

OF THE JUST
SHAPING OF
LETTERS

FROM THE APPLIED
GEOMETRY OF
ALBRECHT
DÜRER
BOOK
III



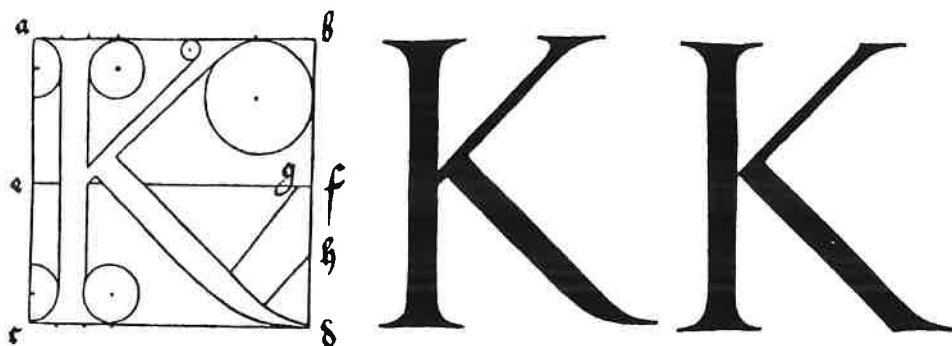
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THE LETTER K.

Now for K: You are to make the first tract vertical, in the same manner as you formerly did for H; then draw another narrower limb from the broader and erect one, so that it may, at its lower end, impinge obliquely on the transverse line e. f. and above may ascend to the right till it meet the line a. b., taking care to make it parallel to the diagonal c. b.; and this, at the top, you are to produce in both directions so that each production may represent a tenth part of the line a. b. The hitherward projection you are to round out with a circle of which the diameter must not exceed the breadth of the lesser limb; but of the other arc, by means of which you round out the farther projection, you shall make the diameter double as great as the diameter of the arcs by which you have customarily hollowed out the preceding extensions of the broad and vertical limbs. Next, from the narrow limb so constructed draw in a downward direction another broad limb, so that it too may be parallel to a diagonal of the square; & of this the beginning is to be taken from the acute angle which the narrower limb makes with the broad vertical limb, and let it be drawn with its projection to the angle d., yet in this fashion: take two points this side of d. after this manner, so that the first point may be distant from d. the tenth part of the line c. d. & the second as far again from the first; then let the said tract be drawn within the space which is between the two points, but in blind and invisible lines. Afterwards you shall add the extension, which you shall make this way: take before f. in the line e. f., a point g. no farther distant from f. than the breadth of the narrower limb; on this point set one leg of your compass, & let the other be extended to the angle d., from which let it be guided back along the broad but invisible blind limb: thence will result the lower convexity of the tail you seek; but its upper concavity look for in this way: divide f. d. in its middle point h.; on this set one leg of your compass, and with the other describe an arc passing through d. to meet the broad limb.

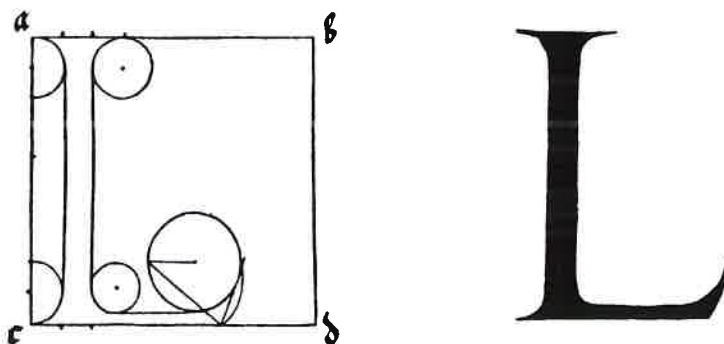
Or you may make K in this manner: First, let your broader vertical limb, and your upper narrow one remain as they have been described, except that the interior angle which the narrower limb forms with a. b. shall remain acute, but the exterior one shall be rounded out, as has

been said. Then let there be drawn the lower broad limb, obliquely from the angle which is included between e. f. and the vertical limb, and let it descend to meet the side c. d. so that between d. and the limb the width of the limb be left vacant; and the hither angle is to be left, but the farther, towards d., shall be rounded out a little, as shown below.



THE LETTER L.

As for the letter L, you shall make it by a combination of parts of two of the preceding letters: namely, you shall make the first vertical broad limb, as you did a while back in I; and to this join a foot as you did at the bottom of E, when you made it. Such is L depicted below.



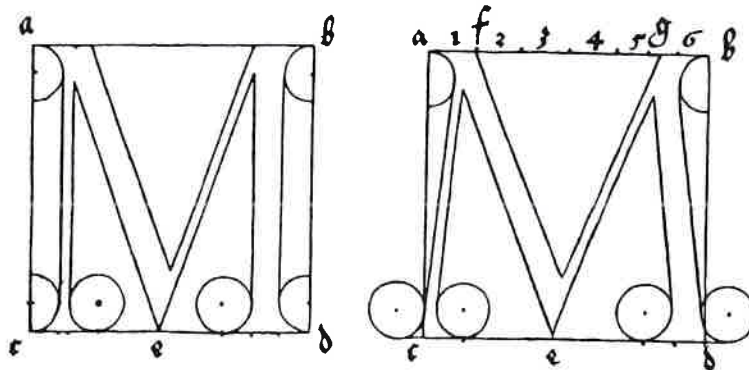
THE LETTER M.

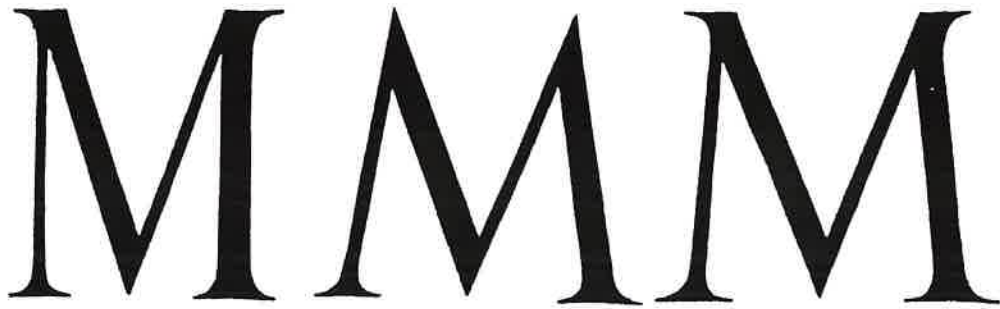
The letter M you shall form in two ways within its square. In the first, draw the narrower limb of the letter vertical, to the right of a. c., distant from a. one-tenth of the distance a. b.: draw the other, & broader limb, on the near side of b. d., also a tenth part of the whole distant

from b. & in such fashion that both limbs touch the square at top and bottom; then, between the two, bisect the line c. d. in the point e. and draw a broad limb from the inner angle of the narrow limb, downwards to the point e., & next a narrow one upwards from e. to the inner angle of the broader vertical limb; and the inner angles at top you must not round out, but leave acute; the exterior angles, however, at the top, and both exterior and interior at bottom of both vertical limbs, you are to adorn with the customary projections, as you have done in the preceding letters. You are to know, too, that when these letters are drawn with a pen, they are to be described with a single stroke. But for your guidance is this letter, in the manner in which I have instructed you, depicted below.

Another method.

Another way is thus: Divide the side a. b. of the square into six equal parts & mark off the two extreme parts, one at either end, by the points f. and g.; then draw the inner and broader limb, with its point at e. as above; and to this, in an upward direction, a narrower one, so that between f. g. be left a vacant space, and so more readily the letter slope forward. Then you are to draw the two lateral and vertical limbs—the near and slender, and the farther broad one—at the top, indeed, as in the first sketch, but at the bottom produce them to the two angles c. and d. and finally add projecting cusps, as you were instructed in the first M; but the projection below will pass beyond the square at the points c. and d. Or you shall make M at top with acute angles, in which case the lateral limbs will slope the more; or shear them off obtusely, and in this fashion (whichever pleases you best) make them as you see them depicted in the following diagrams.

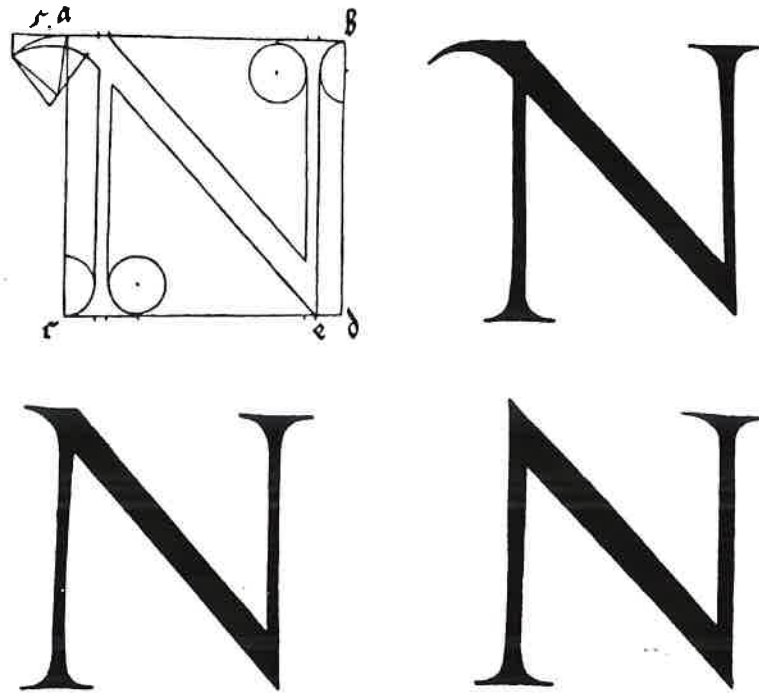




THE LETTER N.

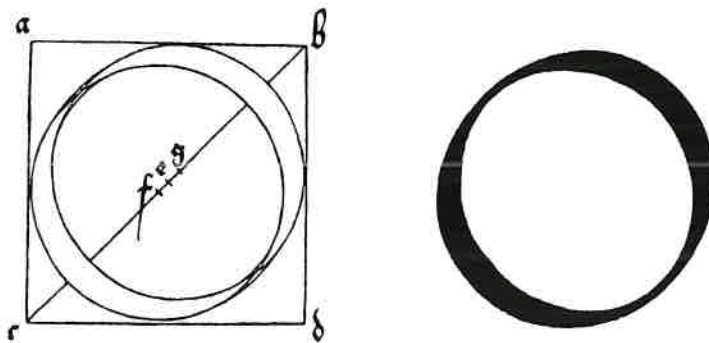
Likewise the letter N you shall make in its square thus: First you are to draw two standards vertical and slender, so that at top & bottom they may touch the square, & that being produced, the nigh one at the bottom, and the farther at the top, they may touch the angles at c. and b. Now join these two by a broad oblique limb, running from the angle a. to the point e., by which is denoted the remote side of the farther limb, where you shall allow the acute angle to remain; but at the top, this limb, produced beyond the angle a., you are to round out to a fifth part of the length of a. b. This prolongation should incurve below, a fifteenth part of the distance a. b. projected on two arcs, the upper one the greater, the lower the less. For the lesser arc, therefore, you shall take as diameter of its circle, a line the fifth part of the distance a. b. and its centre is to be taken outside the square, so that the foot of the compass may touch the tip of the extension and the angle a.; then extend a little the feet of the compass, and shift its centre until the arc touch both the tip of the part produced, & the broad oblique limb, in the middle point between the side a. c. & the nearer of the two slender vertical limbs.

Or you may make the letter N in such fashion that its upper nigh extension shall remain within the square; or you may make from it an acute angle as shown overleaf.



THE LETTER O.

Now O you shall make this way in its square. Set in the square the diameter c. b. and bisect it in the point e., so that e. may form a middle point between the two points f. and g. which are to be your two centres; and from each let a circle be described touching two sides of the square; & where the circles cut one another, there with your hand you must shape the slender outline of the letter to a juster proportion, as below is shown.

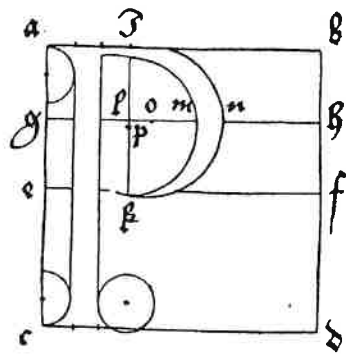


THE LETTER P.

P you shall make in its square in this wise. Divide the square a. b. c. d. by the median horizontal line e. f.; then divide a. e. & b. f. equally by the line g. h. Next draw, first the broad vertical limb for this letter P, as you did a short while ago for K, and afterwards erect the line i. k. the distance of its own breadth to the right of your vertical limb; (here you must ever observe that in a lettered square we speak of the angle a. as the "hither" angle, that is, to the left; & the angle b. as the "farther" angle, that is, to the right). Then where the line i. k. cuts g. h. call the point l, and next draw two slender horizontal limbs, the upper below a. b., the lower above e. f., from the broad vertical limb as far as the line i. k. Set one leg of the compass on the point l, extending the other to the lower side of the lower horizontal limb near k.; then describe an arc through the line g. h. as far as the other slender horizontal limb of this same P, & where it cuts the line g. h. set the point m. Next, on the far side of m. measure the width of the large limb of the letter, along the line g. h. to the point n. and let your compass be stretched so that with one foot it may touch the line a. b. and with the other the point n.; then set one foot of the compass on n. & the other on the line g. h. to the right, in the point o., in which this foot is to be left standing immovable, and with the other is to be described an arc, passing through the point n. and touching the lines a. b. and e. f.

Or you may form the loop of this letter in the following manner. Set a leg of the compass under the transverse g. h. in the line i. k., in a place median between the line e. f. & the lower part of the upper transverse of the slender limb, in the point p. and describe an arc as before, passing through m. so that the loop will be acute at the bottom, and its tip will end in the middle space between the line i. k. and the broad vertical limb of the letter.

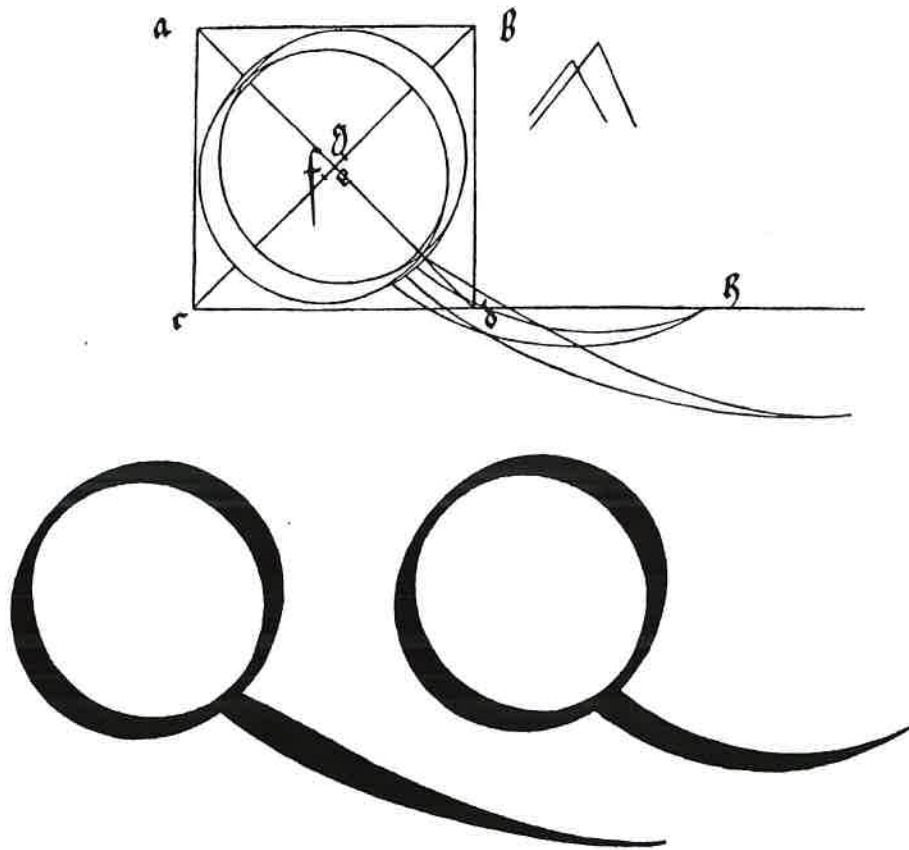
Or make this same P with a circular sweep, by shifting the compass upon the diameter, so that that sweep may be broader at the top (as though made with a pen) as will be shown in the diagram on the following page.



THE LETTER Q.

Make your Q in its square in the self/same manner as was prescribed for O; but add to it its tail thus: Draw a diameter of the square, the line a. d., about which, starting from the curved outline, begin to draw a long tail, producing it through the angle d. in such fashion that d. may be in the middle of the thickest part of the tail; but where the tail begins let it be a little narrower than in the angle d., where it should attain its real thickness. Then let it be drawn out, beyond the angle d. to the length of the entire diameter, and in a downward direction, yet so that it curves while it slopes, & that its tip shall not fall lower than a third of the side below the lowest side of the square, and shall tend, as it nears the point, to grow sharper little by little, and at length end in a very fine point indeed.

Or you shall give Q a shorter tail in this fashion, to wit: set your compasses to the length of the side c. d. and draw a tail from the bulge of the same letter, describing through the point d. its inner arc of the same length as c. d., taking care that the tail bend upwards until it again reach c. d. produced, in the point h.; then shift your compasses, & with the other leg again describe from the bulge of the letter an arc below d. & continue it until again it reach h., but in such fashion that the tail shall find its greatest thickness at the start, as in the following figure is doubly depicted.



THE LETTER R.

Moreover R you must make in its square just as was directed for P; but then erect a right line q. r. through the middle point of the square, & let it cut the exterior arc of the rounded limb in s., from which point, downwards towards the angle d., let there be drawn a broad tract, almost equal to that which you made above for the letter K., but this is to be somewhat bent in, and so shaped by your hand that its tip, well formed, may arrive directly on the angle d.

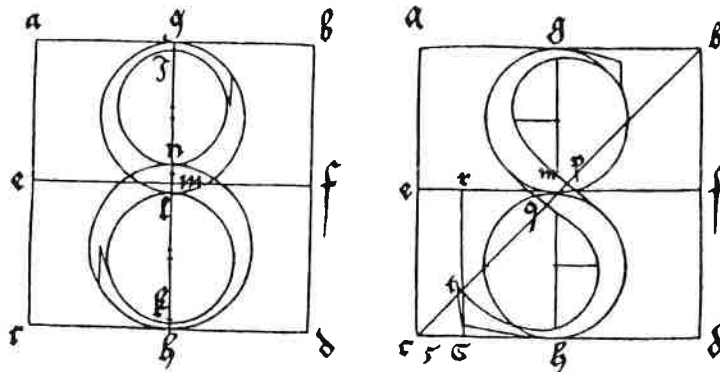
Or make R in such fashion that its rounded sweep, as though made with a pen, shall be above broader, & narrower below. To accomplish this, you must shift your compasses on the diameter q. e. & not allow the rounded limb to touch the vertical one, as was described in P. Besides, the oblique limb is to be deduced from the rounded one with a little more of a curve; just as I have drawn overleaf.

the part so cut off may be a fourth part wider & higher than the upper, and that its tip may rise to the height of the centre of the circle n. h.

Another method.

Yet another way may you make the letter S. In the square a. b. c. d. bisect the horizontal line e. f. in the point m.; then set one leg of your compass upon the mid-point between g. and m. & with the other describe a segment of a circle in the direction of a. e. passing through the points m. and g.; next, set your compass upon the mid-point between m. and h. and describe a segment of a circle through m. and h. in the direction of f. d. The two arcs will touch above, in front, and below, in the rear, the exterior curvatures of this same letter S.

Next, draw through m. the diameter c. b. and at its middle indicate the maximum thickness of the letter by the two points p. and q. from which let there be drawn two right lines, one up, & one down, to those two arcs; & next, from the two points p. & q. draw two curved parallels to the same arcs, regulating the distance between them, their elevation & depression from the centres of the same circles. Next, indicate below g. and above h. the minimum thickness of the letter; and from these points you will with your hand fashion the inner shape of the letter, both above and below, & produce the limb of S, above towards b. Cut it off so that its lower tip may touch the segment, & that the part cut off upwards may contain a tenth part of a. b. and that the segment may still exceed the part cut off. Then construct a vertical line r. s. to the right of e. c. and distant from it a fifth part of c. d.; let it cut the diagonal c. b. in t. and to the angle just formed produce the extremity of the letter, making the part so cut off a third broader than the upper portion. Lastly, you will have to produce the tip ever so little beyond t.; as I have briefly indicated.



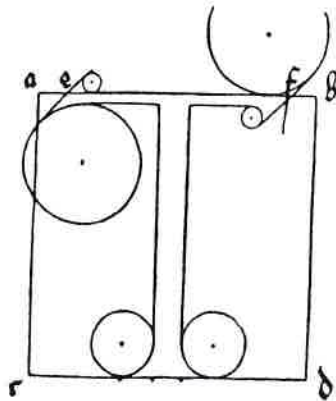


THE LETTER T.

Set the broad limb of T in the midst of its square erect, produced & drawn to a point on either side below, just as you did before in the letter I; then take two points e. and f., distant respectively one-tenth of the whole space from a. and b., and let the transverse limb of the letter be drawn below e. f. and of an equal length with it; but the projecting extremities of this line are to be cut obliquely, and the tips of these projections shall so far extend above the line a. b. to the right as below they depend to the left. The oblique lines of these projections are to be each a fifth part of the length of a. b.; & the angles of these projections you shall round out by means of circles of diverse radius—namely, for the lesser angle you are to use a diameter only two-thirds of the width of the broader limb; but for the greater angle you shall take a diameter equal to the side of a square contained between the broad and vertical limb and the intercepted portion of the line a. b.

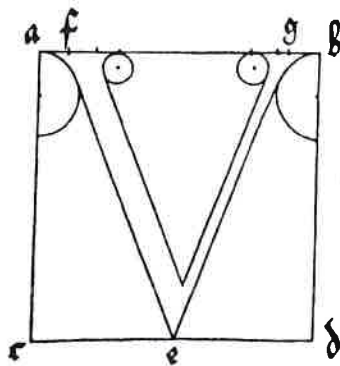
Another method.

Or you make T thus in its square: Take your point e. as before, to the right of a., and cut your transverse limb diagonally, as before, yet so that the projection be dimidiated to the right, and at top the angle remain as it falls; and so at the other extremity, only the point f. must be moved as near again to b., the cutting line to be a little more erect, & the projection formed a trifle broader than at the hither end; otherwise shall everything remain as before; as I have delineated for you on the opposite page.



THE LETTER V.

V you shall thus make in its square: Bisect c. d. in the point e.; then set the point f. one-tenth of the whole line a. b. beyond a., and in like fashion g. to the hither side of b. Then draw the broad limb of your letter downwards from f. to e. and sharpen it; & thence draw upwards your slender limb to g.; and at the top produce it in either direction, as you did before at the bottom of A; just as you see it shown below.

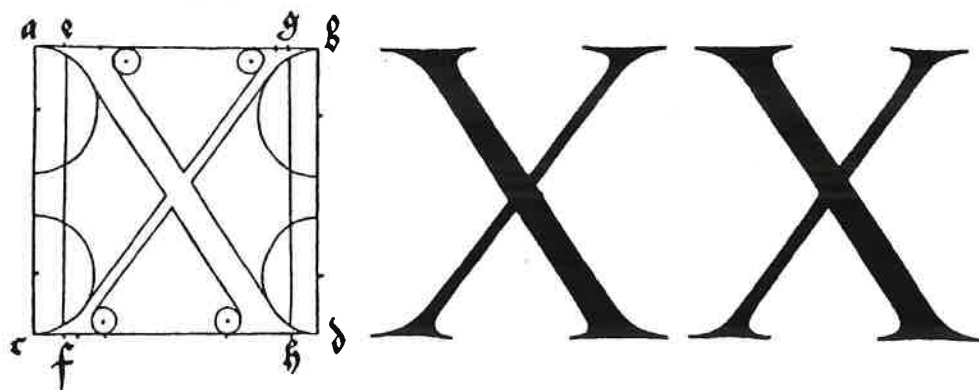


THE LETTER X.

X you shall form thus: Draw two vertical lines e. f. and g. h. distant respectively one-tenth part of the line a. b. from the sides a. c. and b. d. Then draw the two limbs intersecting one another in the form of a cross—the broad one so that at top, & with its hither side it shall touch e., & at the bottom, and with its farther side h.; but the narrow limb so that at top, and with its farther side it may touch g., & at bottom, with its hither side f. Then add its projections, touching, at top and bottom, the four angles a. b. c. d., & choose a semi-diameter of the larger circle

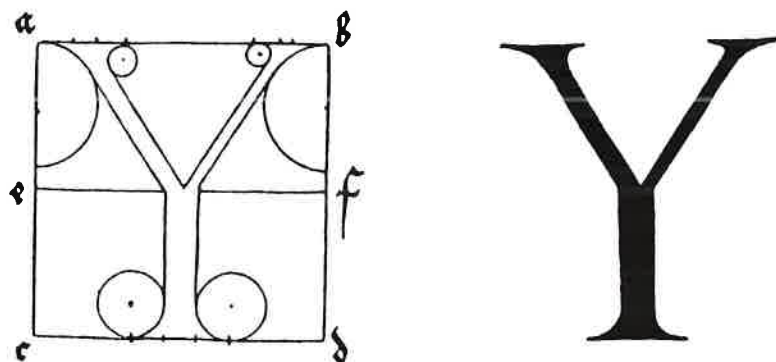
of the length of a fifth part of a. b.; & with that you shall round out the four greater angles; but for the lesser circle you shall take a diameter as long as two-thirds the width of the broader limb.

Or you may vary X thus: Let everything be left as before except the narrower limb, which at top you shall make more erect by one-half the breadth of the wider limb; and so the upper part of the letter shall be less and narrower than the lower, and shall have a different aspect, as is shown below.



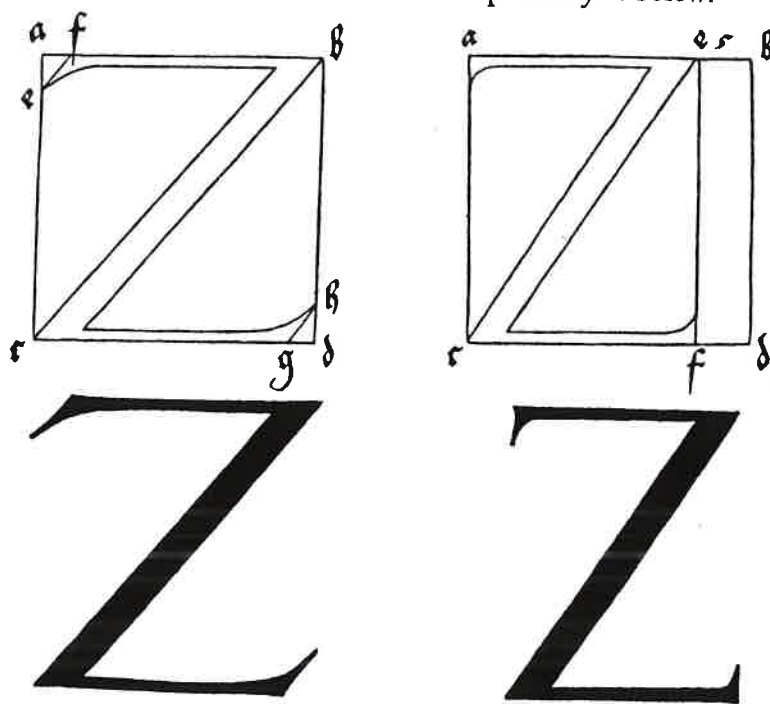
THE LETTER Y.

Y you shall achieve in the midst of its square, as far as its lower half is concerned, after the instructions before given for I; but its upper part you shall divide so that its hither limb shall contain two-thirds, and its farther one-third of the broad standard; and let them slope to either side so that produced they may touch the two angles a. and b.; and the greater circles, by which you are to round out their obtuse or greater angles, make of a diameter as great as a containing side of the square enclosed between the standard and the sides of the great square, as in T was shown; but the diameters of the circles which you apply to the lesser angles, make double the width of the broad standard, as below.



Z you shall make thus: Set upon either side, both beneath & beyond the angle a., two points e. & f., each at a distance of the tenth part of a. b.; so also, set two other points g. and h. both before and above the angle d. and with right lines join e. f. and g. h.; then draw your narrower transverse limb, beneath a. b. backwards as far as the angle b.; from thence draw your broad limb diagonally to c.; and then again a narrower one from c. to g.; and with your hand round out the two tips e. and h.

Or make Z thus: Divide the square a. b. c. d. by the vertical line e. f. and in this reduced space construct the letter as before; but so that the two transverse limbs be cut short, above on the right side, and below on the left, by the vertical lines a. c. and e. f. respectively as below.



So likewise, in other fashion, can we make all the letters already drawn, on a scale of ninths, just as we have now drawn them on a scale of tenths; in just the same manner, according to the due proportion of each, in its own square, a. b. c. d., dividing them into nine, as just now into ten parts; & that this may be the better understood, I have chosen to append here letters of such fashion. Also these letters are to be made five parts high when written small & rapidly, by hand. In such writing the versals are made of the same proportion and form, but one-third larger than the ordinary letters of the writing.

