the number of *Letters* contained in an ordinary *Written Line* of *Copy*, such a *Line* as I guess is likely to *Run Line* for *Line* with the generality of the rest of the *Copy*: And (for Example) I find 43 *Letters* in that *Line*: Then I count the number of *Lines* in an whole *Page*, and find 35 *Lines*, I Multiply 43 by

35, the Product is 1505 for the number of *Letters* in an whole *Page:* Then I multiply 1505 by 127, the number of *Pages* in the whole *Written Copy*; the Product is 191135, the number of *Letters* in the whole *Written Copy.*

If it be now required to know how many *Sheets* in *Quarto*, of the *English Body* this *Written Copy* will make, agreeable to any *Measure* already *Printed?* As for Example, the length of a *Page* given is 33 *Lines*, and in one *Line* is contained 47 *Letters:* I multiply 47, the number of *Letters* in one *Line*, by 33, the number of *Lines* in a *Page*, the Product is 1551. With this Product I divide 191135, the number of *Letters* in the whole *Written Copy*, and the Product gives 123, that is, 123 *Pages* in *Quarto*, which divided by 8, the number of *Pages* in one *Sheet*, gives 15 *Sheets* and 3 *Pages.*

If it be required to know how many *Sheets* it will make of *Pica* in an *Octavo*, or of *Long Primer* or *Brevier* in *Twelves*, &c. the manner of Working is the same: For Multiplying the number of *Letters* in one *Line* by the number of *Lines* in one *Page*, and Deviding the number of *Letters* in the whole Work (suppose, as in the foregoing Operation by 191135) by the number of *Letters* in one *Page*, the Product gives the number of *Pages* in the Quotient: And then at last Deviding the number of *Pages* by 16 if an *Octavo*, or 24 if *Twelves*, &c. you have in the Quotient the number of *Sheets*, and in the Remain (if any be) the number of *Pages.*

These two last ways are the surest Rules for *Counting off Copy:* But yet the *Compositer* has several Considera-

siderations upon his *Copy* before he dares conclude he has truly and exactly *Counted off.*

For first, a strict regard must be had to the *Breaks* that come in the *Copy:* For long *Breaks* in the *Copy* are generally likely to be *Got-in*, and consequently a *Line* is *Got-in:* But short *Breaks* often *Drive-out* a *Line.* Therefore though the *Compositer* has already in general *Cast off* his *Copy*, yet he more particularly considers his *Breaks*; and indeed they serve as so many Regulators to him, to keep him within the bounds of his *Counted off Copy:* For every *Break* he examines by the number of *Lines* from the last *Break*, by the length of the *Break*, and by the close or wide Writing of his *Copy*, whether it will be *Got-in* or *Drove-out*, and accordingly marks it in his *Copy*, before he reckons he has done *Counting off.*

A *Break* to be *Got-in* he marks thus [, and adjoyns in Numerical Figures, the number of *Lines* the *Matter* between the last *Break* and it will make. A *Break* to be *Drove-out* he marks thus ---, and (as aforesaid) adjoyns Numerical Figures to remember him what number of *Lines* he accounted that *Matter* to make from the last *Break.*

If *Chapters*, *Sections* or *Paragraphs* happens in the *Copy*, the *Compositer* takes room enough to set them and their Titles gracefully in; and marks in Numerical Figures what number of *Lines* he assigns for it.

If as he *Counts off* his *Copy* he finds *Abreviated Words*, he tells the *Abreviated Words* to the full number of *Letters* that spells the Word at length, because in *Composing* he *Sets* those Words at length:

And ſhould he not conſider it in his *Counting off*, he would in *Compoſing* find his *Matter Run out* from his *Copy*.

Scarce any *Copy* is ſo regularly Written (as hath ſeveral times before been hinted) but that ſome places are Wider, and other places Cloſer Written, than the generality of the *Copy*, wherefore he conſiders both theſe accidents in his *Copy*, and accordingly allows for them.

If it happens that much *Italick* comes in the *Copy*, as ſometimes two or three *Lines*, or more, or half a *Page*, an whole *Page*, or ſeveral *Pages*; the *Compoſiter* conſiders *Italick* is thinner than *Roman*, and conſequently *Gets-in* more than *Roman* does, and therefore in his *Counting off* will allow accordingly for it.

The proportion that I allow for it is as 9 to 10, or which is all one, as 45 *Roman Letters* is to 50 *Italick Letters*: So that if a *Meaſure* holds 45 *Roman Letters*, the ſame *Meaſure* will hold 50 *Italick Letters*.

As *Italick* is thinner than *Roman*, ſo the *Engliſh Face* is thicker than the *Roman*; wherefore if he meets with the *Engliſh Face*, he conſiders that accordingly.

I find the proportion to be as 40 to 43, *viz.* 40 *Engliſh Faced Letters* fill the ſame *Meaſure* that 43 *Roman* does; and conſequently for every 40 *Lines* to be *Set* in *Engliſh* he muſt *Count off* 43 *Lines*; and ſo proportionaply for more or leſs.

But yet I ſhall not deliver theſe my Obſervations on the *Italick* and *Engliſh* to hold thus in all *Italicks* and

and *Engliſhes*, nor all *Romans* of the ſame *Body* to be of an equal Thickneſs, becauſe ſome are *Cut* Thicker or Thinner on the *Face*: And beſides, ſometimes *Letter Caſt*, though in the ſame *Matrices*, are by the *Founder Caſt* Thicker or Thinner, and conſequently in either Circumſtance *Drive-out* or *Get-in*: Wherefore a *Compoſiter* will conſider what *Fount* of *Letter* it is he Works on, and accordingly *Count off* his *Copy*.

¶ 10. *Of* Papering up *of* Pages.

Papering up of *Pages*, or *Papering* up of *Letter*, are two phraſes indifferently uſed for the ſame meaning. Though this Operation ſeems ſo ſleight and trivial that it may be thought not worth mentioning, yet it being a task incumbent on the *Compoſiter*, it becomes mine too to ſhew how it is performed.

It is thus: When a *Book* is finiſht, and the *Compoſiter* is to *Work* on other *Letter* afterwards; the *Wrought off Letter* is to be *Papered up*. The *Preſsman* therefore having *Waſht* the *Wrought-off Forms*, the *Compoſiter Rinces* them, as was ſhewed in Section 22. ¶ 3. He *Rinces* the *Letter* as well as if it were *Rinced* for preſent uſe, or rather better: for elſe the *Ink* that is deſolved among the *Ly* would, with long ſtanding by, harden between the *Letter*, and make the *Letter* ſtick ſo faſt together that when it comes afterwards to be *Deſtributed*, the *Compoſiter* ſhall not without great difficulty and trouble get them aſunder. This ſticking together of the *Letter* is call'd *Baking* of the *Letter*. And *Compoſiters* in this Caſe ſay, *The Letter is Bak'd*.

The *Compositer* having *Stript* the *Form*, whips *Cords* as tight as he can about every *Page*, not to *Tye* them up for good and all, but aſwell to keep up the *Letter* on the ſides of the *Pages* that it fall not down, while it ſtands by for ſome dayes on the *Letter-board* to *Dry*, as to keep the *Letter* tight together that he may the better with his Hands take an whole *Page* at once off the *Letter-board*.

When it is *Dry*, if the *Pages* are not too broad for his Graſp, he places his Body againſt a ſide of the *Pages*, and the Balls of his two Thumbs againſt the ſide of a *Page*, one indifferently between the middle and *Head* of the *Page*, and the other between the middle and *Foot* of the *Page*, and with the three Fore-fingers of each Hand placed on the other ſide of the *Page*, graſps the *Page* between them and his Thumbs; and to keep his Hands the ſteddier, ſtretches the inſides of his Little-fingers one againſt the *Head* the other againſt the *Foot* of the *Page*: And having the *Page* thus Steddy between his Hands cloſe preſt on all the ſides of the *Page*, he with a quick motion nimbly rears one ſide of the *Page* upright, and receives the weight of it either on the Balls of his Thumbs or on the Balls of his Fingers, as beſt likes him; and ſo carries it to his *Galley* and *Tyes* it firmly up; as was ſhewed ¶ 6. of this Section.

As he took and *Tyed* up this one *Page*, ſo he takes and Tyes up all the *Pages*. But if a *Page* be too big for his Graſp, he underlays the *Slice* of a *Galley* till it lye within a Scaboard ſo high as the edge of the *Letter-board*, and getting ſome one to hold the *Slice* ſteddy againſt the edge of the *Letter-board* he ſlides the

the *Page*, with the *Head* or *Foot* forwards upon the *Slice*, and ſo carries the *Page* to the *Galley* and *Tyes* it up, as aforeſaid.

He ſends the Boy to the Warehouſe-keeper for ſo much Paper as he finds he ſhall want; and if the *Pages* are ſmall, he layes a ſingle Sheet down on the *Correcting-Stone* or on a *Letter-board*, and ſets a *Page* down on that Sheet of Paper, ſo as the farther Side of the *Page* may ſtand towards one end of the Sheet; and ſo far on the Sheet, as that the end of it may lap over the *Face* of the *Letter*, and about half way down the *Shank* of the *Letter*, on the hither ſide the *Page*: And ſmoothing the Paper tight over the *Face* of the *Letter*, and half way down the *Shank* on the hither Side, and quite down the *Shank* at the *Head* and *Foot* of the *Page*, he folds the looſe Paper that hangs over the ends of the *Page*, from each corner of the *Page*, to end in an Angle in the middle of the looſe Paper, and then folds the other end of the Sheet of Paper tight over the Paper that covers the *Face* of the *Letter*; and alſo folds the looſe Paper at the ends of the *Page* down into Angles, as he did the former looſe ends: Then rearing his *Page* over the further ſide, lays the *Face* downwards, ſtill ſmoothing the Paper tight, and folding in the un-folded corners, to meet in the ſame Angles with the former folded Angles in the middle of the looſe Paper: And thus ſo long as he has Paper to ſpare he turns his *Page*, wrapping it at leaſt twice, or if he can thrice about in Paper, folding and doubling down the Looſe Paper into Angles as before: And at laſt turns up thoſe Angles or Lappets either

either over the *Face* or Bottom of the *Letter*, and turns the *Page* upon those folded Lappets, that its weight may press and keep them close under the *Page*.

If the Pages are large, so as one *Sheet* will not compass them twice or thrice about, to be strong enough to bear the *Letter*, which generally sinks downwards in the middle of a *Page*, he lays two, or sometimes three Sheets under the *Page:* And as he wrapt up the first Lay of Sheets, adds more to lengthen them out, that they may wrap at least three or four times about the great *Page*,

Having thus *Paper'd up* the *Pages*, and folded the Lappets under them, he writes upon the upper side what *Letter* it is, *viz. Long-Primer Roman, Long-Primer Italick, Pica Roman, Pica Italick, Pica English, English Roman, Italick, &c.* and sets them by for the *Master-Printer* to dispose of.

§. 23. *Of the* Corrector, *and his Office.*

A *Corrector* should (besides the *English* Tongue) be well skilled in Languages, especially in those that are used to be Printed with us, *viz.* the *Latin, Greek, Hebrew, Syriack, Caldæ, French, Spanish, Italian, High Dutch, Saxon, Low Dutch, Welch, &c.* neither ought my innumerating only these be a stint to his skill in the number of them, for many times several other Languages may happen to be Printed, of which the Author has perhaps no more skill than the bare knowledge of the Words and their Pronunciations, so that the Or-

thography (if the *Corrector* have no knowledge of the Language) may not only be false to its Native Pronunciation, but the Words altered into other Words by a little wrong Spelling, and consequently the Sense made ridiculous, the purpose of it controvertible, and the meaning of the Author irretrievably lost to all that shall read it in After times.

He ought to be very knowing in Derivations and Etymologies of Words, very sagacious in *Pointing*, skilful in the *Compositers* whole Task and Obligation, and endowed with a quick Eye to espy the smallest *Fault*.

But I shall say no more of his Qualifications; but suppose him endowed with all necessary accomplishments for that Office.

The *Compositer* either carries him a *Proof*, or sends the Boy with it to his Appartment, which is commonly some little Closet adjoyning to the *Composing-room:* And the *Master-Printer* appoints him some one that is well skill'd in true and quick Reading, to Read the *Copy* to him, whom I shall call the *Reader*.

This *Reader*, as I said, Reads the *Copy* to him, and the *Corrector* gives attention; and at the same time carefully and vigilantly examines the *Proof*, and considers the *Pointing*, *Italicking*, *Capitalling*, or any error that may through mistake, or want of Judgement be committed by the *Compositer*.

If he finds one *Letter Set* instead of another, as in this Word tho for the, he dashes out the wrong

Letter thus thϕ, and Writes the *Letter* it ſhould be on the Right Hand *Margin* of the *Page*, right againſt the ſame *Line*, and makes a Daſh behind it, as you may ſee in the *Margin*. c/

If two or three, or more Words in the ſame *Line* have *Faults* in them, as in theſe Words, Pϕtien$\not$e pe$\not$t ſ$\not$rce, where firſt an 'o is *Set* inſtead of a, e inſtead of c, t inſtead of r, and c inſtead of o: Theſe he marks in an orderly ſucceſſion towards the Right Hand, againſt the ſame *Line*, as you may ſee in the *Margin*. a/c/r/o/

But if one word be *Set* inſtead of another, as Scoff inſtead of Smile, here he marks Scoff out thus Scoff, and writes Smile, as in the *Margin*. Smile/

If a *Word* or *Words*, or *Letter*, or *Point* be *Left out* he makes this mark ʌ where it is *Left out* for a mark of Inſertion, and Writes in the *Margin* what muſt come in.

If a *Space* be *Left out* he makes the former mark of Inſertion where it ſhould come in, and makes this mark # in the *Margin*. # /

If a whole Sentence be *Left out*, too long to be Writ in the *Margin*, he makes the mark of Inſertion where it is *Left out*, and only Writes (Out) in the *Margin*. If the Sentence *Left out* be not very long, he Writes it under the *Page*, or on the Left Hand *Margin* of the *Page*: But if it (Out)

it be too large to be Writ in the *Margin*, or under the *Page*, he Writes in the *Margin*, See the Copy. (See the Copy)

If a Word or Sentence be *Set* twice, as Him Him, he marks out one Him thus Him, and makes this mark δ in the *Margin*, for *Deleo*, to take out. δ /

If a *Letter* be turned thus $\not$, he daſhes it out as you ſee, and makes this mark in the *Margin*. $\not$/

If Words are *Tranſpoſed*, that is, if one Word ſtand in another Words place, as, no I love Swearing, and it ſhould be, I love no Swearing; he marks this *Fault* thus, (no I love) Swearing, and makes this mark ⌒ in the *Margin*. The like mark he makes in *Matter* and *Margin* if two *Letters* are *Tranſpos'd*. ⌒/

If a *Space* or an m or n *Quadrat*, &c. ſtick up, and *Print Black*, as between theſe words, he marks in the *Margin* thus. l

If a *Word* be *Set* in *Roman Letter* inſtead of *Italick* or *Engliſh Letter*, he daſhes the Word underneath thus, and Writes *Ital.* or *Eng.* in the *Margin*. Ital/ Eng/

In like manner, if a ſingle *Let*- or more *Letters* be *Set* in *Roman*

Letter, and it ſhould be *Italick* or *Engliſh Letter*; or if in *Engliſh* or *Italick*, and it ſhould be *Roman Letter*, he daſhes the *Letter* or *Letters* thus underneath, and writes *Ital.* Ital/ Rom/ Eng/ *Rom.* or *Eng.* in the *Margin*: Or if *Lower-Caſe Letters* be *Set* inſtead of *Capitals*, he daſhes them underneath, and Writes *Capt.* in the *Margin.* Capt./

Having Read the *Matter* of the *Proof* he examines again if the *Form* be right *Impos'd*, for though he before turn'd the *Pages* in the *Proof* as he read them according to their orderly places, yet he will ſcarce truſt to that alone, but again examines them on purpoſe, and diſtinctly, which he does not only by the *Direction Word*, but by examining the whole Sentence the *Direction* comes in, both at the end of the *Page*, and the beginning of the next *Page*.

He examines that all the *Signatures* are right, and all the *Titles* and *Folio's*.

If the Work be large *Forms* and ſmall *Letter*, he has a ſecond, and ſometimes a third *Proof*, which he Reads as the firſt.

After the Second or Third *Proof* he has a *Reviſe*, which is alſo a *Proof-ſheet*: He examines in this *Reviſe*, *Fault* by *Fault*, if all the *Faults* he markt in the laſt *Proof* were carefully mended by the *Compoſiter*; if not, he marks them in the *Reviſe*.

Thus you ſee it behoves him to be very careful as well as skilful; and indeed it is his own intereſt to be both: For if by his neglect an *Heap* be ſpoiled, he is obliged to make Reparation.

A D-

Advertiſement to AUTHORS.

ALthough I have in the precedent Exerciſes *ſhew'd the Accompliſhments of a good* Compoſiter, *yet will not a curious Author truſt either to his Care or Abilities in* Pointing, Italicking, Capitalling, Breaking, &c. *Therefore it behoves an Author to examine his* Copy *very well e're he deliver it to the* Printer, *and to Point it, and mark it ſo as the* Compoſiter *may know what Words to* Set *in* Italick, Engliſh, Capitals, &c.

For his Italick *Words he draws a line under them thus*: *For* Engliſh *Words he draws two lines under them thus*; *and for* Capitals *a line of Pricks thus*, *or elſe draws a line with Red Ink.*

If his Copy, *or any part of it, be Written in any Foreign Language, he is ſtrictly to ſpell that*

Foreign Language right: *Becauſe the* Compoſiter, *as I ſaid in the Preface to this* §, *takes no notice of any thing therein but the very* Letters, Points *and* Characters *he finds in his* Copy.

If an Author have not (through haſte in Writing) made Breaks *in proper places; when he comes to peruſe his* Copy *he may find cauſe to make ſeveral* Breaks *where he made none: In ſuch a caſe he makes a* Crotchet [*thus, at the Word he would have begin his new Paragraph.*

Thus in all particulars he takes care to deliver his Copy *perfect: For then he may expect to have his Book perfectly Printed. For by no means he ought to hope to mend it in the* Proof, *the* Compoſiter *not being obliged to it: And it cannot reaſonably be expected he ſhould be ſo good Natured to take ſo much pains to mend ſuch Alterations as the ſecond Dictates of an Author may make, unleſs he be very well paid for it over and above what he agreed for with the* Maſter-Printer.

The next *Exerciſes* (God willing) ſhall be the

the *Preſs-mans* Trade, The Office of the *Ware-houſe-keeper*, The *Cuſtoms* of the *Chapel*, And a *Dictionary* to explain the hard Words and Phraſes uſed in the whole Practice of *Typography*: Which will be the Concluſion of this Second Volume.

ADVERTISEMENT.

Plate 23.

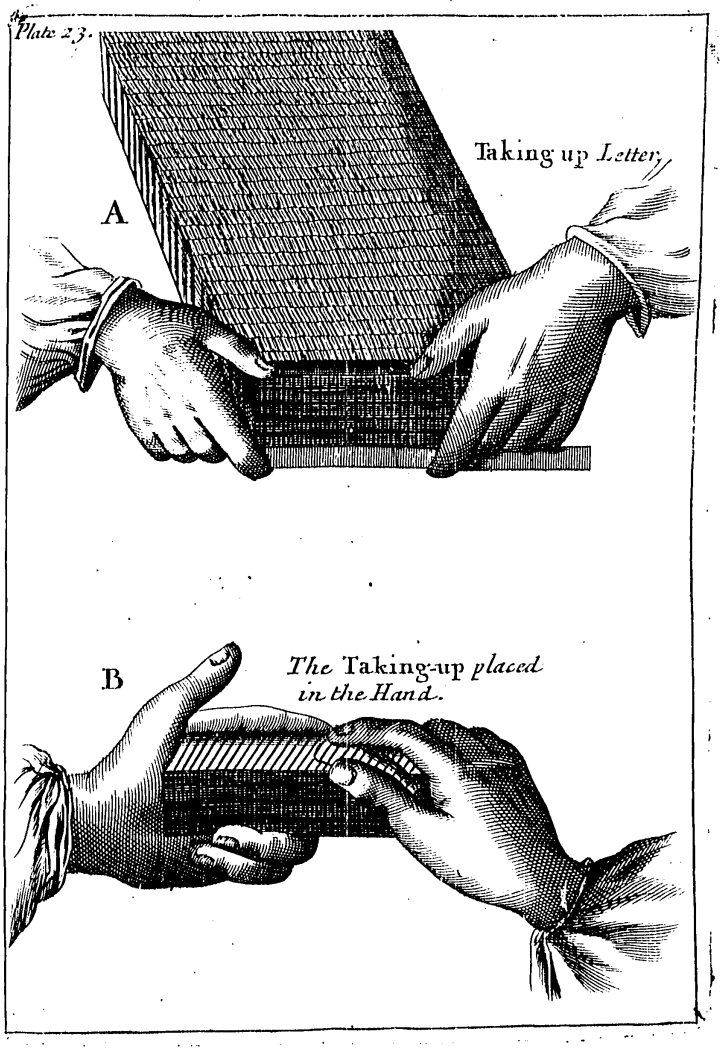
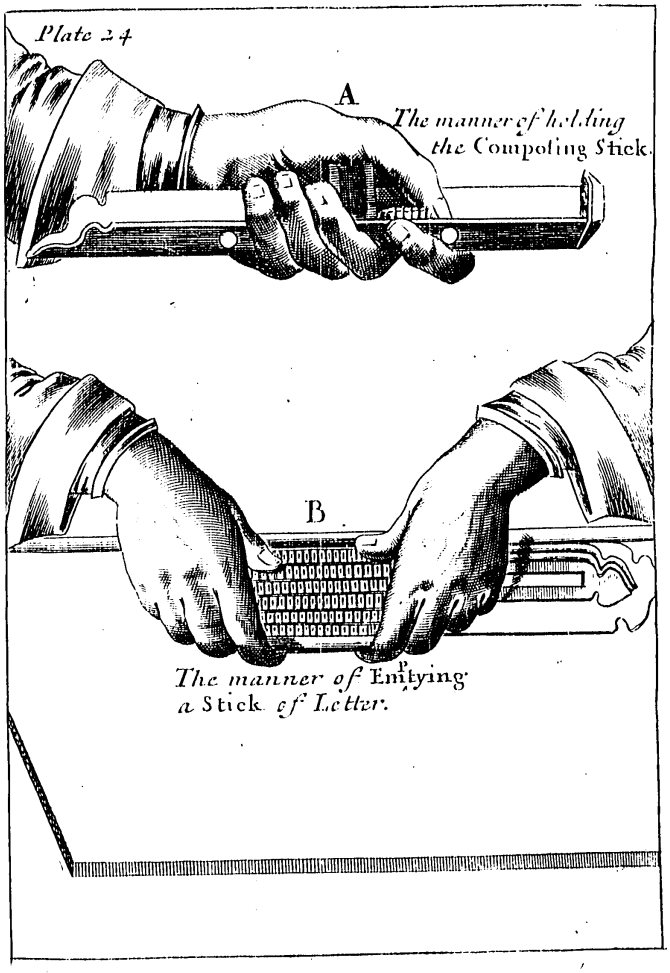


Plate 24



The manner of holding the Composing Stick.

The manner of Emptying *a* Stick *of Letter.*

Plate 25.

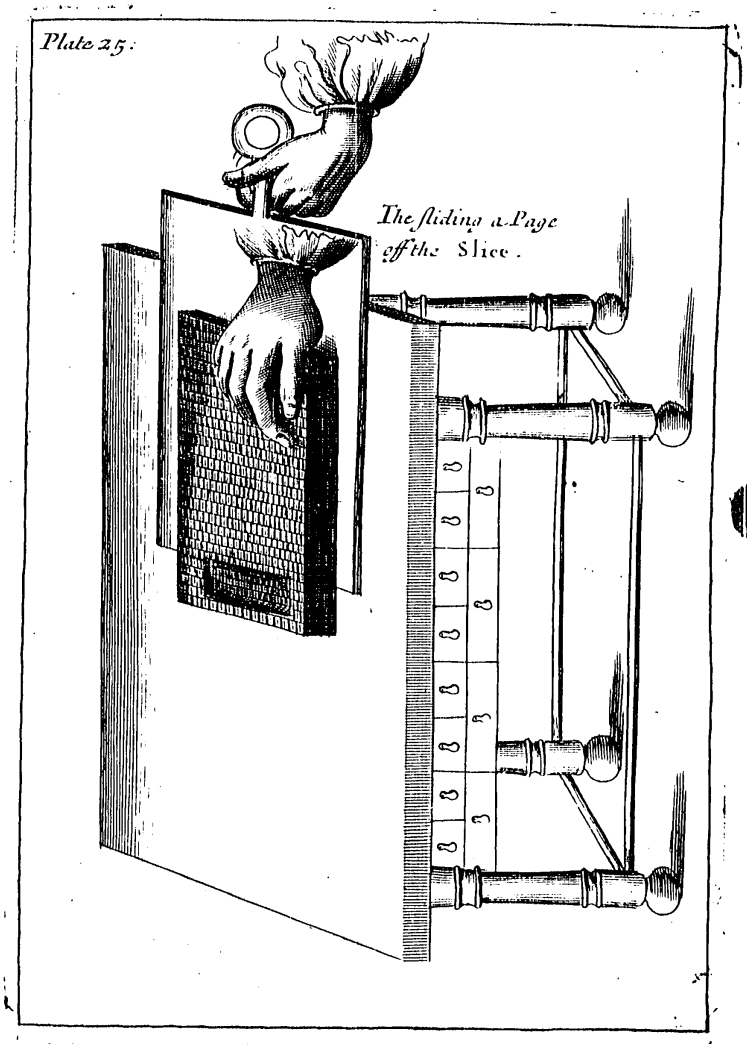


Plate 26.

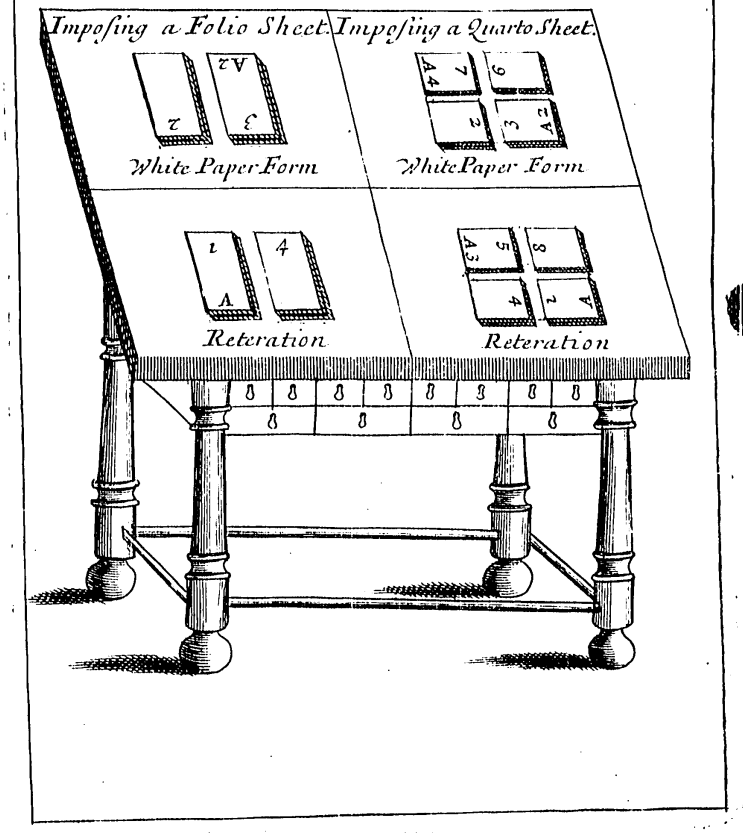

Impoſing a Folio Sheet.
Impoſing a Quarto Sheet.
White Paper Form
White Paper Form
Reteration
Reteration

Plate 27

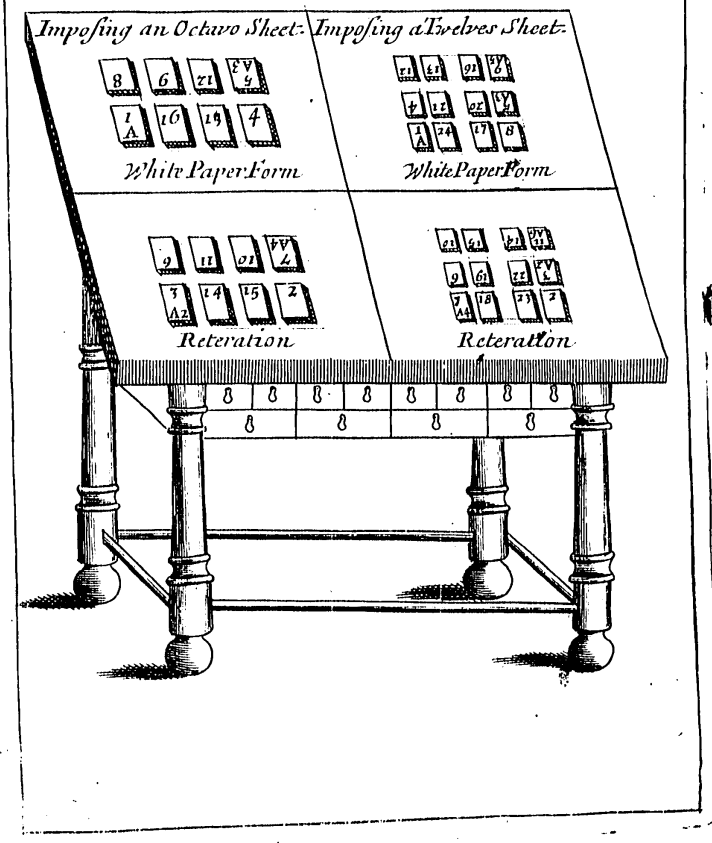
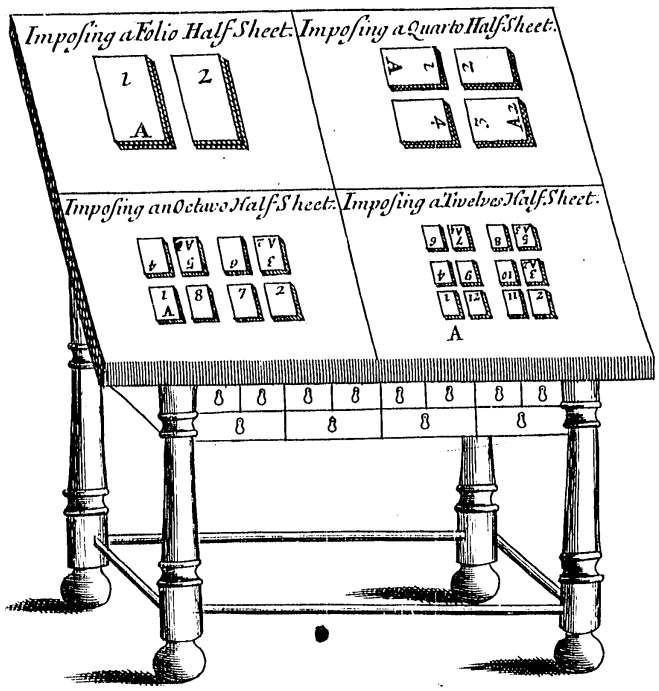

Imposing an Octavo Sheet:
Imposing a Twelves Sheet:
White Paper Form
White Paper Form
Reteration
Reteration

Plate 28.


Impoſing a Folio Half Sheet.
Impoſing a Quarto Half Sheet.
Impoſing an Octavo Half Sheet.
Impoſing a Twelves Half Sheet.
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MECHANICK EXERCISES:

Or, The Doctrine of

Handy-works.

Applied to the

Press-mans Trade.

The Second VOLUMNE.

PREFACE.

THE Printing-Press *that a* Press-man *works at, is a Machine invented upon mature consideration of Mechanick Powers, deducted from Geometrick Principles; and therefore a* Press-man *indowed with a competency of the Inventers Genius, will not only find great satisfaction in the contemplation of the harmonious design and Make of a* Press, *but as often as any Member, or part of it is out of order, he will know how to remedy any deficiency in it. This*

alone will intitle him to be an Understanding Press-man : *But his care and serious industry in the Physical and Manual performance of his Task, must give him the Reputation of a good and curious Work-man.*

§. 24. ¶ 1. *Of the* Press-mans *Trade.*

AN understanding *Press-man* therefore knows not only how to direct a Printers Joyner to Set up and Fasten a *Press* when it is made, but also how to give a strange Joyner and Smith instructions how to make a *Press*, and all its parts, in a Symetrical proportion to any unwonted size, if in a strange place he shall have occasion to use it.

I have already at large insisted upon the dimensions of every particular Member of an ordinary siz'd *Press* in § 10, 11. But in those Sections did omit shewing you how the *Press* is Set up and Fastned ; yet promised to do it when I came to the *Press-mans* Trade : It being not only a care incumbent upon him, but a Curiosity he would assume to himself to direct and see the Joyner set and fasten it in a Steddy and practical position. We will suppose a strange Joyner, and not a Printers Joyner (as here in *London* he may be furnisht with) who generally by their constant conversation in Printers work, do or ought to know as much of Setting up a *Press* as the *Press-man* himself.

The Joyner therefore having set together the Frame, *viz.* the *Cheeks*, *Feet*, *Cap*, *Head*, *Till*, *Winter*, *Hind-Posts*, *Ribs*, *Carriage*, *&c.* The *Press-man* directs, and sees him perform as follows by and by.

by. For I should have told you that before the *Head* is put into its place, the *Press-man* besmears the whole Tennanted ends and Tennants well with Soap or Grease, and also the Mortesses the *Head* slides in, and so much of the *Cheeks* as the ends of the *Head* work against, that the *Head* may the easier work up and down.

He also before the *Carriage* is laid on the *Ribs*, besmears the two edges of the *Plank* and the under side of the *Coffin* well with Soap or Grease ; and the like he does by the inside of the *Wooden Ribs*, that they may slide the easier beside each other.

Now to return to the Joyner. The *Press-man*, I say, directs and sees him perform as follows.

1. To place the *Feet* upon an Horizontal Level Floor, as I shewed in the First Volume, Numb. 7. § 7. when I spoke of the Level that Carpenters use.

2. To erect the *Cheeks* perpendicularly upright, as I shewed *Vol.* 1. *Numb.* 7. § 8. when I treated of the *Plumb-line.*

3. To place the *Stays* or *Braces* so as the *Press* may be kept in the most Steddy and Stable position, as well to give a check to the force of the hardest *Pull* he makes, as to the hardest Knock the *Bar* shall make against the farther *Cheek*, if by chance (as sometimes it does) it slip out of the *Press-mans* Hand.

This consideration may direct him to place one *Brace* against the end of the *Cap* that hangs over the hither *Cheek*, and in a range parallel with the fore and hind side of the *Cap* : For the more a *Brace*

ſtands aſlope to the two parrallel ſides, the leſs it reſiſts a force offered to the end of them, *viz.* the hither end of the *Cap*, which is one main *Stay* to the whole *Preſs*.

If he place another *Brace* againſt the hinder corner of the farther end of the *Cap*, it will reſiſt the *Spring* of the *Bar*, if it ſlip out of the *Preſs-mans* Hand.

And if he places two other *Braces*, one againſt the hither corner of the hind-ſide of the *Cap*, and the other againſt the farther corner of the fore-ſide of the *Cap*, the *Preſs* will be ſufficiently *Braced-up*, if the Room will afford convenience to place the farther end of the *Braces* againſt.

By convenience I mean a firm ſolidity to place the end of the *Braces* againſt, be it either a Stone-wall, Brick-wall, or ſome principal Poſt, or a Girder, *&c.* that will not ſtart or tremble at the force of a *Pull*.

The *Braces* ought to be ſtraight, and of Subſtance ſtrong enough proportionable to their Length: And if convenience will allow it to be fixed in ſuch a poſition that they ſtand in the ſame ſtraight Line with the upper Surface of the *Cap*, viz. that the farther end of the *Brace* neither dips lower or mounts higher than the upper ſide of the *Cap*. Neither ought the *Brace*, though thus poſited, to ſtand aſlope or askew, *viz.* make unequal angles with the ſide of the *Cap* it is faſtned to, but it ought to ſtand Square, and make right angles with the reſpective ſide of the *Cap*; becauſe in thoſe Poſitions the *Braces* beſt reſiſts the force of continued *Pulls*.

But

But though this be by the Rules of Architecture, the ſtrongeſt, firmeſt, and moſt conciſe method for *Bracing-up* a *Preſs*, yet will not the Room the *Preſs* is to ſtand in always admit of convenience to place the *Braces* thus: Therefore the *Preſs-man* ought to conſider the conveniences of the Room, both for the places to ſit the *Braces* to, and the poſitions to ſet the *Braces* in; placing his *Braces* as correſpondent as he can to theſe Rules.

If he doubt the crazy make of the *Winter*, he will cauſe two *Battens* of three or four Inches broad, and a full Inch thick, to be nailed cloſe to the outer ſides of the Feet of the *Preſs*, which will both ſtrengthen the *Winter*, and keep the lower part of the *Cheeks* from flying out, and alſo hinder the *Preſs* from working into a twiſting Poſition.

And though I am loath to name the *Under-laying* of the *Feet*, becauſe at the beſt it is but a *Botch*, and Subjects the whole *Preſs* to an unſtable poſition yet becauſe by accident it may happen, the aforeſaid *Battens* will alſo keep theſe Underlays from working out.

Joyners that Work to Printers have got a Cuſtom to place a ſtrong Piece of Timber between the middle of the *Cap* and the Ceiling or Roof of the Room, which can do no ſervice there, unleſs they intend to ſupport the Roof: For the weight of the *Preſs* alone will keep it cloſe to the Floor, and the ſtrength of Stuff between the Morteſſes in the *Cheeks* and the ends of them, are intended to be made ſtrong enough to reſiſt the Riſing of the *Head*: For ſhould that ſtrength of Stuff ſtart, neither their ſtrong Piece of

Timber, nor the ſtrength of the Roof, would reſiſt the Riſing of the *Head*: but *Head* and *Cap*, and Timber and Roof too, would all ſtart together, as by experience I have ſeen. For indeed the ſtrength of Stuff between the Morteſſes that the Tennants of the *Head* works in, and the upper ends of the *Cheeks*, and the Strength of Stuff between the Morteſſes that the Tennants of the *Winter* lyes in, and the lower ends of the *Cheeks* reſiſt the whole ſtrength of the working of the *Spindle* out of its *Nut*. So that the *Cap* ſuffers no preſſure upwards or the *Feet* downwards, unleſs the force of the *Spindle* break the ſtrength of Stuff between the *Head* and the upper ends of the *Cheeks*, or the ſtrength of Stuff between the *Winter* and the lower ends of the *Cheeks*.

The *Preſs* being thus far faſtned, the *Carriage* is laid on; and if the Joyner performed his Work well in making the Wooden-work, it will at firſt lye exactly Horizontal; if not, it muſt be mended where it is amiſs before the *Preſs-man* can *Lay* the *Stone*; and before the *Stay* of the *Carriage* can be fitted under the end of the *Ribs*.

¶ 2. *Of* Laying *or* Bedding *the* Stone.

We will ſuppoſe the Wooden *Ribs* to lye on the *Winter* exactly, flat and Horizontal, therefore the *Preſs-man* now *Lays* the *Stone*: If the *Stone* be a good thick Marble Stone, and all the way of an equal thickneſs between the *Face* and the Bottom, he may *Bed* or *Lay* it upon ſo many large *Sheets* of Brown Paper as will raiſe the *Face* about a *Brevier* above the Superficies of the *Coffin*, and the *Stone* will do good ſervice.

Or he may *Bed* or *Lay* it on Bran; which indeed the *Preſs-man* moſt commonly does, if the *Stone* be qualified as aforeſaid.

The manner how he lays it on Bran is thus,

He graſps an handful of Bran and lays it down at the hither corner of the *Coffin* on his Left Hand, and it will form it ſelf into a ſmall Hillock; then he takes another handful of Bran, and lays that down in the ſame manner near the firſt, towards the further ſide, and ſo a third, *&c.* towards the further ſide, till he have filled the whole breadth of the *Coffin*. Then he in like manner lays another row of Hillocks, beginning at the hither ſide of the *Coffin*; and ſo a third and fourth row, *&c.* till the length of the *Coffin* is filled as well as the breadth: Then with a *Riglet* he drives the tops of theſe Hillocks into the Valleys between them, to ſpread the Bran into an equal thickneſs in the whole *Coffin*. Which done, he lays the *Stone* upon it.

But in this caſe he conſiders to lay ſo much Bran thus into the *Coffin* as may make the *Face* of the *Stone* riſe about a *Great Primer* higher than the Superficies of the *Coffin*: For elſe he muſt take all his Bran out again, and new-lay his Hillocks, making them bigger or leſs, till he have fitted the *Face* of the *Stone*, to lye about a *Great Primer*, as aforeſaid, higher than the Superficies of the *Coffin*.

But if it be a thin *Stone*, or a *Purbeck* or *Portland Stone*, it is great odds if it be thus *Laid*, but it breaks with the firſt *Pull*: Therefore theſe *Stones* are

are generally *Laid* or *Bedded* with Plaister of *Paris*, which before it hatdens, will of it self run into an Horizontal position.

This Plaister of *Paris* is tempered with fair Water to the consistence of Batter for Pancakes, or somewhat thicker, and such a quantity is put into the *Coffin* as may raise the *Face* of the *Stone* about a Scaboard higher than the Superficies of the *Coffin*.

The different matter the *Stone* is *Laid* on is the reason why the *Face* is *Laid* of different heights above the Superficies of the *Coffin*: For by the force of a *Pull* about a dozen Sheets of Brown Paper may be squeez'd closer by a *Brevier Body*, which brings the *Face* of the *Stone* into the same Level with the Superficies of the *Coffin*. And Bran squeezes much more. But Plaister of *Paris* not at all.

When he *Lays* the *Stone* on Bran, or on Plaister of Paris, he and his Companions slings the *Stone* in two strong Packthreds, placing one towards either end of the *Stone*; and each of them taking an end of each String in each of their Hands, with the *Face* of the *Stone* upwards, and brought as near as they can into an Horizontal Position, they with great care and caution let it into the *Coffin*, and as near as they can, so as the whole bottom of the *Stone* touch the *Bedding* all at once; lest by raking the *Bedding* with any part of the bottom of the *Stone* first, the Horizontal form of the *Bedding* be broken.

Having laid the *Stone* down, they draw the Packthred from under it: And by squeezing a little Water out of a Spunge upon about the middle of the *Face* of the *Stone*, try whether the *Stone* lye truly Horizontal, which they know by the standing of the Water: For if the Water delate it self equally about the middle of the *Stone*, the *Stone* lies Horizontal: But if it have a propensitude to one side more than another, the declivety is on that side, and the *Stone* must be new *Laid*.

Having laid it Horizontal, they *Justifie* it up with the *Justifiers* I mentioned in § 11. ¶ 17.

¶ 3. *Of* Setting *the* Rounce.

The *Rounce* being well *Set* does not only ease a *Press-man* in his Labour, but contributes much to Riddance in a train of Work.

In the old-fashioned *Presses* used here in *England*, the *Press-man* finds often great trouble and loss of Time in *Setting* the *Rounce*: Because the *Girts* being nailed to the *Carriage-board* behind, and to the Frame of the *Coffin* before, he cannot alter the position of the *Rounce* without un-nailing and nailing the *Girts* again, both before and behind. Nay, and sometimes though he thinks he has been very careful in *Winding* the *Girts* off or on the *Barrel* of the *Rounce*, as he finds occasion requires; Yet by straining either of the *Girts* too hard, or not hard enough, or by an accidental slip of either of the *Girts*, or by stirring the *Rounce* out of a Set position, when he thinks he has *Set* the *Rounce*, he has it to do again. Besides, The *Carriage-board*, *Frame* of the *Coffin*, and the *Rounce-barrel*, all suffer tearing to pieces by often drawing out and driving in o. Nails.

But in these new-fashioned *Presses* all these inconveniences are avoided, for the *Press-man*, without nailing or un-nailing, *Sets* the *Rounce* to what Position he will, only by lifting up the Iron *Clicker* that stops the wheel: For then *Winding* off so much *Girt*, and *Winding* up so much *Girt* at the opposite end of the *Carriage*, his *Rounce* is *Set*, without hope or Hazzard.

He *Sets* the *Rounce* to such a position, that when the fore-end of the *Tympan* will just lye down and rise free, without touching the fore-edge of the *Plattin*, then a line drawn or imagined from the Axis of the *Handle* of the *Rounce*, to a Perpedicular or *Plumb-line*, let fall from the Axis of the *Spindle* of the *Rounce*, these two lines shall make an angle of about 45 degrees, which is half the Elevation between an Horizontal line, or Line of Level, and a Perpendicular, or Plumb-line.

¶ 4. *Of* Hanging *the* Plattin.

When the *Press-man Hangs* the *Plattin*, he lays a *Form* upon the *Press*, and about a Quire of Paper doubled upon it (this Quire of *Paper* thus doubled is called the *Cards*) then layes the *Plattin* upon the *Cards*, and so *Runs* the *Carriage* and *Plattin* in, till the middle of the *Plattin* lye just under the *Toe* of the *Spindle*: Then he puts the *Pan* of the *Plattin* in its place, and in part Justifies the *Head*, as shall be shewed in the next ¶. And he un-screws the *Hose-screws*, till the Spuares at the ends of the *Hose* come down to about a quarter of an Inch of the Square of the

the Socket they are fitted into in the ends of the *Garter*, and when the *Toe* of the *Spindle* is fitted into the *Nut* in the *Pan* of the *Plattin*, he examines by straining a Pack-thred against the two foresides of the *Cheeks* of the *Press*, whether the fore-edge of the *Plattin* is set in a parallel Range with the fore-sides of the *Cheeks*: If it be not, he twists the ends till the edge of the *Plattin* stands parallel with the Pack-thred, and consequently with the *Cheeks*.

Then with the *Bar* he *Pulls* the *Spindle* hard down upon the *Plattin*, and Sets the edges of a *Paper-board* between the *Bar* and the farther *Cheek* of the *Press*, to keep the *Bar* from starting back.

And having provided fine Whip-cord, he knots a Noose on one end and puts it over one of the *Hooks* of the *Plattin*, lashing the Whip-cord also upon the farthermost *Notch* of the *Hose-hook*, and again upon the *Plattin-hook*, and again upon the *Hose-hook*, and again upon the *Plattin-hook*: So that here is now three Lashes of whip-cord upon the *Plattin-hook*, and upon the farthermost *Notch* of the *Hose-hook*. Wherefore he Lashes his fourth Lashing of whip-cord now upon the second *Notch*, viz. the middlemost *Notch* of the *Hose-hook*, reiterating these Lashes on the middlemost *Notch* and *Plattin-hook* also three times. And thus in like manner Lashes also three Lashes upon the third and last *Notch* of the *Hose-hook* and also of the *Plattin-hook*, observing to draw every Lashing of an equal strength.

Then he begins to whip about these Lashings to draw them close together: He begins, I say, at at the bottom of the Lashings, *viz.* close above the

Plattin-hook, and draws his whippings very tight and hard, and contiguous above one another, till he have whipt ſo near the top of the Laſhings, *viz.* near the *Hoſe-hooks* that he finds the Laſhings (which now ſpread wide aſunder becauſe the *Notches* of the *Hoſe-hooks* ſtands far aſunder) will yield no longer to to his whiping and pulling: So that now he faſtens his whip-cord with two or three hard knots, and cuts it from the Coyl.

In like manner he begins at the oppoſite diagonal corner of the *Plattin*, and laſhes and whips that: And alſo the two other corners of the *Plattin* as he did the firſt, carefully obſerving to draw all his laſhings and whippings of an equal ſtrength, leſt any corner of the *Plattin* either mount or dip.

If he finds he ſtrained the whip-cord not hard enough; or (when he is in his train of work) that the *Plattin-cords* with long working work looſe; or that the *Toe* of the *Spindle* and the *Nut* it works in, have worn one another; he by turning the *Screws* at the upper ends of the *Hoſe*, draws up the *Nut* of the *Plattin* cloſer to the *Toe* of the *Spindle*, and by conſequence ſtrains the *Plattin-cords* tighter up; which is alſo a great convenience in theſe new-faſhioned *Preſſes*: For, for any of theſe aforeſaid accidents the *Preſs-man* that works at our *Engliſh-Preſſes* muſt new *Hang* his *Plattin*: When (as aforeſaid) in theſe new *Preſſes* he only turns about a *Screw*.

¶ 5. *Of*

¶ 5. *Of* Juſtifying *the* Head.

Juſtifying the *Head* is to put into the Morteſſes in the *Cheeks* between the upper ſides of the Tennants of the *Head*, and the upper ſides of the Morteſſes in the *Cheeks*, an equal and convenient thickneſs of (either) ſquare pieces of Felt, Paſtboards, or Scaboards (ſome or all of them) that when the *Preſs-man Pulls*, the Tennants of the *Head* ſhall have an equal Horizontal level Check.

In *Juſtifying* the *Head*, the *Pull* is to be made *Longer* or *Shorter*.

If the *Preſs-man* be tall and ſtrong and his work be *Light*, that is, a ſmall *Form* and great *Letter*, which needs not ſo ſtrong a *Pull* as a Large *Form* and ſmall *Letter*, he covets to have a *Short-pull*; that is, that the *Spindle* ſhall give an *Impreſſion* by that time the *Bar* comes but about half way to the hither *Check* (in Printers Language *Down*.)

But if the *Preſs-man* be low, and not very ſtrong, he will require a *Longer Pull*, eſpecially if the work be *Heavy*, viz. a Large *Form* and ſmall *Letter*: Becauſe the heighth of the *Bar* is generally made to lye at the command of a reaſonable Tall man, and therefore a Low man cannot Pull the Handle of the *Bar* at ſo great a force at Arms-end as a Tall man; but will require the ſwinging of his whole Body backwards to add force to the *Pull*: So that if the *Pull* be not *Longer*, he cannot fall enough backwards to get the *Handle* of the *Bar* within his command and force. And therefore a Low man and *Heavy Work* requires a long and *Soaking Pull*.

A long or a *Soaking* or *Easie Pull*, is when the *Form* feels the force of the *Spindle* by degrees, till the *Bar* comes almost to the hither *Cheek* of the *Press*, and this is also call'd a *Soft Pull*; because it comes Soft, and Soakingly and easily down: And for the contrary reason the *Short Pull* is call'd an *Hard Pull*, because it is suddenly perform'd.

That which makes a *Hard Pull*, is putting into the Mortesses in the *Cheeks* solid Blocks of Wood, which will scarce Squeeze by the Strength of a *Pull*: And that which causes a *Soft Pull* is putting in pieces of Felt or Pastboard (as aforesaid) which being Soft will Squeeze and retain their Spring for a considerable time, yet will at length grow hard with Working, and then the *Pull* grows *Longer*; which the *Press-man* mends, by putting in another Felt or Pastboard into each Mortes.

The *Head* cannot be conveniently and well *Justifyed* soon after the laying of the *Stone*, if it be *Laid* on Bran, because though the Force of the *Spindle* will at the immediate time of the *Pull* Squeeze the Bran in the *Coffin* close, yet so soon as the force of the *Spindle* is off the Bran, all its dry parts, by their several irregular positions, will like so many Springs, at the same moment of time endeavour to recover their Natural tendency, and heaves the *Stone* upwards again: So that generally for a day or two Working the *Stone* will not lye Solid, though at length through the often and constant Squeezing the Bran it will. But if the *Stone* be *Laid* on Brown Paper, or Plaister of Paris, it quickly finds a Solid Foundation.

When the *Press-man Justifies* the *Head*, he unscrews

screws the *Female Screws* of the *Head Screws*, that the weight of the *Head* may draw it down, to make room to put the *Justifyers* into the Mortesses in the *Cheeks*; and when he has put in so many as he thinks convenient, he *Screws* up the *Head* again as hard as he can. Then lays the *Cards* on the *Form*, on the *Press*, and *Runs in* the *Carriage* under the *Plattin*, and *Pulls* hard upon it, while his *Companion Screws* up the *Head* as hard and tight as he can, that the *Carriage*, *Tympan*, &c. may *Run* the freelier under the *Plattin*.

¶ 6. *Of* Oyling *the Iron Work of the* Press.

The *Ribs*, the *Tympan Joynts*, the *Frisket Joynts*, the *Garters*, both ends of the *Rounce-Spindle*, the *Nut* and *Spindle*, and the *Toe* of the *Spindle*, are all to be well Oyl'd; that they may all perform their several offices the easier, lightlier and nimbler; both *Upper* and *Under hand*.

All but the *Nut* and *Spindle*, and *Toe* of the *Spindle*, are Oyl'd with a Feather dipt in a spoonful, or little Pot, or Oyster-shell, &c. of Sallad Oyl; and that feather dabb'd upon so much of the *Ribs* as he can come at, at either end of the *Press*: For then by *Running* the *Carriage* three or four times quick *Out* and *In*, it dispersses the Oyl equally the whole length of the *Ribs*, and at the same time Oyls the *Cramp-Irons*.

And for Oyling the *Joynts*, he commonly takes out the *Pins* and Oyls them, and puts them in again; and with the edge of a Feather dabs a little

little Oyl between the Crevices of the *Joynts*.

He thrusts the Feather in between the *Spindle* of the *Rounce* and its *Collers*.

To Oyl the *Nut* and *Spindle*, he pours a good quantity of Oyl in at the *Hole* in the *Head*, and with a Cork stops the hole again to keep out dust and filth: Then drawing the *Bar* quick to and fro about half a score times, he works the Oyl equally about the *Nut* and *Spindle*.

To Oyl the *Toe* of the *Spindle*, he pours about a Spoonful of Oyl into the *Plattin-pan*.

¶ 7. *Of* Making Register, *and* Making Ready *a* Form.

A curious *Press-man* will take care that against the *Compositer* brings a *Form* to the *Press* his *Press-stone* be wip'd very clean; for if any (though small) hard extuberant matter lye on it, the *Letter* that lyes on that extuberant matter will, with *Pulling*, quickly *Rise*, and not only Print harder than the rest of the *Form*, but bear the force of the *Plattin* off of the *Letters* adjacent to it. And therefore many times a *Press-man* will receive the *Form* from the *Compositer* when he has only Set the *Form* on the side of its *Chase* upon the *Press-stone*, that he may be the Surer the *Face* of the *Stone* is clean when he layes the *Form* down; as also that he may carefully examine that the backside of the *Form* is clean before he goes about to make *Register*, or otherwise make ready his *Form*.

Making Register is to *Quoin* up a *Form* and otherwise alter *Whites* (if need be) between the *Crosses* and *Pages*: So as that when a second *Form* of the same *Vo-*

lumne, *Measure* and *Whites*, is plac'd in the same position, all the Sides of each *Page* shall fall exactly upon all the Sides of the *Pages* of the first *Form*.

The first process a *Press-man* makes towards this Operation, is the chusing and placing of his *Points*: For to large Paper he chuses *Short Shanked Points*, and to small Paper *Long Shanked Points*, and proportionable to intermediate sizes of Paper: For his *Points* ought to be placed so as that when he is in his Train of work, they prick the *Point-holes* within the grasp of the hollow between his hand, Thumb, and Fore-finger; because when he shall Work the *Reteration* he may the better manage and Command the sheet he lays on the *Tympan* and *Points*.

Nor will he place his *Points* too near the edge of the *Paper*, because when he Works the *Reteration*, he would be forc'd to carry his furthermost *Point-hole* the further from him, which in a long train of Work loses Time: For the *Laying Sheets* quickly on their *Point-holes* adds much to riddance. So also the less distance between the further and hither *Point-hole* makes more riddance than if they are far distant; because he must draw his Body so much the further back to place that *Hole* on its *Point*. Therefore he places the hither *Point* farther into the Paper than the farther *Point*, if it be *Folio*, *Quarto* or *Octavo*, but to *Twelves* equally distant from both edges of the Paper.

By placing the *Points* unequally from the edges of the Paper, as in *Folio's*, *Quarto's* and *Octavo's* (as aforesaid) he also secures himself the more from a *Turn'd Heap* when he works the *Reteration*; be-

cauſe without very much altering the *Quoins*, he ſhall not be able to make *Regiſter:* And *Preſs-men* (eſpecially if they Work upon the ſame ſort of Work) ſeldom or never remove the *Quoins* on the further ſide the *Carriage*, nor on the right hand end of the *Carriage*, but let them lye as gages for the next *Form:* For thruſting the *Chaſe* cloſe againſt theſe *Quoins*, the *Regiſter* is almoſt (if not quite) made: The *Compoſiter* having before, according to his Task, choſen the *Chaſes* exactly of an equal ſize, and made ſtrait and equal *Whites* between the *Croſſes*, &c.

Having choſen his *Points*, he places them ſo that they may both ſtand in a ſtraight line parallel with the top and bottom ſides of the *Tympan*; which to know, he ſtrains a Packthred croſs the whole *Tympan*, laying it at once upon the middle of the *Heads* of both the *Point-Screws*, (for we will ſuppoſe the Joyner hath made the Morteſſes into which the *Point Screws* are Let, parrallel with both the ends of the *Tympan*) then if both the *Points* ſtand in that ſtraight line they are parrallel, if not, he moves one or both of them upwards or downwards till they do, and then *Screws* them faſt.

Then he layes the *Tympan* down upon the *Form*, holding the *Friſket-end* of it in his Left-hand, about an Inch or an Inch and a half above the *Face* of the *Letter*, and Sinks his Body downwards till he can ſee between the *Form* and *Tympan*, and with the Ball of the middle finger of his Right-hand preſſes a little gently upon the *Tympan* juſt over the *Point-ends* of each *Point* ſucceſſively, to ſee if the *Points* fall in or near the middle of the *Slits* in the *Short-*

Short-Croſs. If they fall exactly in the middle of thoſe *Slits*, the *Form* lyes right between the middle of both the ends: If they fall not exactly in the middle of both theſe *Slits*, he moves the *Form* between the ends of the *Carriage*, till they do, and then *Quoins* up the two ends of the *Chaſe*.

Then laying the *Tympan* flat down upon the *Form*, he layes the *Blankets* in it: (They are call'd the *Blankets* though generally it is but one *Blanket* doubled:) Then he puts the *Iron-Pins*, faſtned through the hither ſide of the Inner *Tympan* into the Holes made through the hither ſide of the outer *Tympan* for Gages: And turning about the Tongues of the *Iron-Buttons*, that are fitted into the outer Side of the outer *Tympan* over the upper Side of the *Inner-Tympan*, he *Screws* the *Button* faſt down. He alſo *Screws* down the *Iron-Button* at the end of the *Tympan*. Theſe *Buttons* thus Screwed down are to keep the *Inner-Tympan* faſt in, that it Spring not upwards.

Then he Folds a ſheet of the Paper he is to Work long-ways, and broad-ways, and lays the long Creaſe of it upon the middle of the *Long-Croſs*; and the Short Creaſe over the middle of the *Gutters* of the *Short-Croſs*, if the *Short-Croſs* lye in the middle of the *Form*, (for in *Twelves* it does not, but then he gueſſes at the middle;) then wetting his *Tympan* (as ſhall in proper place be ſhewed) he turns it down upon the Paper, and *Running in* the *Carriage*, *Pulls* that Sheet, which with the force of the *Pull* now the *Tympan* is wet, will ſtick to the *Tympan*; and turning up the *Tympan* again ſees how well the Sheet was laid; that is, how even it was Laid: For

if it was laid even on the *Form*, the *Margin* about the out sides of all the outer *Pages* will be equal; But if the Sheet be not laid even, he lifts it up Side by Side till he have loosen'd it from the *Tympan*, and removes it by his discretion till it be laid even: And then *Pulls* again upon it to fasten it to the *Tympan*. This Sheet is call'd the *Tympan-sheet*.

Then he lays another Sheet even upon the *Tympan-sheet*, for a Register Sheet, and a Waste Sheet over that to keep it clean from any filth the *Face* of the *Letter* may have contracted and imprint upon it, and *Pulls* these two Sheets. Then he *Runs out* the *Carriage*, and takes up the *Tympan*, and takes off the two Sheets, laying the waste Sheet by: But turns the other Side of the *Register-Sheet* the proper way his Volumne requires, *viz.* end-ways if it be *Octavo* or *Folio*; or Side-ways if *Twelves* or *Quarto*, &c. as at large you see in the Section of *Imposing*. And laying the *Point-holes* in the *Register-Sheet* over the *Points*, lays his waste Sheet on again, *Runs-in* the *Carriage*, and *Pulls* upon that the Second side of the *Register-sheet*, to try how well the Impression of the Sides of all the *Pages* agree, and lye upon the Impression in the first *Pull'd* Side. If he finds they agree perfectly well, *Register* is made. But if the Impression of the last *Pull'd* Side of the *Register-sheet* stand be-hither the Impression of the first *Pull'd* side, either the whole length of the Sheet or part, he observes how much it stands be-hither: If the thickness of a *Scaboard*, a *Nomparell*, a *Long-Primmer*, &c. he loosens the *Quoin* or *Quoins* on the farther side of the *Carriage*, and opens one or both of them, *viz.* removes

moves them backwards till they stand a *Scaboard*, a *Nomparell*, a *Long Primmer*, &c. off the sides of their respective Corners: Then *Knocks* up one or both the opposite *Quoins*, till he have removed the *Chase*, and the *Chase* by consequence has forc'd the opened *Quoin* or *Quoins* close against their Corners. Or if the Impression of the last *Pulled Side*, stands within the Impression of the first *Pulled Side*; he observes how much also; and Loosning the hither *Quoin* or *Quoins*, and *Knocking up* the opposite as before, makes *Register*, for the Sides of the Sheet.

Then he observes how the *Register* of the *Head* and *Foot* agrees. And if he finds it agrees on both sides the *Short Cross*, he has good *Register*; supposing the *Compositer* has performed his Office, *viz.* made all his *Pages* of an equal Length, &c.

If the Impression of the Last *Pulled Sheet*, lye without the Impression of the first *Pulled Sheet*, towards the upper or lower end of the *Tympan*, he opens the *Quoins* at the respective end, and *Knocks-up* the opposite till he have made *Register*: Which to try he *Pulls* another clean *Register-sheet* as before. And if he finds *Register* agree on all the Sides of the *Form* the Task is performed: If not, he mends as aforesaid till it do.

But it sometimes happens that the *Compositer* has not made an exact equal *White* between all the sides of the *Crosses*: In this case, altering the *Quoins* will not make good *Register*; wherefore the *Press-man* observes which side has too much or too little *White*; and unlocking the *Form* takes out or puts in such a number of *Scaboards* as he thinks will make good

Regiſter: which he tryes by *Pulling* a Sheet, and if need be, mending as before, till he have *Pull'd* a Sheet with good *Regiſter.*

Although the *Preſs-man* have made *Regiſter*, yet he muſt further *Make Ready* the *Form* before he can go to Work upon it. Under this phraſe of *Making Ready the Form* is comprehended many Conſiderations, leading to ſeveral various Operations; For firſt, The *Friſket* muſt be *Cut:* which to perform, the *Preſs-man* fits the *Match-Joynts* of the *Friſket* into the *Match-Joynts* of the *Tympan*, and pins them in with the *Friſket-pins:* And having *Beaten* the *Form*, turns down the *Friſket* and *Tympan* on the *Form.* And having alſo Rubbed the *Blankets* to ſoften them, lays them ſmooth and even in the *Outer-Tympan*, and *Pins* the *Inner Tympan* in upon them, as was ſhewed in the beginning of this ¶, and *Pulls* as before, and as ſhall farther be ſhewed in ¶ 15. upon the bare *Friſket.*

Then he *Runs out* the *Carriage*, and takes up the *Tympan* and *Friſket* together off the *Form* and lays them on the *Gallows*; Then takes the *Friſket-pins* out again, and takes off the *Friſket:* And laying it flat on a *Paper-board*, with the point of a Pen-knife cuts through the *Friſket* about all the Sides of each *Page*, allowing to each *Page* he thus cuts out of the *Friſket* about a *Nomparil Margin* on all the ſides of the cut cut *Pages*: Then he puts and pins his *Friſket* again on the *Tympan*, as before.

2*dly*, He takes care that the *Tympan* be well *Wet*; which he does by ſqueezing Water out of a *Spunge* on the backſide of it, till it be well Wet all over, and well ſoak'd and limber. 3*dly*,

3*dly*, That the *Form* be well and faſt *Lock'd up.*

4*thly*, That no *Letters* or *Spaces* lye in the *White-lines* of the *Form*; which may happen if the *Compoſiter* have *Corrected* any thing ſince the *Form* was laid on the *Preſs*, and the *Compoſiter* through overſight pickt them not all up.

5*thly*, If any *Wooden Letters* or other *Cuts* be in the *Form*, that they be exactly *Letter-high*: If not, (for it ſeldom happens they are) he muſt make them ſo; If they are too *Low*, (as they generally be) he *Under-lays* them: But firſt He examines how much they are too *Low*, by laying one Card or one Scaboard or two Scaboards, or a Scaboard and a Card, &c. upon the Face of the *Wooden Cut*, and gently feeling with the Balls of the Fingers of his right Hand if the intended *Under-lay*, viz. the Scaboard, Card, &c. lye exactly even with the *Face* of the *Letter*, If it do not, he tries thicker or thinner *Under-lays* till he have evened the *Under-lay* with the *Face* of the *Letter:* For then the Balls of his Fingers will go ſmoothly and equally over the *Under-lay* and the *Face* of the *Letter*, as if they were one and the ſame Superficies.

Having evened his *Under-lay*, he *Unlocks* that *Quarter* it is in, and takes the *Wooden Cut* out of the *Form*, and cutting a Scaboard or Card or what it wants a little ſmaller than the bottom of his *Wooden Cut*, he lays it into the place he took the *Wooden Cut* out of, or elſe he Paſts the *Under-lay* on the bottom of the *Wooden Cut*, and puts the *Wooden Cut* into its place again upon the *Under-lay.* But yet he truſts not to his Judgment altogether for the thick-

neſs

neſs of the *Underlay*: But *Locking up* the *Form* again, *Pulls* the *Cards* upon it to ſink it as low as it will go, and *Beats* and *Pulls* a Sheet to ſee how it pleaſes him. If it be too low, which he finds by the Pale Printing of it, he *Underlays* it a little more, and again trys by Printing till it pleaſes him. But by no means he lets the *Cut* ſtand too high, though but a ſmall matter, For then it will Print too *Hard* and too *Black*, and deface the beauty and fairneſs of the *Cut*; So that it may better ſtand about half a Card too low, than in the leaſt too high.

If the *Wooden Cut* be too high, he cauſes a Joyner to Plain off ſome at the bottom.

6thly, If a *White Page* or *Pages* happen in a *Form*, and he uſes a *New-drawn Friſket*, then he does not *Cut out* that *Page*: But if he Work with an *Old Friſket*, and that *Page* is already *Cut out*, he Sews, or ſometimes Paſtes on a Scaboard, if the *Page* be not too broad, or a ſtrong Paſteboard to the *Sides* and *Croſſes*, to cover the *White-page* in the *Form*, that it Print not Black.

If the ſides of the *Pages* adjacent to the *White-page* Print *Hard*, as moſt commonly they do, becauſe the *White-page* is generally lower than *Letter* high, ſo that the force of the *Spindle* ſqueezes the yielding *Paper*, *Tympan* and *Blankets* below the Plain of the *Face* of the *Letter*; and beſides the force of the *Spindle* falling upon the center of the *Plattin*, and the Plain of the *Plattin* not finding reſiſtance to entertain it equally, preſſes lower down upon the low *White-page*, than upon the *Face* of the *Letter*; ſo that the *Preſs-man* either *Underlays* the *White-page*,

page, as he does *Wooden Cuts*, or elſe he fits a *Bearer* on the *Friſket*.

The *Bearer* is a *Riglet* of a convenient thickneſs: and this convenient thickneſs the *Preſs-man* finds as I ſhewed you how he found the thickneſs of his *Underlays* for *Wooden Cuts*; only with this difference, that as then he made his *Wooden Cut* exactly *Letter-high*, ſo now he maks his *Bearer* and the *Furniture* his *Bearer* bears on *Letter-high*: Wherefore he Paſts one ſide of his *Bearer*, and lays it as he would have it on the *Furniture*, with the Paſted ſide upwards; and laying his *Tympan* and *Friſket* down upon the *Form*, with his Fingers preſſes on the outſide the *Inner-Tympan Friſket* and all, upon the place where the *Beares* lies; So that with the Paſte the *Bearer* ſticks to the ſide of the *Friſket*, which he takes up again: and if he thinks the Paſte not ſtrong enough to hold it till the *Form* is wrought off, he ſews it to the *Friſket* by pricking his Needle on both ſides the *Bearer*, and laſhing the Thred over it ſo often till he thinks it faſt enough ſew'd on.

7thly, He examines whether the *Friſket Bites* not: That is, whether no part of it Print upon any of the ſides of any of the *Pages*: if they do he cuts away ſo much and about a *Nomparel* more off the *Friſket* where it *Bites*.

8thly. He examines if the *Beards* of the *Letter* Print at the Feet of the *Pages*: If they do, He conſiders whether the too ſhort or too far *Running* in of the *Carriage* cauſes it. Or whether it be only the *Beard* of a ſhort *Page* that Prints; If it be the *Beard* of a ſhort *Page* that Prints, he remedies it with an

Under-lay as I ſhewed he did in the *White Page*.

If the *Carriage* be *Run* in too ſhort, and the *Feet* of the *Pages* ſtand towards the *Plattin*, the *Hind-ſide* of the *Plattin* will preſs ſtrong upon the *Feet* of thoſe *Pages* : And if the *Carriage* be *Run* in too far, the *Feet* of the *Pages* that ſtand towards the hinder *Rail* of the *Tympan* will moſt feell the force of *Plattin*, and according to a greater or leſs proportion of that force, and to the ſoftneſs or yielding of the *Paper*, *Tympan*, and *Blankets*, and all other *Springs* in the *Preſs*, mentioned in §. 11. ¶ 1. of this *Volnmne*, the *Feet* of the *Pages* and *Beard* of the *Letter* will more or leſs Print *Hard*.

Wherefore in this caſe he *Runs* the *Carriage* under the *Plattin*, till the farther Edge of the *Plattin* juſt cover the *Feet* of thoſe *Pages*, and with a piece of Chalk makes a White ſtroke over the *Board* of the hither ſide of the *Carriage* behind, and the upper ſide of the *Rail* of the *Ribs* : Then he *Runs* in the *Carriage* again, till the Foreſide of the *Plattin* juſt cover the *Feet* of the *Pages* next the *Hind Rail* of the *Tympan*, and makes another mark with Chalk on the *Rail* of the *Ribs* to joyn with the mark he firſt made on the *Board* of the *Carriage*. Then he *Runs* out the *Carriage*, and lays the *Tympan* down on the *Form* ; and *Runs* in the *Carriage* again till he joyn the mark or line he made firſt on the *Carriage-board* and *Rail* of the *Ribs*, and makes a mark with Chalk on the farther *Rail* of the *Tympan* juſt range with the Fore-ſide of the *Plattin*. This mark on the *Tympan* ſhews him how far he muſt *Run* the *Carriage* in againſt the Fore-edge of the *Plattin* for the *Firſt Pull*. Then he *Runs*

Runs in the *Carriage* farther, till he joyn the ſame Mark or Line on the *Carriage-board* to the ſecond Mark he made on the *Rail* of the *Ribs*, and makes another Mark on the further *Rail* of the *Tympan* juſt range with the Fore-ſide of the *Plattin*, for the Mark he is no *Run* the *Carriage* in to againſt the Fore-edge of the *Plattin*, for his *Second Pull*.

9*thly*, He Examines if the *Catch* of the *Bar* will hold the *Bar* when the *Spindle* makes a ſmall Spring, *viz.* When the *Bar* flies but a little way back from the preſſure of the *Form* : If it will not, he knocks up the *Catch* a little higher till it will, and then Screws the *Screw* on the *Shank*, and conſequently the *Catch* cloſe and firm againſt the *Cheek* of the *Preſs*.

But if the *Catch* ſtand too high, ſo that it will not without a great Spring, (*viz.* when the *Bar* is *Pull'd* hard from the farther *Cheek*) fly up ; He then knocks upon the top of the *Catch* to ſink it lower ; And when it is well fitted Screws it up again, as before.

If the *Catch* of the *Bar* ſtand too Low, it will not hold the *Bar* ; But it will *Come down* again of it ſelf when he is in his train of Work : For if, as it often happens, he lets the *Bar* fly harder than ordinary back, or if it ſlip out of his Hand, it will knock hard againſt the *Cheek*, and Spring back again.

If the *Catch* of the *Bar* ſtand but a little too High, the Violence of the *Bars* flying back to make it ſtick on the *Catch* will ſoon Looſen the Square of the *Bar* in the *Eye* of the *Spindle* ; and indeed ſubject the whole *Preſs* to an unſtable condition.

This is another caſe and convenience theſe New-faſhioned *Preſſes* gives the *Preſs-man* : For in the Old

make of the *Press*, when the *Catch* of the *Bar* holds too hard, or too soft, he is troubled to Raise or Sink the *Catch* with the thickness of *Scaboards*, which being indevisable, does not without trouble or luck justen it to an exact Heighth. And besides, These *Under-lays* being but put under the *Catch* upon the *Wooden Bearer* without any Fastning, are very subject to work out by the constant disturbance the motion of the several Parts of the *Press* (when at work) gives it: Or else (which is worse) he many times is forced to batter the *Cheek* of the *Press*, with drawing and driving of Nails out and in it, to fit on another *Catch* bigger or lesser, whereas here with a softer or an harder knock of the Hammer (as aforesaid) he Raises or Sinks the *Catch*, and afterwards Screws it firmly up.

10*thly*, He considers whether the *Stay* of the *Frisket* stands neither too forwards or too backwards. The *Stay* may stand too forwards, though when it is leisurely turn'd up it stays the *Frisket*: Because, when the *Press-man* is in a Train of Work, though he generally throws the *Frisket* quick up with an accustomed, and as he intends, equal strength; yet if his guess at strength in throwing it up varies, and it comes (though but a little) harder up, the *Batten* fastned on the *Cap*, and the Perpendicular *Batten* fastned to the aforesaid *Batten* (as is described in §. 11. ¶ 21. of this Volumne) will by their shaking cause a Spring, which will throw the *Frisket* back again upon the *Tympan*: Nay, though (as sometimes it happens) a solid Wall serves to do the Office of a *Stay* for the *Frisket*; yet with a little too hard throwing it up, the

the *Frisket* it self will so shake and tremble (its Frame being made of thin Iron) from end to end, that e're it recover rest, its own Motion will by the quick running of a Spring through it beat it back again.

If the *Stay* stand too backward, then after he has given the *Frisket* a Touch to bring it down, it will be too long e're it come down, and so hinder his Riddance.

Therefore he places the *Stay* so, that the *Frisket* may stand but a little beyond a Perpendicular backwards, that with a near-guess'd strength in the tossing it up it may just Stand, and not come back; For then with a small Touch behind, it will again quickly come down upon the *Tympan*.

11*thly*, He considers the Scituation of the *Foot-step*, and that he places so as may best suit with his own Stature; For a Tall man may allow the *Foot-step* to stand farther off and lower than a Short, because his Legs reach farther under the *Carriage*, and can tread hard to add strength to his *Pull*; when a Short man must strain his Legs to feel the *Foot-step*, and consequently diminish the force of his *Pull*.

12*thly*, He fits the *Gallows*, so that the *Tympan* may stand as much towards an upright as he can: Because it is the sooner clapt down upon the *Form* and lifted up again. But yet he will not place it so upright, but that the White Sheets of Paper he lays on it may lye securely from sliding downwards: And for *Reteration* Sheets their lying upon the *Points* secures them.

In these New-fashioned *Presses* there is no trouble to place the *Gallows*, so as it may mount the *Tympan*

to any Position: For sliding the *Male-duftails* made on the *Feet* of the *Gallows* through the *Female Duftails* fastned on the *Planck* of the *Carriage*, performs this great trouble that in our English *Presses* requires Unnailing the Studs of the *Gallows* and Nailing them again; and many times tearing them and the *Carriage-Planck* to pieces: And that so oft as the fancy of the *Press-man* alters, or another Work-man comes to Work at that *Press*.

13*thly*, Few *Press-men* will Set the range of the *Paper Bench* to stand at right angles with the *Plank* of the *Carriage*: But draws the farther end of the *Paper Bench* so as the hither side may make an Angle of about 75 Degrees (more or less) with the hither side of the *Carriage*: The reason is, if the hither side of the *Paper Bench* stand at right Angles with the hither side of the *Carriage*, he must carry his Hand farther when he *Lays out Sheets* which would hinder riddance: Besides his *Companion* has a nearer access to it, to look over the *Heap*; which he frequently does, to see the constant Complexion of the Work.

14*thly*, The *Press-man* brings his *Heap* and Sets it on the hither end of the *Paper Bench* as near the *Tympan* as he can, yet not to touch it, lest it stop the *Tympan* in a train of Work: and he places an end of the *Heap* towards him. Then taking off the *Paper-board* that cover'd it when it was Prest, he lays the long sides of it parallel to the sides of the *Paper Bench*: Then he takes the uppermost Sheet (which as you may Remember is a Waste-sheet) and lays it on the empty *Paper-board*; And taking Three or Four or Five Quires off his *Heap* in both his Hands, he

he lifts it a pretty height above his Head, and claps it as hard as he can down upon the rest of the *Heap*, to loosen the Sheets that with Pressing stick close together: And not thinking them yet loose enough, he thrusts them long-ways and side-ways, heaving and huffing them till he think he has pretty well loosen'd or hollow'd that quantity of Paper.

Then with the nail of his Right Hand Thumb, sloaping from his Thumbward, he draws or slides forwards the upper Sheet, and two or three more commonly follows gradually with it, over the hither edge the *Heap*, to prepare those Sheets ready for him to snatch off the *Heap*.

15*thly*, He considers if the *Face* of the *Tympan* be moist enough, for a *Tympan-sheet* to stick to, for though he Wet the back-side of it before to supple it, yet if the *Tympan* be strong, the Water will not soak quite through to moisten the *Face*, So that he wets the Spunge in fair Water, and besprinkles the upper side or *Face* of the *Tympan* all over: And squeezing the Water that is left in the Spunge well out again, rubs it quickly and gently all over the *Face* of the *Tympan*, to drink up or lick off the body of Water that he besprinkles on, and only leaves moisture on the *Face* of the *Tympan* to hold the Sheet.

Here accrews now a benefit by the make of these New-fashioned *Presses* to the Master *Printer*: For these *Presses* having a *Gutter* fastned to the *Hind-rail* of the *Carriage* (as was described in § 10. ¶ 9. of this Volumne) to receive the Water that falls from the *Tympan*, and to convey it beyond the farther side of the *Press*, secures the *Blank* of the *Carriage* from

from Wet and moisture, and consequently from that cause of Rotting.

Then he takes a Sheet of Paper off the *Heap* for a *Tympan-sheet*, and Folds it exactly into four quarters, and lays the Creases of the Sheet exactly upon the middle of the *Short* and *Long Crosses*, if the Volumn of the *Form* allows them both to be in their respective middles of the *Chase*; if not, he lays the Creases exactly against the Notches in the *Chase* that are made for them respectively: And if his *Frisket* be Blackt with former Work, he lays a Sheet of Waste-Paper upon the Creast-sheet: Then lays the *Tympan* down on the *Form*, and *Pulls* on these two Sheets, and takes up his *Tympan* again, and lays by the Waste-Sheet; but the Creast-Sheet he lays on the *Tympan*. But first presses the *Tympan* downwards, from under the Shank of each *Point* successively, puts the two opposite sides of the Sheet under the *Shancks* of the *Points*, and the *Holes* the *Points* prickt with *Pulling* exactly under the bottom Revits of the *Points*: Then taking a little Paste on the Ball of one of his fingers, a little besmears the under corners of that Sheet, and claps them down close on the *Tympan*, that the Sheet may stick: But the bottom corner of that side the Sheet that is next to him, he besmears within the Matter of the Sheet, *viz.* within the Impression the *Form* made. For when he has fastned that corner down, he tears off the *Margin*, (by guess) in a straight line athwart the very corner, that it may not lye in his way to catch at as he *Takes off Sheets*, when he is in his train of Work.

This Sheet is called the *Tympan-sheet*; and is only as

as a standing mark to lay all the other Sheets exactly even upon, while he Works upon *White-paper*.

The *Press-man* does now suppose he has *Made Ready*: Yet for assurance he will try his *Register* once more, lest some of the *Quoins* should have slipt. How he made *Register* I shewed you before, wherefore if his *Register* be not good, he mends it as I there shewed. But we will suppose it now good, wherefore he gently *Knocks* up all the *Quoins* in the corners, with an equal force to fasten them.

Though I have in Numerical order set down these Operations, Circumstances and Considerations in this ¶: yet does not the *Press-man* oblige himself to observe them in this or any other orderly succession: Because it often happens that some of these Operations may more readily be performed out of this or any other prescribed Order.

¶ 8. *Of* Drawing *the* Tympans *and* Frisket.

Drawing the *Tympans* or *Frisket* is the Covering and Pasting on of Vellom, Forrels or Parchment upon the *Frames*. To each *Tympan* and *Frisket* is chose a Skin large enough to cover and lap about the Frames.

These Skins the *Press-man* rumples up together, and puts them into a Pail of fair Water to soak; and if he thinks they do not soak fast enough, he takes them and rubs them between his Hands, as Women wash Cloaths, to supple them, that the Water may Soak the faster in. And being throughly Soakt he wrings the Water as well out as he can.

Then the Boy having provided a Brush and about

a Pint of Paſte, made of fine Wheaten Flower, well boiled in fair Water to the conſiſtency of Haſty-pudding, he ſpreads the Skin flat upon a Table; and firſt Paſtes the under Side of the *Tympan*; then lays it on the middle of the Skin, and rearing each ſide ſucceſſively up, Paſtes the Skin alſo from the inſides the *Tympan* to the outer edges of the Skin, and lays the *Tympan* down flat again: Then he Paſtes all the other ſides of the *Tympan*, and wraps the Skin about the two long Sides firſt, Cutting the Sides of the Skin away ſo much, till he leaves only enough to reach almoſt quite through the under-ſides of the *Tympan* again: Then drawing and ſtraining the Skin tighter, he drives in the points of two-penny or three-penny Nails about ſix Inches diſtant from one another, to keep the Skin from ſtarting as it Dries.

Having thus Drawn the ſides, he with the Point of a Pen-knife cuts ſquare holes in the Skin, juſt where the *Iron-Joynts* fall, for the Joynts to fall into, and Draws and Strains the ends of the *Tympan* as he did the Sides; wrapping the ends of the Skin under the under-ſides of the *Tympan*, and where Wood is, drives in the points of Nails, as before.

Then ſetting it by to dry; when it is dry, he draws the Nails.

As he Drew this *Tympan*, ſo he Draws the other: and the *Friſket* alſo: only, becauſe he cannot drive in Nails, (the *Friſket* being all made of Iron) he doubles the Skin over the ſides of the *Friſket*, and being well Paſted, as aforeſaid; he Sews the ſides that Lap over down upon the whole Skin, to keep it from ſtarting while it drys: And he Paſtes a Sheet or

or two Thick of Paper all over the inſide of it; as well to ſtrengthen as to thicken it.

¶ 9. *Of Wetting Paper.*

Paper is commonly *Wet* in a Tray full of fair Water. The *Preſs-man* places the length of the Tray before him; his dry *Heap* on the Left Hand the Tray, and a *Paper-Board* with its Breadth before him on his Right Hand of the Tray: He lays firſt a Waſte Sheet of Paper on the *Paper-board*, leſt the Board might Soyl or foul the firſt Sheet of the *Heap*. Then he takes up the firſt *Token*, and lays it in ſuch a poſition that the backs of the Quires lye towards his Right Hand, that he may the readier catch at the Back of each Quire with his Right Hand, when he is to *Wet* it: And he lays that *Token* athwart, or ſomewhat Croſſing the reſt of the *Heap*, that he may the eaſier know when he has *Wet* that *Token*.

Then taking the firſt Quire of the *Heap* with the back of it in his Right Hand, and edge of the Quire in his Left, he lays the Quire down upon the Waſte Sheet, ſo, as that the back of the Quire lye upon the middle creaſe of the Waſte Sheet, and conſequently one half of the Quire already laid even down upon one half of the Waſte Sheet. If the Paper be Strong, he opens about half the Quire, and turns it over dry upon the other half of the Waſte Sheet: But if the Paper be Weak and Spungy, he opens the whole Quire, and lays that down Dry.

The reaſon why he lays the firſt Laying-down Dry, is, becauſe it lying under the reſt of the *Heap*

will ſufficiently imbibe the moiſture that Soaks from it: And the reaſon why he leaves but half a Quire Dry for ſtrong Paper, and an whole for Spungy, is, Becauſe Spungy Paper Soaks in moiſture faſter than Strong.

Having laid down his Dry Laying, he takes another Quire off the Dry *Heap*, with the back of the Quire in his Right Hand, and the edge of the Quire in his Left, (as before,) and cloſing his Hand a little, that the Quire may bow a little downwards between his Hands, he Dips the back of the Quire into his Left Hand ſide of the Tray of Water: And diſcharging his Left Hand of the Quire, Draws the Quire through the Water with his Right; but as the Quire comes out at the Right Hand ſide of the Tray, he nimbly catches the edge of the Quire again in his Left Hand, and brings it to the *Heap*, but by lifting up his Left Hand bears the under ſide of the Quire off the Dry Paper, laid down before, leſt the Dry Sheet ſhould ſtick to the Wet, before he have plac'd the Quire in an even poſition, and ſo perhaps wrinkles a Sheet or two, or elſe put a Dry Sheet or two out of their even poſition, on the ſides or ends.

But this Drawing the Quire through the Water he performs either nimbly or ſlowly: If the Paper be Weak and Spungy, he performs it quickly; if Strong and Stubborn, ſlowly.

To place this Quire in an even poſition, he lays the back of the Quire exactly upon the opening creaſe of the former Quire, and then lets the ſide of the Quire in his Left Hand fall flat down upon the *Heap*; and diſcharging his Right Hand, brings it to the

the edge of the Quire; and with the aſſiſtance of his Left Hand Thumb (ſtill in its firſt poſition) opens or divides either a third or half of the whole Quire, according to the quality of the Paper, (as was ſaid before,) and ſpreading the Fingers of his Right Hand as much as he can through the length of the Quire, turns over his opened diviſion of the Quire upon his Right Hand ſide of the *Heap*.

The reaſon why he ſpreads the Fingers of his Right Hand as much as he can through the Length of the Quire; is, becauſe the outſide Half Sheet is Wet, and conſequently quickly Limber, ſo that if the Paper be Weak, it would fall Down before the reſt of his Opening, and double into wrinkles, which thus ſpreading his Fingers prevents.

In the ſame manner he Wets all the Quires of his Dry *Heap*. *See Plate* 29.

But having Wet his firſt *Token*, he doubles down a great corner of the upper Sheet of it on his Right Hand, ſo as the farther corner may lye a little towards the Left Hand of the creaſe in the middle of the *Heap*, and ſo as the hither corner may Hang out on the hither ſide of the *Heap* about an Inch and an half: This Sheet is called the *Token-Sheet*, as being a mark for the *Preſs-man* when he is at Work to know how many *Tokens* of that *Heap* is *Wrought-off*, and conſequently to know how many is to Work.

When he has Wet the firſt *Token*, he removes the next uppermoſt Dry *Token* askew on the Dry *Heap*, and ſucceſſively all the reſt, as I ſhewed in the beginning of this ¶.

Having Wet the whole *Heap*, he lays a Waſte

Sheet of Paper upon it, that the *Paper-Board* to be laid on, Soyl not the last Sheet of the *Heap*: Then three or four times takes up as much Water as he can in the hollow of his Hand, and throws and sprinkles it all over the Waste-sheet that it may moisten and Soak downwards into the un-wet upper part of the last Division of the Quire.

The Paper being thus Wet, he takes up the whole *Heap* upon the *Paper-board*, and sets it by in a convenient place of the Room, and lays another *Paper-board* upon it: And upon the middle of the *Paper-board*, sets about Half an Hundred Weight, and lets it stand by to press, commonly till next Morning: For *Press-men* generally Wet their Paper after they have left Work at Night.

The manner how Paper is *Set out*, shall be shewed when I come to the Office of the *Warehouse-keeper*.

¶ 10. *Of* Knocking up *the* Balls.

Ball Leathers (as I said before in § 11. ¶ 21.) are either *Pelts* or *Sheep-skins*: If *Pelts*, they are chosen such as have a strong Grain, and the Grease well Wrought out of them: They are either Wet or Dry before they come to the *Press-mans* use: If Wet, he having before-hand provided a round Board, of about Nine inches and an half Diameter: Supposing the *Ball-stocks* to be six Inches diameter, lays the Round Board upon the whole *Pelt*, and cuts by the out-side of the Board so many round pieces as he can out of the *Pelt*, reserving two for his present Use.

And hanging the rest up (commonly upon the *Braces*

Braces of the *Press*) to dry, that they may not Stink or Mould before he have occasion to use them.

But if his *Pelts* are Dry, he lays them to Soak (by choice in Chamber-ly) but I never heard, or by my experience could find why it is preferred before Fair Water: For the purpose of Soaking them is only to supple them.

If he Work with Leather, It is chosen with a Strong and close grain: Wherefore by experience it is found that the Neck-piece, and indeed all along the back of the Skin is best; but is is commonly subject to be greasie, which gives the *Press-man* sometimes a great deal of trouble, to make his *Balls Take*. He also lays the *Ball Leathers* in *Soak* to supple them.

When they (either *Pelts* or *Leathers*) are well *Soaked*, he Rubs them well with both his Hands, and then twists and wrings them (as Women do Cloaths) to get the Water out again.

When they are well wrung, he Sits down upon a Seat about fourteen or fifteen Inches high, commonly a *Heap* of *White Paper*, if it stand conveniently for him; but not upon a *Printed Heap*, least his Weight pressing it cause the un-dryed *Inck* to *Set-off*: He sits down, I say, and lays the *Ball-stock* upon his a little opened Thighs near his Knees, that with closing his Thighs he may hold it in a Steddy position, and with the Handle of the *Ball-stock* towards his Belly. Then taking the *Ball-Leather*, helaps or Folds about three quarters of an Inch of one part of it over so much of it towards his Left Hand into a Plaight, and laying the edges of that Plaight towards him, an Inch above the edge of the *Ball-stock*, he with the Head of the

the *Sheeps-foot* drives a *Ball-nail* into the middle of the Plaight, a little more than half an Inch above the the edge of the *Ball-ſtock*: But he Drives the *Ball-nail* not quite up to the Head, but leaves about almoſt a quarter of an Inch of the Nail out; that with the *Claw* of the *Seeeps-foot* he may Draw the Nail again when occaſion ſerves.

Having driven the firſt Nail, he turns about the *Ball-ſtock*, till the oppoſite ſide, and as near as he can gueſs, point of the edge of the *Ball-ſtock* lyes directly upwards between his Thighs, (as before,) and then taking as near as he can gueſs the oppoſite edge of the *Ball-leather* between his Fore-fingers and Thumb of his Left Hand, he holds the edge of the *Ball-leather* upright, and having his Wooll or Hair *Teized*, lying by him on his right Hand on the Floor, he graſps at once as near as he can gueſs, ſo much as may juſt ſerve to fill his *Ball-leather* and the hollow of the *Ball-ſtock*; which bringing to the hollow of the *Ball-ſtock*, he draws the *Ball-leather* over it; and lapping the edges of the *Ball-leather* over, as before, makes another Plaight, and Drives another Nail, as before: So that here is now the two oppoſite Sides of the Leather Nailed on. Then he takes up the *Ball* by the Handle in his Left Hand, and obſerves whether the Wooll tend more to one than the other open half: If it do, he thruſts it with the ends of his Fingers of his Right Hand into the middle, or elſe over to the other Half, till the Wooll lyes equally on both the Halfs.

If he have put too much or too little Wooll into the *Ball*, he either takes ſome out, or adds more to, as the

the reſpective Half may require. Then lays it down again between his Thighs, as before, and lays another Plaight in the middle of the *Ball-leather* on one of the open Halves, and as near as he can gueſs, between the middle of the two oppoſite Nails; and Nails that Plaight down to the *Ball-ſtock*, as before.

In the like manner he Nails down the other open ſides, (now Quarters,) and then again takes a View how the Wooll is diſpoſed into the middle of the *Ball*; and where he finds it tend moſt to any of the open Quarters, he Drives the Wooll with the ends of his fingers, as before, or ſometimes when the *Balls* have been Wrought with, and blackt with *Inck*, with the *Head* of the *Sheeps-foot* into the middle, and then Nails down as before all the open Quarters as near as he can gueſs; between the middle of his former driven Nails, and then again, takes another View as before, to ſee how the whole *Ball* pleaſes him.

If he finds any of the Plaights laid too near one another, he draws that Nail, and alters that Plaight, to lay it as near as he can by gueſs, in the middle between the next two Plaights.

Then he conſiders if his *Ball* be round: If it be not, he thruſts the Wooll from the bunching-out ſide, towards the wanting ſide, either with the ends of his Fingers, or the Balls of one of his Hands; while the Wooll is yet looſe in the *Ball-ſtock*: For when the *Ball* has been Wrought withal, it will grow ſo hard, that the Wooll will not move out of its place.

Having *Knockt up* one *Ball* well, he *Knocks up* the other, as the firſt.

The *Balls* are well *Knockt up*, when the Wooll is equally disperſed about all the Sides, and the middle ſmoothly covered with the *Leather*, viz. not riſing in Hillocks, or falling into Dales, not having too much Wooll in them, for that will ſubject them to ſoon hardning, and quickly be uneaſie for the *Preſs-man* to Work with; or too little, for that will make the *Leathers*, as the Wooll ſettles with Working ſoon flap, and wrap over it ſelf into Wrinkles. So that he cannot ſo well deſtribute his *Balls*: But the *Balls* ought to be indifferently plump, to feel like an Hard ſtuft Bed-pillow, or a ſtrong Spunge a little moiſtned with Water.

Having Knockt up the *Balls*, and Rub'd out the *Inck*, as ſhall be ſhewed in the next ¶, he trys if his *Balls* will *Take*, that is, he Dabs the top of one of them three or four times lightly upon the hither part of the *Inck-block*: If he finds the *Inck* ſticks to it equally all about, and that ſo much as has toucht the *Inck-block* is Black, it *Takes*: But if ſcarce any of the *Leather* is Black, or that it be Black and White in Splotches, then the *Balls* does not *Take*: Wherefore he conſiders whether his *Ball* be too Wet, or elſe Greaſie, for each of theſe inconveniences will hinder the *Taking* of the *Ball*.

If it be too Wet, he burns half a Sheet or an whole Sheet of Waſte Paper, and waves his *Ball* to and fro over the flame of it; but ſo quick and cautiouſly that he neither ſhrinks the *Leather* or Dryes it too much: In Winter time when a fire is at Hand, he dryes it gently by the fire.

If it be Greaſie, he with the edge of the *Ball-knife* ſcrapes

ſcrapes off the thick Oyl, that Works down out of the *Nut* and *Spindle* of the *Preſs*, or elſe with the point of his Knife takes a convenient quaintity of Oyl out of the *Plattin-pan*, or for want of either takes freſh Sallad Oyl and ſmears and ſpreads it well all over the whole *Ball-leather*; and then holding the *Ball-knife* in his Right Hand, with its edge a little ſloping downwards that it cut not the *Ball-leather*, and the handle of the *Ball-Stock* in his Left Hand, he joyns the bottom of the *Ball-leather*, viz. as near the outer edge of the *Leather* as he can, for the *Ball Nails* to the edge of the *Ball-knife*, and turning the *Ball* about by its Handle, preſſes it hard againſt the ſloapt edge of the *Ball-knife*, and at once drives the laid on Oyl and Greaſe too before the ſloapt edge of the *Ball-knife*; but he keeps the Handle of the *Ball-Stock*, and conſequently the whole *Ball* too, conſtantly turning, that the whole circumference of the *Ball* may be *Scraped*: And as the *Ball* has performed a Revolution againſt the ſloapt edge of the *Ball-knife*, he draws gradually his Left Hand a little backiſh, that the ſloapt edge of the *Ball-knife* may by ſeveral Spiral revolutions of the *Ball*, ſcrape up to the very top of the *Ball*, and carries before it the Oyl and Greaſe thither: Which having there, he gathers up upon the *Blade* of his *Ball-knife* and diſpoſes of it, as of ſo much Dirt and Filth.

After a due proceſs of either of theſe Operations reſpectively, his *Ball* will *Take*, and he again dabs gently the top of his *Ball* three or four times on the *Inck-block* (as before) and finding it *Take*, he takes the Handle of it into the clutched Fingers of his Left

Hand, holding the *Ball-ſtock* juſt a little above the circle of his Fore-finger and Thumb, and graſps the Handle of the other *Ball-ſtock* into his Right Hand, with the circle of his Finger and Thumb upwards, and the now bottom of his Right Hand downwards, but not reſting upon the *Ball-ſtock*; and trys if that *Ball* will *Take*, by dabbing the Leather of it three or four times upon the other *Ball*: If it do not *Take* with dabbing, he twiſts the *Balls* in either Hand cloſe and hard, contrary to one another, to beſmear the upper with the under *Ball*. If after this, the upper *Ball* do not *Take*, he conſiders the cauſe, and remedies it, as he did the firſt *Ball*.

¶ 11. *Of* Rubbing out Inck.

Before the *Preſs-man* goes to Work, he Rubs out his *Inck*.

If the *Inck* have lain long on the *Inck-block* ſince it was *Rubbed out*, the Superficies of it generally is dryed and hardened into a Film or Skin, wherefore the *Preſs-man* careſully takes this Film quite off with the *Slice* before he diſturb the Body of the *Inck*: For ſhould any, though never ſo little of it, mingle into the *Inck*, when the *Ball* happens to take up that little particle of Filin, and delivers it again upon the *Face* of the *Letter*, it will be a *Pick*, and Print black, and deface the Work: And if it get between the *Face* of two or more *Letters*, or the *Hollows* of them, it will obliterate all it covers. And if it be *Pull'd* upon, and the *Preſs-man* not careful

careful to over-look his Work, it may run through the whole *Heap*.

Wherefore having careſully skinned off the Film with the edge of the *Slice*, he ſcrapes his *Slice* clean with the *Ball-knife*, leſt ſome ſmall parts of the Film ſhould yet ſtick to, or remain on the *Slice*: And then with the *Slice* brings the body of *Inck* into the middle of the Plain of the *Inck-block*, and ſearches the ſides of the *Inck-block*, by thruſting the edge of the *Slice* forwards along them and all the angles of the *Inck-block*, and ſo ſcrapes off all the *Inck* as clean as he can, and gathers it to the whole maſs of *Inck*: Then with the *Slice* he turns the whole maſs about half a ſcore times over and over to mingle it well together, leſt ſome part of it ſhould be more conſolidated than the reſt: And to mingle it yet better, he then falls to *Rubbing* it with the *Brayer*, graſping the Handle of it in his Right Hand, he begins to *Rub* with all his ſtrength at the hithermoſt ſide-boundings of the Body of *Inck*, and keeping *Rubbing* through the almoſt whole length of the *Inck-block*, he gradually proceeds to the farther ſide of the Body of *Inck*. In this manner of *Rubbing* he bears hardeſt upon the farther edge of the *Brayer*, becauſe the hither ſides of the *Inck-block* are not fenced in with Rails about them; and ſhould he *Rub* with the bottom of the *Brayer* flat upon the *Inck-block*, he might draw too great a body of *Inck* to the unfenced ſides; ſo that the *Inck* would be ſubject to run off: This *Rubbing* is only to ſpread the *Inck* pretty equally over the ſuperfices of the *Inck-block*: Wherefore he now begins a circular *Rubbing*, obſerving in the circulation

culation of the *Brayer* that he always a little mounts the part of the edge of the bottom, which in its progress is ready to approach a prominent body of *Inck*, that it may somewhat slide over it, that the *Inck* be not lickt up high on the sides of the *Brayer*.

Then with the Handle of the *Slice* in his Left Hand and the Handle of the *Brayer* in his Right, he joyns the bottom edge of the *Slice* to the side of the *Brayer*, holding the flat of the *Slice* Horizontal, and the bottom of the *Brayer* perpendicular both over the *Inck-block*, and keeping his *Brayer* and *Slice* in this position, by turning the *Handle* of the *Brayer* in his Right Hand, held pretty stiff against the edge of the *Slice*, he scrapes off all the *Inck* that the side of the *Brayer* has lickt up: And setting down his *Brayer*, he takes the *Slice* in his Right Hand and lays what *Inck* he scrapes off the side of the *Brayer* again upon the *Inck-Block*, and *Slices* the whole mass of *Inck* into the farthermost corner of the *Inck-block*.

This *Rubbing* of the *Inck* may serve when the *Inck-block* had *Inck* on it before.

But if no *Inck* were on the *Inck-block* before, then he lays new *Inck* on the *Inck-block*: Wherefore he considers what Work he Works on: whether it be small or great *Letter*: If it be small *Letter*, or curious Work, the *Inck* must be *Strong* he Works with: But if it be great *Letter* or sleight Work, he makes *Soft Inck* serve, or at least mingles but a little *Hard Inck* with it.

If the *Inck* be too *Hard*, as sometimes in very frosty Weather it will be, then, though his Work be curious, yet he must *Rub* in a little *Soft Inck* to soften it; because

because it will not else *Destribute* well upon the *Balls*; especially if the *Leathers* be a little too Wet, or a little Greasie: Besides, it may and many times does pull and tear the Grain off the Skin; which not only spoils the Skin, but fills the *Form* full of *Picks*.

Sometimes when he finds the *Inck* too pale, he *Rubs* in *Blacking*, but he first joults the bottom of the *Blacking Tub* three or four times against the ground, that if by chance any dirt or filth have gotten into it, it may sink to the bottom of the *Tub*.

But when he either mingles *Strong* and *Weak Inck* together, or else puts in *Blacking*, he applies himself again first to *Rubbing* with the *Brayer*, the length-way of the *Inck-block*, as before, and then to a circular *Rubbing*, as before; and to cleansing his *Brayer*, as before; and this long-ways *Rubbing*, circular *Rubbing*, and cleansing his *Brayer*, he reiterates so oft, till he judge the whole mass of *Inck* sufficiently *Rubbed* and mingled, and the *Blacking* perfectly imbibed by the *Inck*: And then he *Slices* the whole mass of *Inck* to the farthermost corner of the *Inck-block*, as before.

¶ 12. *Of* Destributing *the* Balls.

I shewed you in ¶ 10 of this § how he dabb'd the *Ball* on the *Inck-block*, to try if it would *Take*: And I shewed you in what Posture he handled the *Balls* when he tryed if the other *Ball* would *Take*: Therefore for *Taking Inck* and Handling the *Balls* I (to avoid tautology) refer you to that ¶.

Having now *Taken Inck*, and gotten the *Balls* in his Hands, in that posture, he Works them side-ways upon

upon one another to and from him, and with a craft (acquired by use) in the Handling of the *Balls*, all the while keeps the Handles, and consequently the whole *Ball-stocks* (both) turning round in his Hands and in a motion contrary to each other, *viz.* His under *Ball* moving from the Left Hand to the Right, and his upper *Ball* moving from his Right Hand to to the Left; and by and by in a second motion contrary to the first, *viz.* his under *Ball* moving from the Right Hand to the Left, and his upper *Ball* moving from the Left Hand to the Right.

And these motions and Operations he continues so long till he judges, and in part perceives the *Inck* is equally *Destributed* all over the whole *Ball-Leathers.*

The first way of turning the *Ball Handles*, while the *Balls* are moved to and from him, is made by pressing the ends or Balls of the fingers of both his Hands upon the *Ball-handles* from-wards his Hands: And the second way of turning them contrary to the first, is made by gathering in the ends or Balls of of his fingers while they are in their circular to and fro motion. But because in gathering in his fingers, he does somewhat dis-ingage his grasp of the *Ball-Handles*, therefore he lightly and almost insensibly, tosses the *Ball-stocks* a little up, that when they are dis-ingaged from a close grasp, his fingers ends may the easier draw the *Handles* towards him. This is a Hand-craft, which by continued use and practice, becomes familiar to his Hands.

¶ 13. *Of*

¶ 13. *Of* Beating.

The *Press-man* imagines, or by his eye judges the length of his *Form* (be it what Volumne it will) devided into four equal parts or Rows, which four Rows for distinction sake, I shall number from the Left Hand to the right, with first Row, second Row, third Row, fourth Row, just as an *Octavo Form* is exactly devided by four Rows of *Pages.*

He places his Left Hand *Ball* at the hither end of the first Row, so that though the *Ball* be round, yet the square encompassed within that round shall sufficiently cover so much of the square of the hither end of that Row as it is well capable to cover; and his Right Hand *Ball* he sets upon the hither end of the third Row: He sets his *Balls* close upon the *Face* of the *Letter*, with the *Handles* of the *Ball-stocks* a little bending towards him: But as he presses them upon the *Face* of the *Letter*, he mounts them perpendicular; and lifting at once both the *Balls* lightly just clear off the *Face* of the *Letter*, he removes them about the fifth part of the breadth of the *Form* upwards, *viz.* towards the farther side of the *Form*, and again sets them close down upon the *Face* of the *Letter*, with the Handles of the *Ball-stocks* again bending a little towards him, as before: and as he presses them upon the *Face* of the *Letter*, mounts them perpendicular, as before: Thus in about four or five or six such motions, or rather removes of the *Balls*, according to the breadth of the *Form*, he *Beats* over the first and third Rows. Thus *Beating* from the hi-

ther towards the farther side, is in *Press-mens* phrase called *Going up the Form.*

The reason why he bends the *Handles* of the *Ball-stocks* a little towards him, is, that the *Ball-leathers* drag not upon the *Face* of the *Letter*; for then the edges of the hollows between the *Lines* or *Words*, or the edges of the cavities below the *Face* would scrape *Inck* off the *Balls* to stop up or choak the *Form.* And the reason why (before he removes them) he mounts the *Handles* of the *Ball-stocks* a little perpendicular, is, that the *Balls* may touch in their greatest capacity upon the *Face* of the *Letter.*

To *Come down the Form*, he skips his *Balls* both at once from the first and third Row to the second and fourth Row, and brings them down as he carried them up; only, as before, he bended the *Handles* of the *Ball-stocks* a little towards him, so now he bends them a little from him: That the *Ball-leathers* (now *Coming down*) drag not, as aforesaid. Then in like manner he again skips the *Balls* from the second and fourth Row to the first and third Row, and again *Goes up the Form* with the *Balls*, as he did before. And then again skips, as before, and *Comes down the Form* again with the *Balls.*

Having thus gone twice upwards and twice downwards with the *Balls*, the *Form* is sufficiently *Beaten* in a train of Work, when the *Face* of the *Letter Takes* well.

But if he *Beats* the first Sheet of a fresh *Form*, or after a *Form* is *Washed*, or he makes a *Proof*, he *Goes* three four or five times *Upwards* and *Downwards*: Least the *Face* of the *Letter* should happen to be Wet or

or moist, and consequently un-apt to take *Inck*, without reiterated *Beatings.*

¶ 15. *Of* Pulling.

We will suppose now two *Press-men* going in the Morning to their train of Work: The one they distinguish by the name of *First*, the other his *Second*, these call one another *Companions*: The *First* is he that has wrought longest at that *Press*, except an Apprentice, for he must allow any Journey-man though new-come that title: Generally the Master Printer reposes the greatest trust upon his care and curiosity for good Work; although both are equally liable to perform it.

All the priviledge that the *First* has above the *Second* is, that the *First* takes his choice to *Pull* or *Beat* the agreed stint first: And that the *Second Knocks up the Balls*, *Washes the Forms*, *Teizes Wooll*, and does the other more servile Work, while the *First* is imploid about making *Register*, ordering the *Tympan*, *Frisket*, and *Points*, &c. or otherwise *Making Ready* the *Form*, &c.

The *First* now takes his spell at *Pulling*: For the *First* and *Second* take their spell of *Pulling* and *Beating* an agreed number of *Tokens*: Sometimes they agree to change every three *Tokens*, which is three Hours work, and sometimes every six *Tokens*; that they may both *Pull* and *Beat* a like number of *Tokens* in one day.

Under the general notion of *Pulling* and *Beating* is comprised all the operations that is in a train of work

performed by the *Puller* and the *Beater*: For though the *Puller Lays on Sheets*, Lays down the *Frisket*, Lays down the *Tympans* and *Frisket*, *Runs in* the *Carriage*, *Runs out* the *Carriage*, takes up the *Tympans*, Takes up the *Frisket*, *Picks* the *Form*, Takes off the Sheet, and Lays it on the *Heap*, yet all these Operations are in the general mingled and lost in the name of *Pulling*. And as in *Pulling*, so in *Beating*; for though the *Beater Rubs* out his *Inck*, *Slices* it up, *Destribute* the *Balls*, peruses the *Heap*, &c. yet all these Operations are lost in the general name of *Beating*. Thus they say the *First* or the *Second* is *Pulling*; or, the *First* or the *Second* is *Beating*; though they are performing the different Operations aforesaid: unless upon particular occasions the respective Operations are particularly nam'd.

As there are many Operations conjunct to *Pulling*, and *Beating*, so the *Press-man* performs them with various Set and Formal Postures and Gestures of the Body. For,

To take a Sheet off the *Heap*, He places his Body almost straight before the hither side of the *Tympan*: I say almost straight, Because it is more straight before the side of the *Tympan* than it is before the angle made by the *Paper-bench* and the side of the *Tympan*: But he nimbly twists the upper part of his Body a little backwards towards the *Heap*, the better to see he takes but one Sheet off, which he loosens from the rest of the *Heap* (as I have shewed before) by drawing the back-side of the Nail of his right Thumb on his Right Hand nimbly over almost the whole length of the *Heap*, and receiving the hither end of the Sheet with

with the inside of his Left Hand fingers and Thumb catches with his Right Hand about two inches within the farther edge of the Sheet near the upper corner, and about the length of his Thumb below the hither edge of the Sheet, and brings it nimbly to the *Tympan*: And at the same time twists his Body again straight before the *Tympan*, only a very little moving his right Foot from its first Station a little forwards under the *Carriage Plank*: And as the Sheet is coming to the *Tympan* (we suppose now he Works upon *White Paper*) he nimbly disposes the fingers of his Right Hand under the farther edge of the Sheet near the upper corner; and having the Sheet thus in both his Hands, lays the farther side and two extream corners of the Sheet down even upon the farther side and extream farther corners of the *Tympan-sheet*, but he is careful the upper corner of the Sheet be first laid even, upon the upper corner of the *Tympan-sheet*; that he may the sooner disingage his Right Hand: And if by the nimble casting his eye, he perceive the sides of the Sheet lye un-even upon the *Tympan-sheet*, he with his Left Hand at the bottom corner of the Sheet, either draws it backwards, or pulls it forwards, as the Sheet may lye higher or lower on the hither corners of the *Tympan-sheet*, while his Right Hand being disingaged, as aforesaid, is removed to the backside the *Ear* of the *Frisket*, and with it gives it a light touch to double it down upon the *Tympan*. And by this time his Left Hand is also disingaged, and slipt to the hither under corner of the *Frisket*, to receive it, that it fall neither too hard or too quick down upon the *Tympan*: For hard

falling may ſhake the looſe Sheet on the *Tympan* out of its place; and ſo may the quick preſſure of the Air between the *Tympan* and *Friſket*, after the Sheet is well laid: and while his Left Hand receives the *Friſket* his right is diſingaged from the *Ear* of the *Friſket*, and removed to the middle of the back-ſide the *Tympan*; which he graſps between the Balls of his Fingers and Thumb, to lift it off the *Gallows*, and double it and the *Friſket* together on the *Form*. And while the *Tympan* is coming, he ſlips his Left Hand Fingers from under the *Friſket* to the hither outer corner of it, as well to keep the Sheet cloſe to the *Tympan* in its poſition, as to avoid the jobbing of the lower ſide of the *Friſket* againſt any ſmall ſquare ſhoulder, either of the *Furniture*, *Quoins*, *Chaſe*, or the corners that may ſtand higher than their common Plain.

Then nimbly ſlipping his Left Hand, he with it graſps the *Rounce*, and with a moderate ſtrength, nimbly gives its *Winch* about one Turn round; I ſay about, becauſe the firſt *Pull* will generally fall out to be made about the middle of the *Carriage*; as was ſhewed in § 11. ¶ 16.) but perhaps not juſt in the middle: yet to regulate his *Runing in*, he made a mark before on the farther Rail of the *Tympan*, (as I ſhewed in ¶ 3. of this §) to which mark he *Runs* the *Carriage in*, till he bring the mark in a Range with the fore-edge of the *Plattin*; and as it is coming, skips his Hand to within an Inch or two of the end of the *Bar*, and then at once gently leans his Body back, that his Arm as he *Pulls* the *Bar* towards him may keep a ſtraight poſture; becauſe in a *Pull* it has then the greateſt ſtrength. And he alſo ſlips his right Foot upon the *Foot-ſtep*, while his Left Hand holds faſt by the *Rounce*; as well to reſt on the *Foot-ſtep* and *Rounce*, as to enable his Body to make a ſtronger *Pull*; which will prove *Longer* or *Shorter*, according to the ſtrength put to it, and alſo the *Hard* or *Soft Juſtifying* of the *Head*, (as was ſhewed in ¶ 5. of this §.)

Then diſingaging his Right Hand again from the *Handle* of the *Bar*, he ſlips it to the *Bow* of the *Bar*, before the Handle fly quite back to the *Cheek* of the *Preſs*: For ſhould the *Bar* by its forcible Spring knock hard againſt the *Cheek* of the *Preſs*, it might not only ſhake ſome of its Parts or circumſtantial appurtenances out of order, but ſubject the whole Machine with oft reiteration to an unſtable poſition. Beſides, the farther the *Bar* flyes back, the more he hinders quick riddance in recovering it again. But yet he muſt let the *Bar* fly ſo far back as that the *Tympan* may juſt riſe clear off the *Plattin*; leſt when he *Runs in* his *Second Pull*, the *Face* of the *Plattin* rub upon the *Tympan*, and ſhoves the Sheet upon the *Face* of the *Letter*, and ſometimes *Slurs*, and ſometimes *Doubles* it upon the *Face* of the *Letter*.

Having *Pull'd* the *Firſt Pull*, and having the *Rounce* ſtill in his Left Hand, He turns the *Rounce* about again, till the *Carriage Runs in* ſo far, as that the ſecond mark on the Rail of the *Tympan* comes into a Range with the hither edge of the *Plattin*, as before the firſt mark did; and then *Pulls* his ſecond *Pull*, as he did his firſt; and ſlips his Right Hand again off the *Handle* of the *Bar* to the *Bow*, (as before) and guides the *Bar* up to its *Catch* leiſurely, that coming now

now near the *Cheek* it knock not againſt it: and juſt as he has *Pulled* his *Second Pull*, he gives a pretty quick and ſtrong preſſure upon the *Rounce*, to turn it back, and the *Carriage* out again: And ſo ſoon as he has given that one preſſure, (as aforeſaid) he diſengages his Left Hand from the *Rounce*, and claps the fingers of it under the middle of the *Tympan*, and on the *Ear* of the *Friſket*: and while this is doing, removes his Right Hand to the now upper, but immediately it will be the under-ſide of the *Tympan Rail*, within four or five Inches of the upper end of it, to receive the *Tympan*, as it is lifted up off the *Form* by his Left Hand. And having thus received it, lets it deſcend gently down on the *Gallows*. And as it is deſcending, ſlips his Left Hand fingers under the hither lower corner of the *Friſket*, and gives the *Friſket* a toſs up; while by this time his Right Hand being diſingaged from the *Tympan*, is ready to catch the *Friſket* by the *Ear*, and convey it quick and gently to its *Stay*: And while the *Friſket* is going up; he ſlips the end of the middle finger of his Left Hand, or ſometimes the ends of his two middle fingers with their Balls upwards, under the hither lower corner of the *Pulled off Sheet*, and at the inſtant he has got them under, he nimbly bows his Joynts upwards, to throw up the corner of the Sheet, to make it mount a little, for him to gather about two Inches hold of it between the Balls of his Thumb and fore-finger. And heaving the whole Sheet by this corner a little upwards, He at the ſame time lifts it off the *Points*, and draws it ſomewhat towards him; and as it comes, catches it near the upper corner of the ſame ſide of the Sheet,

Sheet, between the foremoſt Joynts of his fore-fingers and Ball of the Thumb of his Right Hand, and nimbly twiſting about his Body towards the *Paper-bench* carries the Sheet over the *Heap* of *White-paper* to a *Paper-board*, which before he placed beyond that *Heap* on his Right Hand, (as aforeſaid in ¶ 14.) and lays it down upon a Waſte-ſheet laid for that purpoſe on that *Paper-board*; but while it is coming over the *White-paper Heap*, though he have the Sheet between both his fore-fingers and Thumbs, yet he holds the Sheet ſo looſly that it may move between them as on two Centers, as his Body twiſts about (as aforeſaid) from the ſide of the *Tympan* towards the ſide of the *Paper-bench*.

Thus you ſee both the *Preſs-mans* Hands at the ſame time alternatively ingaged in different Operations: For while his Right Hand is imployed in one Action his left is buſie about another, and theſe exerciſes ſo ſuddenly varied, that they ſeem to ſlide into one another one Poſture; beginning when the former is but half performed.

Having thus *Pulled* one Sheet, and laid it down: He turns his Body towards the *Tympan* again, and as he is turning gives the next Sheet on the *White-paper Heap* a Touch with the backſide of the Nail of his Right Thumb, as before, to draw it a little over the hither edge of the *Heap*, and lays it on the *Tympan*, &c. as he did the firſt; and ſo ſucceſſively every Sheet till the whole *Heap* of *White-paper* be *Wrought off*.

As he comes to a *Token-ſheet*, he un-doubles that, and ſmooths out the Creaſe with the back-ſide of

the Nails of his Right Hand, that the *Face* of the *Letter* may Print upon ſmooth Paper. And being Printed off, he folds it again, as before, for a *Token-ſheet* when he works the *Reiteration.*

Having *Wrought off* the *White-paper*, he turns the *Heap* thus:

He takes the *Paper-board* that his *White-paper* lay on, and ſets it down on the ground: Then removes the *Heap* to his Left Hand; then takes up the *Paper-board*, and lays it on his Right Hand: And if it be *Twelves*, or any *Form Impoſed* like *Twelves*, as *Twenty fours*, &c. he turns it from one long ſide of the Paper to the other, that is, the long ſide of the Paper that ſtands on his Right Hand when the Printed ſide lies upwards, he turns over to his Left Hand, and lays the un-printed ſide upwards. In performing this, he graſps off of the *Wrought off Heap* ſo much at once between both his Hands as he can well govern, without diſordering the eveneſs of the ſides of the *Heap*, viz. a *Token*, or more, and lays that upon the *Paper-board*; then takes another graſp in like manner, and lays that on the firſt graſp, and ſo ſucceſſively, till he have turned the whole *Heap*, graſp by graſp. Then removes the *Heap* near the *Tympan*, and lays the other *Paper-board* beyond it, as the firſt *Paper-board* ſtood before; always remembring to lay a Waſte-ſheet firſt on the *Paper-board.*

Having now turned the *Heap*, and made *Regiſter* on the *Reteration Form* (as was ſhewed in ¶ 7. of this §) he Works off the *Reteration:* But he ſomewhat varies his poſture in the *Laying on his Sheets:* For as before, when he wrought *White Paper*, he catcht

catcht the Sheet by the upper farther corner with his Right Hand, he now having heaved up the Sheet (as aforeſaid) catches it as near the farther ſide of the farther *Point-hole* as he can, with the Ball of his Right Hand Thumb above the Sheet, and the Ball of his fore-finger under the Sheet, the readier to lay the *Point-hole* over its reſpective *Point*: which having done, he ſlips his Body a little backwards, and both his Hands with it, his Right Hand towards the hither *Point-hole*, with the back-ſides of the Nails of his fingers to draw or ſtroak it over the *Point*: and the fingers of his Left Hand, as they come from the farther corner, nimbly ſlipping along the bottom edge of the Sheet, till they come to the hither corner; and then with his fore-finger and Thumb, layes hold of it, to help guide the *Point-hole* on that *Point* alſo: Then *Pulls* that Sheet, as before, as he did the *White Paper*, and ſo ſucceſſively all the reſt of the *Reteration.* Only, the *Token-ſheets*, as he meets with them, he Folds not down again, as he did the *White Paper.*

If a *Preſs-man* have no *Companion*, but works alone; he has a little oblong Square *Form* or Bench made to ſtand ſo high as the *Face* of the *Letter* upon the *Preſs-ſtone*, and ſo long as to contain the *Balls* when ſet upon the *Ball-leathers.*

This Form or Bench ſome Work-men will place on the hither ſide the hither *Cheek*, within about half an Inch of the foreſide of the *Cheek:* And other Work-men will place it on the farther ſide of the *Carriage*; each ſort of Work-men ſuppoſing that in the place he ſets it, the *Balls* ſtand moſt commodious for

his quick taking up and ſetting down : I ſhall not plead the convenience of either, but in ſhort ſpeak to the inconveniences of both.

The inconvenience of placing it on the hither ſide the hither *Cheek*, is, that the *Preſs-man* muſt twiſt his Body ſomewhat about to take up the *Balls*. And the inconvenience of placing it on the further ſide the *Carriage*, is, that the *Preſs-man* muſt thruſt his Body over the *Form* to take up the *Balls*: both ways ſtrain the Body, and hinder riddance.

Thoſe that place it on the hither ſide the *Cheek*, begin and end their *Beating* as has already been ſhewed, *viz.* on the hither ſide the *Form :* But thoſe that place it on the farther ſide the *Carriage*, begin and end their *Beating* on the Rows on the farther ſide the *Form*.

One *Preſs-man* in his train of Work will *Beat* ſo ſoon as he has laid the *Tympan* on the *Gallows* after *Pulling* : Another will not *Beat* till he has laid his Sheet on the *Tympan*, and doubled the *Frisket* down on it: both ſorts fancying their own way moſt quick and commodious : For theſe conveniences are the purpoſes they both drive at.

¶ 16. *Of Printing* Red, *or other Colours with* Black.

When *Red* and *Black* are to be Printed upon the ſame Sheet, the *Preſs-man* firſt *Makes Regiſter*, as was ſhewed ¶ 7. and *Makes Ready* his *Form* as was ſhewed ¶ 14. of this §. Then having a new *Frisket Drawn*, as was ſhewed ¶ 8. He Prints upon his new *Frisket* with *Black*. And having before a *Proof-ſheet* Printed

Printed *Black*, with the Words to be Printed *Red* under-lined on that *Proof-ſheet* ; He takes off his *Frisket*, and lays it flat on a *Paper-board*, and with a ſharp-pointed Pen-knife neatly cuts out thoſe words on the *Frisket*, and about half a Scaboard *Margin* round about the words, that he finds under-lined on the *Proof-ſheet :* Then ſets the *Frisket* by till he has wrought off his *Heap* with *Black*, and puts his common *Frisket* on the *Joynts* of the *Tympan* again.

While the *Preſs-man* is *Cutting* the *Frisket*, the *Compoſiter* takes thoſe *Words* out of the *Form* that are *Under-lin'd* on the *Proof-ſheet*, and in their place puts *Quadrats*, m-*Quadrats*, *Spaces*, &c. to *Juſtifie* the *Lines* up again.

Then *Locking up* the *Form*, the *Preſs-man* Works off the *Heap* Black, as was ſhewed in the laſt ¶.

Having wrought off his *Heap* Black, he takes off the common *Frisket*, and puts on his new cut *Frisket:* Then taking a piece of thick Scaboard he cuts it into ſo many ſmall ſlips as there are *Whites* in the *Form* to be Printed with *Red* ; Theſe ſmall ſlips he cuts exactly to the length of the *Quadrats*, &c. the *Compoſiter* put in, and to the breadth of the *Body*; but rather a ſmall matter leſs than bigger, leſt they bind at the bottom of the *Shank* of the *Letter :* for when the *Compoſiter* takes out the *Quadrats*, &c. he put in before the *Form* was *Wrought off* Black, theſe ſlips of Scaboards the *Preſs-man* pricks on the Point of a *Bodkin* and puts them into their reſpective holes: And being looſen'd off the Point of the *Bodkin* with the blunt Point of another *Bodkin*, are laid down flat on the *Preſs-ſtone* ; Theſe ſlips are called *Underlays*, and

are described in ¶ 14. of this §. Upon these *Underlays* the *Compositer* puts in again the *Words* or *Letters* he took out before the *Form* was *Wrought off Black*: So that these *Words* now stand higher than the other *Matter* of the *Form*, and therefore will Print when the other *Matter* will not. But yet for the more assurance that the other *Matter* Print not, the *New-cut Frisket* was prepar'd, which hinders any thing to Print but what Prints through the Holes cut in it; which Holes these *Underlaid Words* fall exactly through.

Having mingled the Red, or any other intended Colour with *Varnish*, as shall be shew'd in the next ¶, he *Beats* the *Form* as with *Black*; and *Pulls* it very lightly, lest these *Underlaid Words* standing higher than the rest of the *Matter*, Print too *Hard*.

¶ 17. *Of mixing and Grinding Colours with* Varnish.

Varnish is the common *Menstruum* for all Colours that are to be used in Printing.

Red is the chief Colour that is used with *Black* in Book-Printing: of *Reds* there are two sorts in general use, *viz. Vermillion* and *Red-Lead*; *Vermillion* is the deepest and purest Red, and always used to Books of Price. *Red-Lead* is much more faint and foul, and though more used than *Vermillion*, yet used only to Books of Vulgar Sale and Low price, as Almanacks, &c.

Yet may other Colours also be used to Print withal; yea, any Colours that are used in Oyl-Painting, as *Lake* and *Russet*, which are *Reds* deeper than *Ver-*

Vermillion; *Virditur Indico* and *Bice* for Blews; *Orpment*, *Pinck*, *Yellow Oaker*, for Yellow: *Virdigreace*, and Green *Virditur*, for Greens: or what other Colours may be fancied.

But all Colours for Printing must be Ground with *Soft Varnish*; especially those Colours that are of themselves Dryers; as *Red-Lead*, *Vermillion*, *Orpment*, *Verdigrease*; For should they be Ground with *Hard Varnish* the Colour'd *Ink* would dry and harden so quick and fast upon the *Form*, that it would soon be choaked up, and consequently want *Washing* e're the *Form* be *Wrought off*; which would be very troublesome to the *Press-man*, because he must expect to have all his *Underlays* to new fit to their places: And besides, it will so Dry and Harden upon the *Balls*, that the Grain of the *Leathers* would quickly tear off, and fill the *Form* full of *Picks*.

The fittest Colours therefore for Printing, are such as are of the lightest Body and Brightest Colour.

They are to be Ground with a Mullar on a smooth Marble Stone, so long that the Colour becomes impalpable, and is throughly mingled with the *Varnish*.

¶ 18. *Of Printing with Gold and Silver.*

This Operation is seldom used but for Printing Names; and therefore rarely dresst in a *Form* to the *Press*; but is usually Printed in the *Stick*: And then the *Compositer Justifies* his *Stick* very *Hard*, as well that

that the *Letters* fall not out when the *Back* of the *Stick* is turned upwards, as that the ſtrength of the *Hard Varniſh* the *Face* of the *Letter* is *Beat* with, pulls not the *Letter* out of the *Stick*.

Therefore the *Preſs-man* makes two little *Balls*, by tying about an Handful of Wooll in new clean Leather, and dabs one of his *Balls* upon the Hardeſt *Varniſh* he has,and with the other deſtributes his *Varniſh* to a convenient Fatneſs,as he did his *Balls* in ¶ 12. With one of theſe *Balls* he *Beats* the *Name*;and having his Paper *Wet*, he lays a ſingle *Blanket* on the *Correcting-ſtone*, and his Paper on the *Blanket*; and with a *Riglet* fitted to the *Stick*, he preſſes the *Letter* to keep it ſtraight in *Line:* Then places the *Face* of the *Letter* exactly flat down upon the Paper, and with the force of both his Hands preſſes the *Letter* hard and even down upon the Paper, to receive an Impreſſion: But he takes care not to wriggle the *Letter* in the *Stick* backwards or forwards, leſt either the *Beard* Print, or the ſides of the *Letter* be more or leſs beſmeared with the *Varniſh:* Becauſe the Gold or Silver will ſtick to the leaſt Sully that the *Varniſh* may chance to make.

Then cutting his Gold or Silver to a ſize full big enough to cover the Printed *Name* or *Matter*, he lays his Gold or Silver on what was Printed, and with a little White Cotton gently preſſes the Gold or Silver upon the Printed *Matter*, and lets the Paper lye by a while; as well that it may dry, as the *Varniſh* Harden, (which will quickly be) he with his Handkerchief gently wipes over the Printed *Matter*. So ſhall all the Gold or Silver that was toucht

toucht by the *Varniſh*, ſtick to the *Varniſh* on the Paper, and the other will wipe away.

If he liſts to Poliſh it, he uſes a Tooth or the Ivory Handle of a Knife.

¶ 19. *Rules obſerved; and Remedies to the Inconveniences the* Preſs-man *may meet with in a Train of Work.*

1. The *Preſs-man* is to make a *Proof* ſo oft as occaſion requires: If he takes off his *Form* to make a *Proof*, he *Un-locks* and lays the *Quoins*, as ſhall be ſhewed when I come to *Waſhing* of the *Form*:but many *Printing-houſes* have an empty *Preſs* ſtands by to make *Proves* on.

The *Compoſiter* having brought the *Form* to the *Preſs*, lays it down on the *Preſs-ſtone*, and the *Preſs-man* places it even under the *Plattin*, that the *Plattin Bear* not harder on the hither or farther ſide of the *Form:* Then he *Pulls* the *Cards* upon the *Form*, to preſs it into a flat poſition: Then *Beats* the *Form* four or five times over, that he may be ſure it *Take*: Then he lays the *Proof-ſheet* on the *Form*, ſo as by his Judgement it ſhall have an equal *Margin* on all its oppoſite ſides, and a double *Blanket* on the *Proof-ſheet*; and *Running in* the *Carriage*, *Pulls* the *Proof-ſheet*: Having *Pull'd* it, he *Runs-out* the *Carriage* again, and takes the *Proof-ſheet* off the *Form*. Then with the *Ly-bruſh* dipt in *Ly*, he *Rubs over* the *Face* of the *Letter* three or four times, to Waſh off what *Inck* may remain on it, and carries the *Form*

again to the *Correcting-stone* and lays it down: And the *Proof* he carries to the *Compositers Case*.

2. If the *Form* he Works on be *Small-letter*, or *Old Letter*, he uses *Strong Ink*; and *Beats Lean*: For *Weak Ink* and *Fat Beating*, will quickly Choak up the *Face* of the *Letter*. But to fetch off *Hard Ink* thin *Beat* on the *Face* of the *Letter*, he *Pulls Hard*. But if the *Form* be great *Letter* or *Black English Letter*, it will allow *Fatter Beating*.

3. He keeps a constant and methodical posture and gesture in every action of *Pulling* and *Beating*, which in a train of Work becomes habitual to him, and eases his Body, by not running into unnecessary divertions of Postures or Gestures in his Labour, and it eases his mind from much of its care, for the same causes have constantly the same effects. And a *Pull* of the same strength upon the same *Form*, with the same *Beating*, and with the same *Blankets*, &c. will give the same Colour and Impression.

4. That every two Sheets, if the *Form* be small *Letter* (rarely three, unless *Great Letter*) he *Takes Ink*; and so soon as he comes off the *Form*, viz. has *Beat* it, he falls to *Destributing* his *Balls*. And that Sheet which he *Takes* not *Ink* he steps to the *Heap* to overlook the Colour, *viz.* whether he has *Taken* too much or too little *Ink*; and to see if no accidents have befallen the *Form*, viz. that no *Letters*, *Quadrats* or *Furniture*, &c. Rise, that no *Letters* are *Batter'd*; That *Bearers* fail not, *viz.* grow so thin with long *Pulling* on, as not to perform the office of *Bearers*; that the *Register* keep good; that no *Pick* be got into the *Form*, or any other accident that may deface

face the beauty of the Work, but all this while still keeps his *Balls Destributing*.

If he have taken too much *Ink*, which sometimes may happen (but seldom for want of carelessness) he will not *Take Ink* again, till he have wrought his *Balls* to a good and moderate Colour. But if the Sheet already *Pull'd* be so *Black* that it may not tolerably pass, he Doubles or Folds it in the middle and lays it cross the *Heap*, that the *Gatherer* may take or leave it, in case the *Heap* falls Short. If he foresee the next Sheet will also be too *Black*, he takes a Dry Sheet of Waste Paper between his *Balls* and *Destributes* upon that Dry Sheet, that it may take off the *Ink*.

If in doing this, the strength of the *Ink* have *Pull'd* the *Paper* to pieces, so that small rowl'd-up bits may stick upon the *Ball-leathers*, if they be but a few he picks them off with his Fore-finger and Thumb, but if there be many he makes his *Balls* clean by *Scraping* them (as I shewed in ¶ 10. of this §) for else these small rowl'd-up bits of Paper will be apt to fill the *Form* full of *Picks*.

If *Letters*, *Quadrats* or *Furniture Rise*, he puts them down, the *Letters* and *Quadrats* with his *Bodkin*, and the *Furniture* with his *Hammer*, and *Locks* the *Quarter* they are in, a little Harder.

If any *Letters* are *Batter'd*, he *Unlocks* the *Quarter* they are in, and desires the *Compositer* to put in others in their room.

If *Bearers* Fail, that is, Squeeze thinner with long *Pulling* on, he takes those *Bearers* off, if they are on the *Frisket*, and puts on thicker: But if the *Furniture*,

ture, were *Under-laid* (as I shewed in ¶ 7. of this §) he *Unlocks* the *Quarter* they are in, and *Under-lays* them according to his Judgement.

If *Register* be *Out*, which sometimes happens by the starting of the *Quoins*, he mends it, as I shewed in ¶ 7. of this §.

If a few *Picks* are got into the *Form*, that is, little bits of Paper, Skin or Film of *Inck*, Grease or other filth which may stick to the *Face*, or get into the hollows of the *Letter*, he with the point of a Needle picks them out: But if many be gotten in, he takes off the *Form* and Washes it, as shall hereafter be shewed.

And though he every other Sheet overlook the *Heap* (as was said before) yet his *Companion* that *Pulls*, by an habitual use casts his eye upon every single Sheet; Yet rarely hinders his riddance by it, for while he is taking the Sheet off the *Tympan*, he gives a quick spreading glance upon it, and lays it down, as was shewed ¶ 15. of this §, unless he perceive somewhat to mend: For then he lets it lye on the *Tympan* till he has mended what was amiss.

And that he may *Take Inck* more equally, to keep the *Balls* of an equal Fatness, he keeps the *Rubb'd out Inck* on the *Inck-block* of an equal Fatness; which to do, he with the under-edge of the bottom of the *Brayer*, draws often from the mass of *Inck* a small, (and as near as he can guess) an equal quantity of *Inck*, viz. about the quantity of a Pea, and with the *Brayer* Rubs and dispersses that *Inck* of an equal thickness, all over the hither corner of the *Inck-block*. While this is doing he holds the *Balls* upright on one another

another in his Left Hand, leaning the Handle of the uppermost *Ball-stock* against his Breast.

The equal and often *Taking* of *Inck* in a small quantity, and constant *Destributing* of the *Balls*, is the onliest means to keep the *Heap* throughout of an equal Colour, and to avoid *Beating* of *Fryers*.

5. If he meets with naughty Sheets in his Work; as torn, or stain'd, &c. he Prints them not, but throws them under the *Paper-bench*; and if any crease or wrinkles be in any Sheet, he laying the backs of his four Left Hand fingers upon a smooth place in the Sheet, rubs with the backs of the Nails of his Right Hand Fingers from-wards him upon the wrinckles, till he have smoothened them.

6. And though his constant care is to Lay every particular Sheet even upon the *Heap*, yet it often happens either through *White Pages* that may come in the *Form*, which because not Printed lye solid on one another, the unequal pressing of one side or end of the Paper, or the unequal Bearing of the *Plattin* on one side or end of the *Form*; I say it often happens by these accidents, that the *Heap*, as it grows higher is on one part of the Sheet raised above, and on another part sunk below an Horizontal level: It is raised higher on that side or end of the *Heap* most prest in the *Tympan*, and by consequence makes the Paper there more Huffie; Because deep pressure of the *Letter* into the Paper below the common level of the Sheet bears the Paper off from the *Heap*, on the underside the Sheet; and the greater the number of Sheets are thus Printed off and laid on the *Heap*, the more that side or end of the *Heap* shall Rise:

And by the Rule of Contraries, when *White Pages* come in the *Form*, the greater number of Sheets laid on the *Heap*, shall where those *White Pages* lye, make the *Heap* lower in that place, because they clap solider together, for want of Printing the Paper through the backside level of each Sheet: So that the small un-level lying of every Sheet, though unperceptable, in a small number of Sheets, makes each Sheet incline to the lowest side of the *Heap*, and as the *Heap* accumulates heighth, throws the *Heap* more or less towards the dripping side, or end over the bottom of the *Heap*.

To remedy which, he claps the insides of both his Hands against both the ends of the *Heap*, but more forcibly against the Hanging over end towards the other end, till he has drove the *Heap* into an upright position.

If either of the sides hang over, he with the inside of his Left Hand commonly against the farther side of the *Heap*, and the outside of his Right Hand fingers on the hither side the *Heap*, either draws the hanging over side towards him with his Left Hand, or thrusts it from him with his Right Hand fingers, as aforesaid, while his opposite Hand does the office of a stop, that it be not drawn too forward, or thrust too much backward. Then where the *Heap* rises above the Level, he with the inside flats of one or both of his Hands presses it down into an Horizontal Plain.

7. If it be a *Reteration* he Works, and a great Number is laid on, he uses a *Tympan-cloath* instead of a *Tympan-sheet*: This *Tympan-cloath* is a Fine and even

even Linnen Cloath, about an Inch or two larger on every side than the Paper he Works on: He Wets this Cloath and wrings the Water out again, so that it remains only moist: Then lays his Cloath instead of his *Tympan-sheet*, and Pastes the corners of the under side of it to the *Tympan*, and Works upon it as on a *Tympan-sheet*.

One reason why he uses a Cloath to Work the *Reteration* on rather than a Sheet of Paper, is, because a Sheet of Paper quickly wears out, which a Cloath will not do. Another reason is, that when the *Inck* that wrought off the *White Paper* Sets off upon the *Tympan Cloath*, it may in clean *Ly* be washt clean again: For a good *Press-man* will not Work on a foul *Tympan Cloath* or (if he use no Cloath) on a foul *Tympan-sheet*, because as the *Inck* of the *White-paper* aforesaid, set off on the *Tympan Cloath*, so the more the *Tympan Cloath* has gathered *Inck* from the *White-Paper*, the more it will Return or give back again, towards the besmearing of every Sheet that is Printed on it.

The reason why the *Press-man* does not use a Cloath to Work the *White Paper* with, is, because in Working the *White-Paper*, the use of the *Tympan-Sheet* is principally to lay all the Sheets of the *Heap* even by, as being of the exact size with all the rest of the *Heap*, which a *Tympan-Cloath* is not, nor could it, without great trouble, be reduced to that size by the *Press-man*, or if reduced to that size, without much difficulty be laid even or square on the *Tympan*: Because the *Cloath* when *Wet*, will be hard to be kept straight and square, but every side

will

will naturally run into irregularities, which a Sheet of *White Paper* will not do.

8. Sometimes, through the loose *Hanging* of the *Plattin* on its *Cords*, or through the much wearing of the *Hose*, or the *Garter*, or the *Worms* in the *Nut* and *Spindle*, or the irregular wearing of the *Toe* of the *Spindle* in its *Nut*, or too much play of the Tennants of the *Head* in their Mortesses, or the irregular dryness of the *Tympan*, or through irregular *Running in* of the *Carriage*, It will happen that the *Letter* will *Double* upon the Sheets, that is, Print double.

If the loose Hanging of the *Plattin* be the cause, it is easily mended by turning about the *Female Screws* fitted to the tops of the *Hose*, as was shewed ¶ 4. of this §.

If the *Hose* be worn, or the square holes the *Hose* Works in, it may for the present be borcht up by putting Scaboards between the *Hose* and the square holes of the *Till*; but to mend it perfectly either another *Till* must be made, or a new *Hose*, or both.

If the *Garter* be worn too wide; the Smith must either mend the Old, or make a new one.

If the *Worms* of the *Nut* or *Spindle* be worn, the *Spindle* must be examin'd by the Smith, and made true, and have a new *Nut* Cast on it.

If the *Toe* of the *Spindle* and its *Nut*, or either of them be worn irregularly, it is Smiths Work to mend.

If the Tennants in the *Head* have too much Play in their Mortesses; which though it seldom happens, yet if the *Head* were not made of well seasoned Stuff, the Tennants may be subject to shrink, and so have too

too much play. There is no substantial remedying this fault, but by making a new *Head*.

If an unproper temperature of the *Tympan* be the cause; that is, when it is dry in one place and moist in another, the dryed place may by its spring force the Paper against the *Face* of the *Letter*, and in part Print it before it come to feel the force of the *Plattin*; (but this is rather slurring than *Doubling*) and when the force of the *Plattin* does come, the spring in the dryed part will again remove the Paper, and the force of the *Plattin* gives its full Impression where the Paper is thus removed, but when it is real *Doubling*, it happens generally on the whole Sheet.

This *Doubling* or *Slurring* is mended, by reducing the dryest part of the *Tympan* to an equal moist temperature with the moistest.

Doubling often happens in the middle of the *Form*, and the reason is, because the foreside of the *Plattin* Prints beyond the middle of the *Form* at the first *Pull*, and the hindside of the *Plattin* by the *Second Pull* reprints part of the *First Pull*: So that a Spring in the *Tympan* removes the Paper in this interval of Time.

This fault is mended by exact observing the *Running in* of the *Carriage*.

Doubling may also happen by the too loose and flapping straining of the *Tympan*, when it was first *Drawn*.

This cannot be mended without taking the *Tympan* off, and *Drawing* on a new one.

A *Press-man* having *Pull'd* a Sheet, may by some accident (either of Object or Discourse) let it ly on the

Form after he has *Run-out* the *Carriage*, and afterwards forget it was *Pull'd*, yet may perhaps lift the *Tympan* a little off the *Form*, which lifting off (if the *Joynts* are not very good) will remove the Sheet, if then he *Pull* it again, it will *Double*.

This fault becauſe it is but an accident I ſhall paſs by, and only ſay,

If the *Joynts* are ſo faulty (as ſometimes Old *Joynts* are) that the *Preſs-man* cannot keep *Regiſter* with them, the Smith muſt make new or mend the Old.

9. When the *Preſs-man* leaves Work at Noon, he draws half the Nails out of the Balls, and takes the Wooll out: Then doubles the looſe half of the *Leather* over the remaining Nail'd-on half, with the *Incky ſides* of each half next each other, and Rowls up the *Leathers* cloſe, and laies them in a Bowl or Pan of Water to Soak till he has Din'd.

He alſo covers the *Form* with the *Tympan*, to keep it from duſt or filth that may fall on it: And takes out the *Blankets* and lays them on the *Heaps*: And with a *Spunge* Wet in Water beſprinkles the backſide of the *Tympan*, to Soak it whiles he is at Dinner.

Coming again to his Work afternoon, he takes the *Handles* of the *Ball-ſtocks* between his Thighs, (being ſeated as before, when he knockt up the *Balls*, ¶ 10.) to hold them faſt, and he takes the turn'd down backſides of the *Ball-leathers* in both his hands, (for the other ſide being all over Black, would black his Hands) and rubs them between his Fingers very well, to ſupple them. Then ſqueezes and Wrings the Water well out again; and *Teizes* his Wooll, by opening

opening all the hard and almoſt matted knots he finds in it: but he does not pull the Wooll or hardned knots in it aſunder from the whole maſs of Wooll: But endeavours to keep the Wooll of each *Ball* intirely connected in the ſame maſs, and only opened, to Looſen and Soften it: For pulling the knots to pieces, would tear the Wooll, and ſoon make it unfit for uſe. Having *Teazed* the *Wooll* he *Knocks up* his *Balls* again, as I ſhewed in ¶ 10.

Then he goes to the *Tympan*, and ſqueezing his *Spunge* as dry as he can, he rubs it over the backſide of the *Tympan*, to Suck up the Water, that may lye on it.

Then taking the *Blankets*, he rubs them between both his Hands to ſoften them; for we muſt ſuppoſe that the Mornings *Pulling* on them has compacted and hardned them: being well Rub'd, he lays them in the *Tympan* again, as was ſhewed before in ¶ 7. and falls again to his Afternoons train of Work.

Having wrought all day, though his *Form* be not *Wrought off*, it may yet be *Foul*, ſo that he muſt *Waſh* it: Nay, in ſmall *Letter* a good *Preſs-man* will *Waſh* his *Form* twice a day: Wherefore he calls to the Boy to Heat the *Ly*, ſomewhat before he is ready for it, about a Heating time: And having a *Shooting-ſtick* lying by him on the *Till* or ſome other convenient place, drives every *Quoin* between the *Furniture* and the *Chaſe* faſt up; leaſt they may have ſomewhat ſhrunk, or elſe ſtarted back: Then with a piece of Chalk he makes a ſcore on the two farthermoſt *Corners* of the *Carriage*; and through the *Quoins* droven againſt them, and upon the two *Corners* of the

Carriage of the *Tympan* and their *Quoins*, and lets the *Quoins* ly; but he *Unlocks* all the oppoſite *Quoins*, and takes them out of their places; laying thoſe *Quoins* that he takes from between the fore-end of the *Carriage* and the *Chaſe* on the hithermoſt upper long ſide of the *Plattin*, the hithermoſt *Quoin* on the hithermoſt ſide of the *Plattin*, and the farthermoſt *Quoin* on the farthermoſt ſide of the *Plattin*; with their ſmall ends towards him, and fromwards him as they lay on the *Carriage*. The *Quoins* that he takes from the hither ſide of the *Carriage*, he lays on the hithermoſt Return ſide or end of the *Plattin*; that on his Left Hand on the *Carriage*, towards the farther Corner of the *Plattin*, and that *Quoin* on the Right Hand on the *Carriage*, towards the hither corner of the *Plattin*, with their ſmall ends towards the Hand they lay on, on the *Carriage*.

Having taken out and placed theſe four *Quoins*, he tryes if the *Form* will *Riſe*, as was ſhewed § 22. ¶ 7. then takes up the *Form*, and carries it to the *Ly-Trough*, and lays it in it, even as the *Compoſiter* brought the *Form* to the *Preſs*, and laid it on the *Preſs-ſtone*. § 22. ¶ 7. and taking the *Ly Kettle*, or *Chafer*, in his Left Hand pours the *Ly* Scalding hot place by place over the whole *Form*: And then with the ends of the Hair of the *Ly Bruſh* rubs gently over the whole *Form*: And as he thus *Rubs* with his Right Hand Rocks the *Ly-Trough* a little on its Axis, that the Body of *Ly* may accompany the *Ly-Bruſh* in its progreſs from the hither to the farther ſide of the *Form*: And thus he *Waſhes* the *Form* ſtill on, till he perceive the *Face* of the *Letter* purely clean. Then

Then he lets the *Ly* out again into the *Ly-Kettle* at the Hole and Pipe in the Left Hand hither corner of the *Ly-Trough*: and ſtopping the hole again, ſets by the *Ly-Kettle*. Then with a Diſh or two of fair Water he *Rinces off* the Laver of the *Ly* that may ly on the *Face* of the *Letter*, and rears up the *Form* and throws a Diſhful or two of fair Water on the backſide of it, to *Rince* it alſo. Then takes the *Form* out of the *Ly-Trough*, and ſets it by, ſhelving with its *Face* againſt the Wall, to Dry.

If the *Heap* be *Wrought off*, he lets the *Compoſiter* know it, to take Charge of it.

Having *Wrought off* his *Heap*, he takes it off the *Paper-bench*, and ſets it by on the floor, covering it with a Waſte-ſheet: And gives notice to the Boy, or to the *Ware-houſe-keeper*, to fetch it away and *Hang it up* to Dry.

Then he draws the *Balls*, and takes the *Blankets* out of the *Tympan* (as at Noon:) And if he have Paper to *Wet*, *Wets* it as was ſhewed ¶ 9. of this §.

§ 25. *The Office of the* Warehouſe-keeper.

¶ 1. *Of* Hanging up *Paper.*

THe *Warehouſe-keeper* takes the *Heap* out of the *Preſs-room*, and carries it into the *Warehouſe*, or other *Drying-place*, and ſetting it upon a Form or Bench of convenient heighth, with an end of the *Heap* from him, he takes the *Handle* of the *Peel* in his Left Hand, and lays the *Board* flat down upon the *Heap*, with the Left Hand ſide of the *Board* to-

wards the Left Hand side of the *Heap*, and so as its upper edge may reach to almost three quarters of the length of the Sheet, and that the Right Hand end of the *Peel* may ly on the middle of the *Heap*: Then with his Right Hand he doubles over so much of the *Heap* as he thinks good, perhaps about a *Quire*, or half a *Quire*, or about seventeen Sheets, more or less, either as he can allow them time to *Dry*, or have room on his *Racks* to *Hang* them on. Having thus doubled his first *Doubling* on the *Heap*, he removes the Left Hand half of the *Peel* almost off the *Heap*, viz. to about two Inches within the Left Hand side of the *Heap*, and doubles, as before, a second *Doubling* to hang over the first *Doubling*, towards the Left Hand about two Inches, as aforesaid, on the *Peel*, and as near as he can guess, the same number of Sheets. And having these two *Doublings* on his *Peel*, he takes the *Peel* off the *Heap*, and holding the *Handle* a little aslope, that the *Shorter Folding-over* of the Sheets may open from the *Peel*, he lifts it up, and places it at one end of his first *Rack*, and lets it hang on it, by drawing the *Peel* from under the Paper. In like manner he Loads and unloads his *Peel* again successively, till he have *Hung up* the whole *Heap*. See Plate 31.

Note, that the sides of the Sheets do not hang against one another, but lap over one another, as you may see by Plate 31. Nor are they *Hung up* to *Hang* with their edges against the side of the former *Hanging-up*, but to lap over, so as every Right Hand *Doubling* may lap about two Inches over the Left Hand *Doubling*; that when the *Books* are taken down, the

the *Warehouse-keeper* clapping the flat side of his *Peel* against the Right Hand edge of the Paper, slides several *Doublings* over one another (perhaps three or four:) And putting the *Peel* under them, takes them off the *Racks*, and lays them on the *Heap* again, on a clean Waste Paper, and sets the *Heap* orderly by, till it comes to be *Gather'd*.

The *Warehouse-keeper* is also very careful to lay all the Sheets, so as the respective *Signatures* of every Sheet may ly exactly over the respective *Signature* of the first Sheet, lest when the *Books* come to be *Gathered*, some Sheets may be *Turned*, which will give him a great deal of trouble to *Turn* them right when he *Colations* the *Books*.

¶ 2. *Of* Laying the Heaps.

Laying the Heaps is to place them on Benches or Forms of a convenient Heighth, in an orderly *Signatural* Succession. By an orderly *Signatural* succession, I mean the first *Signature*, which most commonly is A (and therefore shall be so accepted) be placed on the Left Hand of the Bench, with either the Side or Foot of the *Page*, as the *Volumn* requires, that hath the single *Signature* A at the bottom of it upwards, and towards the hither side of the Bench. On the Right Hand side of the *Heap* A is B, and next it C, in like order D E F, *&c.*

¶ 3. *Of*