

A Reprint of

"The Art of Cutting, Casting, and Preparing of Letter for Printing" (1750)

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This missing plate has been supplied in a version scanned from John Findlay Mcrae's *Two Centuries of Typefounding* (London: George W. Jones, 1920), a history of the Caslon foundry.

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To the PROPRIETORS of the UNIVERSAL MAGAZINE,

GENTLEMEN,

You have given us the Art of Printing in a most exact Manner, on Page 27, and 60, Vol. I. The Method of Preparing the Letters I think equally as curious, and doubt not but will be as acceptable to your Readers: And am Yours,

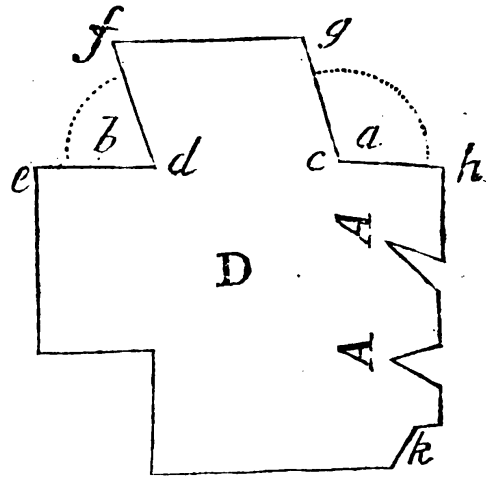
A. B.

The Art of Cutting, Casting, and Preparing of Letter for Printing, with a neat Representation of a Letter-founder's Work-house.

THE Letter-cutter must be provided with a vice, hand-vice, hammers and files of all sorts for watchmakers use; as also *gravers* and sculptors of all sorts and an oil-stone, &c. suitable and fizeable to the several letters to be cut: a *flat gage* made of box to hold a rod of steel, or the body of a *mold*, &c. exactly perpendicular to the flat of the *using-file*: a *sliding gage* whose use is to measure and set off distances between the shoulder and the tooth, and to mark it off from the end, or from the edge of the work; a *face-gage*, which is a square notch cut with a file into the edge of a thin plate of steel, iron, or brass, of the thickness of a piece of common tin, whose use is to proportion the face of each sort of letter, *viz.* Long letters, ascending letters, and short letters. So there must be three gages, and the gage for the long letters is the length of the whole body supposed to be divided into forty two equal parts. The gage for the ascending letters *Roman* and *Italic* are $\frac{5}{7}$ or 30 parts of 42, and 33 parts for the *English* face. The gage for the short letters is $\frac{2}{7}$ or 18 parts of 42 of the whole body for the *Roman* and *Italic*, and 22 parts for the *English* face.

The *Italic* and other *standing* gages are to measure the scope of the *Italic* 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 shape.

The manner of making which gages, and of all other angular gages is thus:



By placing one point of a pair of steel dividers at the point *c* or *d* in the figure *D*, and with the other point describe a small fine arch of a circle, as *ef*, or *gh*. In this arch of the circle, must be set on the gage *a* 10 degrees, and on the gage *b* 70 degrees, and draw from the centers *c* and *d* two straight lines thro' 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, describe a circle on a piece of plate brass of any radius: draw a straight line exactly through the center of this circle, and another straight line to cut this straight line at right angles in the center through the circle, so shall the circle be divided into four quadrants: Then fix one foot of the compasses in one of the points where

where any of the strait lines cuts the circle; and extend the moving foot of the compasses where-ever it will fall in the circle, and make there a mark, which is 60 degrees from the fixed foot of the compasses: Then again fix the foot of the compasses in the intersection of the strait line and circle, that is, next the mark that was made before, and extend the moving foot in the same quadrant towards the strait line, where you first pitched the foot of your compasses, and with the moving foot make another mark in the circle. Which two marks will divide the quadrant into three equal parts. The other three quadrants are divided the same way, till the whole is divided into 12 equal parts: and each of these 12 parts contains an arch of 30 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 5 equal parts, so shall the circle be divided into 360 equal parts for use.

To use it; describe on the center of the circle an arch of almost a semi-circle: which arch must be exactly of the same radius with that I have prescribed to be made on the gage *a b* from *e* to *f* and from *g* to *b*; then count in your circle of degrees from any diametrical line 110 degrees; and laying a strait rule on the center, and on the 110 degrees aforesaid, make a small mark through the small arch; and placing one foot of the compasses at the intersection of the small arch, with the diametrical 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 made by the two points of the compasses in the small arch on the gage, draw two strait lines from the center *c*, and, the brass between these two strait lines being filed away, that gage is made. And in like manner you may set off any other number of degrees for the making of any other gage.

And thus you may measure any angle in the draughts of letters, by describing a small arch on the angular point, and an arch of the same radius on the center of the divided circle: for then, placing one foot of the compasses at the intersection of the small arch with either of the strait lines proceeding from the angle in the draught, and extending the other foot to the intersection of the small arch with the other strait line that proceeds from the angle, you have, between the feet of the compasses, the width of the angle; and by placing one foot of your compasses at the intersection of any of the strait lines that proceed from the center 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 strait ruler laid on the center 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 diametrical or strait 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 yourself the labour of dividing a circle as aforesaid; and work by your dividing plate, as you have been directed to do with the circle.

The next care of the *letter-cutter* is to prepare good steel punches, well tempered and quite free from all veins of iron; on the face of which he draws or marks the exact shape of the letter, with pen and ink, if the letter be large; or with a smooth blunted point of a needle, if it be small; and then, with sizeable and proper shaped and pointed gravers and sculpters, digs or sculps out the steel between the strokes or marks he made on the face of the punch, and leaves the marks standing on the face. Having well shaped the inside strokes of his letter, he deepens the hollows with the same tools: for if a letter be not deep in proportion to its width, it will, when used at the press, print black, and be good for nothing. This

M m 4

work

work is generally regulated by the depth of the *counter-punch*. Then he works the outside with proper files till it be fit for the *matrice*.

But, before we proceed to the sinking and justifying of the *matrices*, we must provide a *mold* to justify them by, of which you have a draught on the copper-plate, *fig. 5, 6*.

Every mold is composed of an *upper* and an *under* part. The under part is delineated at *fig. 5*. The upper part is marked *fig. 6*, 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 wire between the body and carriage, near the break where the under part hath a small rounding groove made in the body. This wire, or rather half-wire, in the upper part makes the nick in the shank of the letter, when part of it is received into the groove in the under part. These two parts are so exactly fitted and gaged into one another (*viz.* the male gage, marked *c* in *fig. 6*, into the female marked *g* in *fig. 5*, 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 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.

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 c The Mouth.

d d The Throat.

e d d The Pallat.

f. The Nick.

g g The Stool.

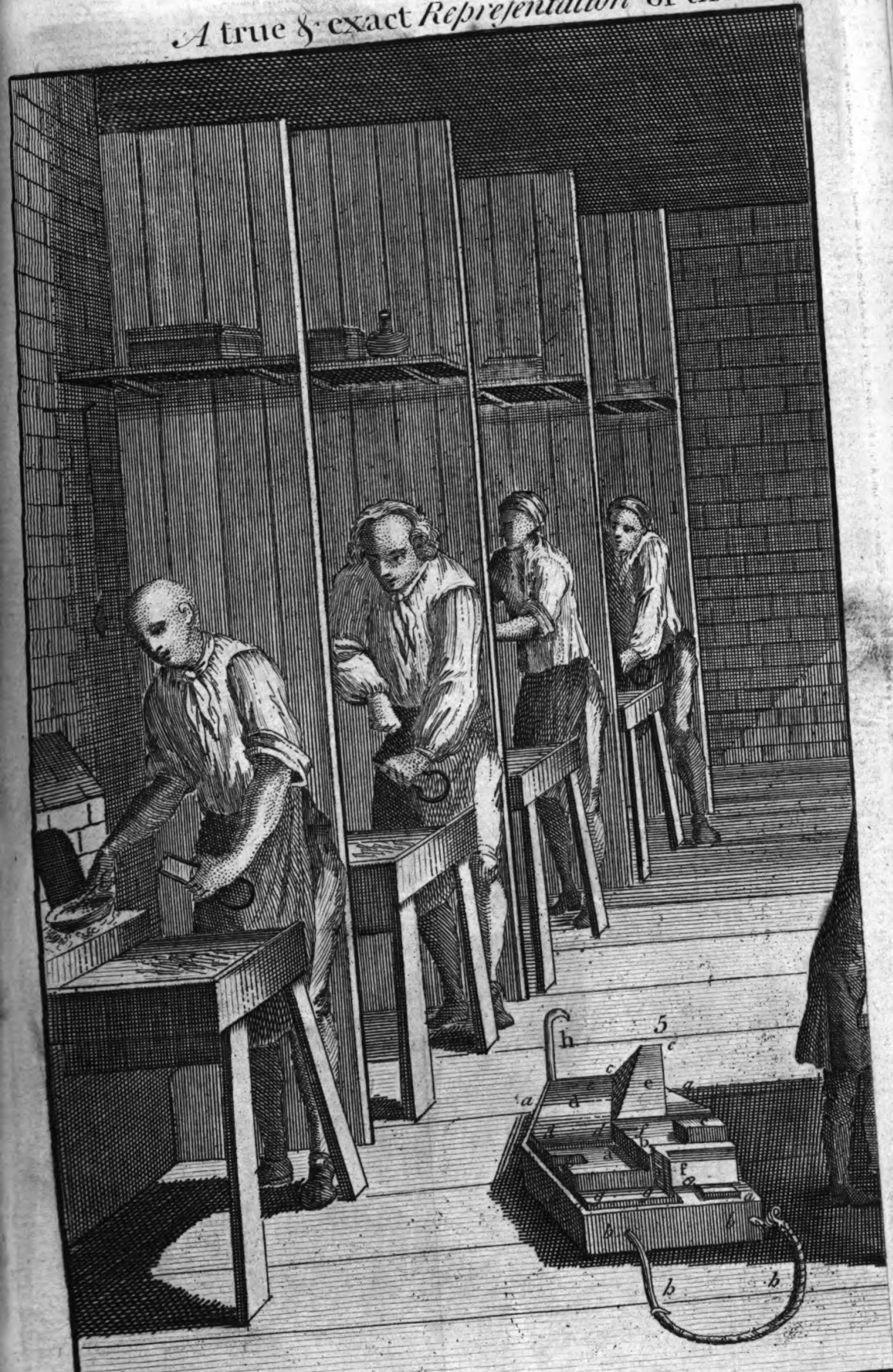
b b The Spring or Bow.

Then the *mold* must be *justified*. And first the founder justifies the *body* by casting about twenty proofs or samples of letters: which are set up in a composing stick, with all their *nicks* towards the right hand; and then by comparing these with the pattern letters, set up in the same manner, he finds the exact measure of the *body* to be cast. He also tries if the two *sides* of the *body* are parallel, or that the *body* be no bigger at the head than at the foot; by taking half the number of his proofs, and turning them with their heads to the feet of the other half; and if then the heads and the feet be found exactly even upon each other, and neither to *drive out* nor *get in*, the two sides may be pronounced parallel. He further tries whether the two sides of the thickness of the letter be parallel by first setting his proofs in the composing stick with their *nicks* upwards; and then turning one half with their heads to the feet of the other half: and if the heads and feet lie exactly upon each other, and neither drive out nor get in, the two sides of the thickness are parallel.

The *mold* thus justified: the next business is to prepare the *matrices*. A *matrice* is a piece of brass or copper of about an inch and a half long, and of a thickness in proportion to the size of the letter it is to contain. In this metal is sunk the face of the letter intended to be cast, by striking the letter punch about the deepness of an *n*. After this the sides and face of the *matrice* must be justified and cleared, with files, of all *bunchings* made by sinking the punch.

Every thing thus prepared, it is brought to the furnace, which 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

A true & exact Representation of the A



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Engrav'd for the Universal Magazine 1750. for J. Hinton
UNIVERSITY OF MICHIGAN

A true & exact Representation of the Art of Casting & Preparing Letters for Printing.



Two Centuries of Typesetting

Engraved for the Universal Magazine 1750 for J. Henton at the Kings Arms in St. Pauls Church Yard. LONDON.

Interior of the Caslon Letter-Foundry, 1750.
The seated figure is that of Joseph Jackson (1733—1792).

to stand in. A foundery of any consequence has several of these furnaces in it, as you see described at *fig. 1.*

The *metal*, of which printing letters are made, is lead hardened with *iron* or *stub-nails*, which are commonly made of good soft and tough iron.

To make the iron run, they mingle an equal weight of antimony, beaten, in an iron mortar, into small pieces, and stub-nails together : And preparing such a number of earthen pots as will endure the fire, and are necessary at a time, they charge these pots with the mingled iron and antimony, as full as they will hold ; and melt it in an open furnace built on purpose.

When it bubbles, it is a sign of the iron's being melted : but it evaporates so much that they seldom find above one quarter of the pot full ; which composed of iron and antimony melted is ladled into an iron pot of lead, fixed on another furnace close to the former, in the proportion of three pounds of melted iron to 25 pounds of lead ; and they incorporate them according to art.

The founder must be now provided with a ladle, which differs nothing from other iron ladles, but in its size. And he is provided always with ladles of several sizes, which he uses according to the size of the letters he is to cast. Before the caster begins to cast, he must kindle his fire in the furnace to melt the metal 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 in metal into it to melt : if it be a small bodied letter he casts, or a thin letter of great bodies, his metal 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 with its narrow end against the face to the leather groove of the matrice, by whipping a brown thread twice about the leather-groove,

and fastening the thread 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-fide 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 the 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 places itself 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 shoulder 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, 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 stroke, two or three, outwards upon the surface of the melted metal, to scum or clear it from the film or dust

duft that may swim upon it; then takes up the ladle full of metal, and having his mold as aforefaid in his left hand, he a little twifts the left fide of his body from the furnace, and brings the geat of his ladle (full of metal) to the mouth of the mold, and twifts the upper part of his right hand towards him to turn the metal into it, while at the fame moment of time he jilts the mold in his left hand forwards, to receive the metal with a ftrong shake (as it is called;) not only into the bodies of the mold, but while the metal is yet hot running, fwift and ftrongly, into the very face of the matrice, to receive its perfect form there, as well as in the fhank.

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 moft commonly by reafon of its weight it does) he throws or toffes the letter, break and all, upon a fheet of wafte paper laid for that purpofe on the bench, juft a little beyond his left hand, and is then ready to caft another letter as before; and alfo, the whole number that is to be caft with that matrice.

A workman will ordinarily caft about three thoufand of thefe letters in a day.

The letters thus caft are delivered to the boys to break off the *breaks* from the *fhanks*, as in *fig. 2*, and to rub them upon a ftone as in *fig. 3*. And then, being brought to their juft proportion in the body, they are delivered to a man, as in *fig. 4*, to cut them all of an even height: which finifheth the font for the ufe of the printer.

Instructions for the Ordering of B E E S.

I Will fuppofe you are poffeffed of a place proper for an *Apiary*, which fhould be as much expofed to the fun, as may be, and not too much amongft trees. The firft bufinefs (if you are defirous to make much profit of *Bees*) is to make an houfe, the full length your place will allow, of this form, if you think fit.

Fix fome ftools, or fuch-like things, to lay the floor on, which muft be broad enough to hold the hives, and the fpace of three or four inches behind and before to fpare, efpecially for the *Bees* to light upon; Support the floor well, that the boards may not bend or move when you fet your hives upon them. The floor may be laid about two feet from the ground, and the height of the houfe may be five feet, and cover'd with tiles or boards like a penthoufe, to caft off the wet. If your Bee-houfe is not againft a wall, you may have a back in the fafhion of a folding-door, to open or fhut at pleasure, as your fore-door. Such houfes as thefe may be fixed in any place free

from wind, ftanding to the fouth, inclining a little to the eaft.

When your Bee-houfe is ready, the beft time to remove them is the beginning of *October*. Chooft thofe that are combed down to the floor, ftool, or ftone, and that weigh the moft, for a fwarm that weighs not above 14 *lb.* will fcarce live through the winter. If you live near, you may buy and remove that day, or the day after they fwarmed; take heed you break not the combs in carrying them home. Thofe bought in *May* or *June*, are in danger of being deftroyed by robbers; therefore prefer *October* before it, as a better time to remove in. If a large hole or mouth is made in the hives, you muft make little doors with three or four holes for the *Bees* to go in and out at, and to give them air; when you have drawn with lime and hair all the fkirts of the hives to keep out their enemies, which are *Mice*, *Moths*, *Ear-wigs*, and (in fummer the *Wasps* and *Hornets*) and fuch like, that attack them cowardly in the rear. Set the doors

up

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