

A Motif-piece

There is hardly a better first example of creating an Insular design than a piece that preserves some of the process of creating a plan, in the form of sketchings of the kind that can eventuate in a typical Insular design. The piece described here is variously called the Dunadd trial-piece or motif-piece.

Parts of it are compass-drawn and parts are drawn free-hand. In the orientation of a brooch—which the piece prefigures—the upper portion has concentric arcs for the loop, with their centre clearly visible. In the lower portion there is only one arc that appears to be partially compass-drawn, the broad arc at the top of the lower portion. All the rest—circles, arc, and straight lines—appear to be free-hand sketches.

The free-hand portion of the plan shows the left-hand side of a tentative scheme for decoration of the lower segment of the brooch, the disposition of cells for precious stones, or interlace, or fligree, or whatever. (No need to sketch the right-hand side, which would be merely the same pattern in reverse.) This part of the design is little more than an inventory of the decoration to be designed for this part of the brooch's surface. In this state it contains almost no information about the coherent geometry of this part of the design. As the design may have developed, of course, the elements in this area could well have been plotted according to the geometry that is present in the compass-drawn portion.

The compass-drawn portion is plotted as functions of linked ratios built around $\sqrt{3} - 1$ (see Figs. 3.16 and 3.17). The plan can be replicated by the procedure illustrated in Fig. 4.1.

Begin by drawing a circle. Development of the plan will require the path of a diameter and division of the circumference by six—that is, the circle divided first by two, and then half of a circle divided by three. The classic method is illustrated first, in Fig. 4.1a, carried out with a single setting of the compass. But much less is needed.

The short arc in the upper portion, stretching through about one-third of the upper half, has a radius $\sqrt{3} - 1$ in relation to the radius (=1). In Fig. 4.1b, one sixth of the circumference is marked successively three times starting from the top. The third mark is half way around the circle, the opposite end of the starting point, these two points standing at either end of a diameter

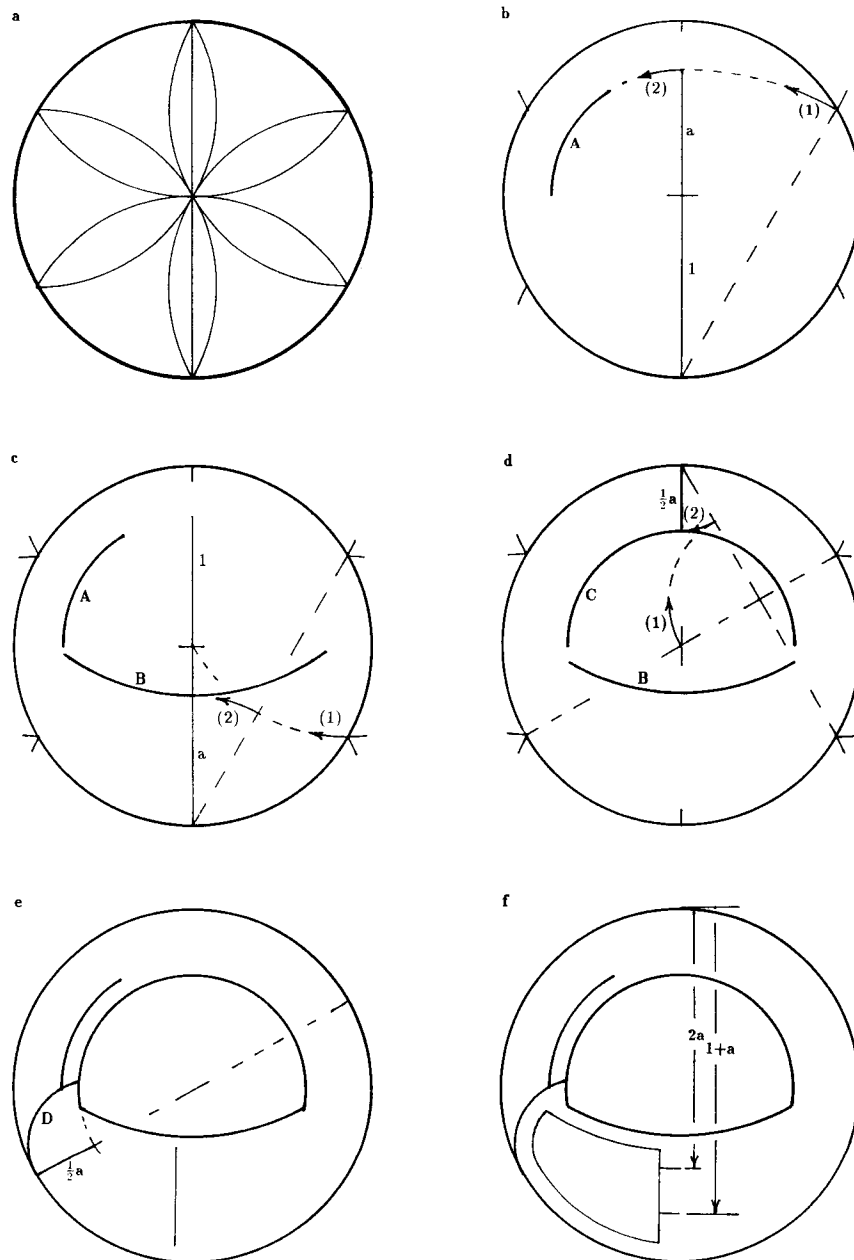


Fig. 4.1 Geometry of the compass-drawn portion of Dunadd motif-piece.

that divides the plan for bilateral symmetry. Then the measure between two of these divisions of the circumference ($\sqrt{3}$) is copied along the central diameter, marking a point $\sqrt{3}-1$ above the centre of the circle, which becomes the centre of this arc, designated A.

The symmetrical arc just below the centre of the plan has a radius $1 + (2 - \sqrt{3})$, which is to say, the diameter less $\sqrt{3}$, added to the radius. See Fig. 4.1c. The measure $\sqrt{3} - 1$ is re-computed from the circumference of the circle this time (instead of from the centre). The same straight measure $\sqrt{3}$ between two-sixths of the circle's circumference, represented here by a line (1), has the radial measure 1 subtracted from it (2), and the resulting measure is copied (3) to the centreline. From the upper end of the diameter to this point is the radius of another arc, designated B.

The inner arc of the 'loop' in this plan has a radius $1 - \frac{1}{2}(\sqrt{3} - 1)$; in constructional rather than algebraic terms, its radius is the difference between the circle's radius (=1) and half the radius of arc A, same as half the nearest measure between arc B and the circle, already plotted. Any convenient method of halving a measure will be appropriate; the procedure shown (Fig. 1d) places the division such that its distance from the centre of the plan sets the radius for this third arc, designated C.

In this rudimentary plan, only partially sketched and in a medium that does not facilitate precision, the traits of coherent geometry cannot be mistaken. They can be expressed in modern notation for the radii of the three arcs,

$$B/A = \sqrt{3} \quad C/A = \frac{\sqrt{3}}{2} \quad B/C = 2$$

or they can be expressed in the tactile procedures which produced the primary, compass-drawn portions of the form of the Dunadd motif-piece.

One additional arc may be compass-drawn and relevant to the geometry of this plan. Where the path of arc C intersects a diameter running between the eight o'clock and two o'clock positions is the centre of arc D (Fig. 4.1e); its radius is the same measure $\frac{a}{2}$ already established. This one may be compass-drawn and then over-drawn by hand.

Two hand-drawn lines may participate in this plan as well—the nearly horizontal lines spacing the decorative cells from the centreline in the lower portion of the plan (Fig. 4.1f). The upper one seems to be $2a$ from the top, the lower one $1 + a$ from the top (same measure used in Fig. 1a); extending Arc A around the figure would mark its intersection with the lower part of the vertical axis. (If b is designated as the complement of a in the radius, the two horizontal lines are b and $2b$ from the bottom.)