Chapter 15

Using Sundials

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The ancients, it seems, were fond of sundials. Hundreds of ancient dials survive. They are mentioned in literature and inscriptions, and two writers, Vitruvius and Cetius Faventinus, provide instructions on how to construct them. Even to list this material would be a major project, and in this paper I will limit the discussion to a relatively small and closely related set of topics: the basic characteristics of sundials (mostly Roman in date), the various ways the ancients used sundials, and some of the implications of all this.

In a book that appeared in 1976, Sharon L. Gibbs catalogued and described all of the Greek and Roman sundials she could find (256, some complete but many fragmentary), and her book remains the basic catalogue and starting point for work on sundials. Despite her diligence, Gibbs missed some dials, and a good many more have been found and published since 1976; Karlheinz Schaldach has apparently assembled a list of 501 dials. My own database, the sundials I will consider in this article, is smaller, including 310 whole or fragmentary dials. Surviving dials range in date from the fourth century BC to the
fourth or fifth century AD, and in size from an Egyptian limestone dial just 6.5 centimeters high to a dial now in Vienna that is 97.7 centimeters high, as well as a few the size of a building, including the dials on the Tower of the Winds in Athens. Sundials have been found in almost every large province of the Roman Empire (Britain and Lower Pannonia may be exceptions), and as far away as Afghanistan and Sudan. In towns, they can appear in large numbers: Gibbs lists no fewer than thirty dials from Pompeii and its immediate vicinity. Sundials, in short, were common items, close to ubiquitous by late antiquity, and most people in the Roman Empire had probably either consulted or at least seen one.

We can begin with a brief look at the design of a more or less typical ancient sundial (figure 15.1). Unlike modern dials, ancient sundials were seldom flat round disks. Occasionally they were plane surfaces, either vertical or horizontal, but about 80 percent of the known dials look something like the one in our figure. The dial-maker began with a block of stone, typically 20 to 40 centimeters high. He cut a rounded surface (often conical or hemispherical) into the stone, and on that surface he cut a grid of hour lines and day curves, as indicated. At the top, a metal gnomon extended out over the grid, and the dial was placed so that the gnomon pointed due south. As the sun rose in the east, the tip of the gnomon would cast a shadow on the upper edge of the western side of the curved surface. Then, as the sun rose higher and moved across the sky, the shadow would gradually move down and across the grid, crossing the first and then the second hour lines, and so on through the day. In my drawing, the gnomon’s shadow is falling between the third and the fourth hour lines, so we

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6 Early dials: Schaldach (2004), a fourth-century BC dial from the Amphiareum at Oropus; Rohr (1980), of ca. 300 BC. Late: Gibbs 5002G, cf. IG 2.3.5208, late fourth century AD; our figure 2 below, from Aphrodisias, perhaps fifth century AD.

7 The small Egyptian dial: Gibbs 1040G. Note also a tiny ivory dial from Tanis in Egypt, 5.1 cm. wide: Evans and Marée (2008). The Vienna dial, probably from Ephesus: Gibbs 3058G. Tower of the Winds: Schaldach (2006) 61–83. What has been recovered of the so-called Sundial of Augustus in Rome was almost certainly not a sundial that could mark the hours but a meridian line to mark the seasons: Heslin (2007).

8 The dials in my list come from at least twenty-one provinces. Afghanistan: Rohr (1980); Sudan: Catamo et al. (2000) 219–20 and Gibbs 3089.

9 I do not include portable dials in this paper. Schaldach (1998) 41–47 discusses them and provides a list of twenty known examples.