Multi-facetted sundials

Scotland is rich in multi-facetted sundials, singularly rich in fact. One is hard pressed to find two the same. As well as being individual in appearance, each one combines an appreciation of science, mathematics, high skill in stonemasonry, art and spectacle in a single object. Besides all of that, most of them are remarkably old, dating from between 1625 and 1725 in round numbers. They are mainly found in the gardens of venerable country houses, sometimes castles, or if they have been moved then they come from old country estates. These dials have usually outlasted the original houses of the aristocracy who commissioned them. A good many are described and some illustrated in Mrs Gatty’s famous book of sundials\(^1\) and more recently in Andrew Somerville’s account of *The Ancient Sundials of Scotland*\(^2\).

Their widespread occurrence over Scotland attests to the fact that they were fashionable for about a century but, curiously enough, we don’t know why that was so. Were they just ‘fun’ to have in the garden, effectively a pillar with multiple clock faces on it, sometimes more than 50? Each dial is quite small so they aren’t precision instruments but people didn’t worry overmuch about the exact time of day in 1700. Were they a symbolic representation of ‘Science’ in the garden, a centre-piece and statement in a formal garden, just as later in the 18\(^{\text{th}}\) century one may have found an orrery in the library showing that the owner was *au fait* with the mechanism of the heavens? Alternatively, does the detail in their shape have some mystic significance now lost to the modern eye, or were they symbols of prestige or commemorative of marriage or a life well lived? Whatever the original motivation, multi-facetted sundials are still impressive for the learning that went into their design, for the craftsmanship that went into their making, for the pleasure they give to the eye and, if they still have their gnomons and hour lines, for the fact that some 350 years on they still do the job for which they were built.

Most sundials include an opaque edge (the gnomon) that casts a straight shadow and the dial is engraved with lines to show where the shadow falls at various hours of the day. The surface on which the lines are drawn is usually flat but it can be oriented horizontally, vertically or in any direction whatsoever. The skill of the ‘diailler’ is to draw the hour lines correctly for an arbitrary orientation\(^3\). The skill of the mason, who was probably the same person in the case of multi-facetted dials for they are all stone constructions, is to carve the device accurately. For added complication, and it surely needed a master mason to bring this off, the hour lines could be cut into spherical hollows in the stone or even more complicated shapes (scaphes) such as heart-shaped hollows. The simplest gnomon is a triangular piece of metal leaded into the stone but for some hollow shapes and orientations an edge of the stone could act as gnomon. The golden rule of dialling is that the shadow-
casting edge must be parallel to the Earth’s axis. This has two implications. First, all the gnomons in a multi-facetted dial must have their shadow-forming edges parallel. Secondly, a sundial has to be specifically made for the latitude of its site. For example, at the latitude of Aberdeen (57° N) the gnomons must make an angle of 57° to the horizontal and be aligned towards the celestial pole (near enough the pole star).

Multi-facetted dials tend to be classed as lectern shaped, obelisks (with dials on the upright) or complex polyhedrals but this is just a convenient way of describing appearance rather than flagging any known difference in purpose or significance. On our Scientific Tourist map I have flagged four examples in the locality of Aberdeen: a lectern dial at Castle Fraser (National Trust for Scotland (the only lectern dial in this part of the country. It has dials on five sides, including the top, with some dials using a stone edge as gnomon); a polyhedral dial at Pitmedden Gardens (also NTS), a cubical dial at Haddo House (NTS; the top gnomon was badly bent when I photographed it) and the 1707 dial at the Duthie Park (currently in a corner of the English Garden, shielded from the sun for most of the year and about as functional as a garden gnome). Andrew Somerville’s account that is referenced above lists these and some more in the locality including facetted dials at Pittodrie House and Guthrie Castle (now hotels), Kildrummy Gardens (open to the public), Glamis Castle (a bit far but perhaps the best in Scotland; open to the public) and in the private properties of Schivas House near Tarves, Ellon Castle, Midmar Castle, Kinnaird Castle Brechin, Lour House, Balnabmoon House and others. Access to these may be possible at some times of the year but I haven’t seen any of them. There’s the remnant of a cube dial at Stonehaven harbour.

I suspect that a lot of people who own a reasonable sized garden might say to themselves after seeing a few of these dials “I want one”. That may have been just the motivation of our ancestors 350 years ago. Today, though, you would really struggle to find someone who could make you one. The examples we can see are worth admiring and preserving: science, art and nature working in unison.

John S. Reid

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3 Nowadays the correct pattern can be calculated by computer from the necessary trigonometry. See, for example, the impressive program Shadows at http://www.shadowspro.com/en/index.html. Other programs and much more are recommended by the British Sundial Society at http://www.sundialsoc.org.uk/.