

The Horologium of Augustus as a sundial

Robert Hannah

Two aspects of the so-called Horologium of Augustus on the Campus Martius warrant renewed attention with regard to the monument as a sundial: the manner in which it could have measured the length of days and nights, and the play of the shadow beyond the line of the meridian. Both features have, I believe, been misunderstood in a recent review of the monument.¹ A fresh analysis allows us to see that the Horologium was a more complex instrument than is currently promoted.

1. Measuring the lengths of days and nights

In his description of outstanding Egyptian obelisks, both those in Egypt and more particularly those transported to Rome, Pliny the Elder (*NH* 36.72) makes special mention of the one brought by Augustus to the Campus Martius:

To the [obelisk] which is in the Campus [Martius] the divine Augustus has added a marvellous purpose, that of observing the shadows of the sun, and thus the lengths of both days and nights. A stone pavement was laid out in accordance with the height of the obelisk, equal to which was the shadow at the sixth hour on the day of the full winter solstice, and it would from day to day gradually decrease, and then again would increase, along lines, which were inserted of bronze, a thing worth knowing, and due to the ingenuity of Facundus Novius, the mathematician. He added on the apex a gold ball, at the top of which the shadow would be concentrated into itself, when otherwise the apex would spread diffusely, the theory, they say, being derived from the human head (my translation).

The astronomical acuity of Pliny's description is worth noting. I have translated, for instance, his phrase *brumae confectae die* as 'on the day of the full winter solstice', taking *confectae* to mean 'completed'. I assume that Pliny is implying the fact that the solstice can seem to the eye to occupy several days, as the sun rises or sets over practically the same spot on the horizon before shifting back along the horizon, or as the noontime shadow peaks at the same point over several days, and so he might be referring to the actual moment of the solstice on one particular day, as the astronomers would identify it. Modern English translations tend to ignore the word completely and so sidestep the issue, but measuring the actual time of the solstice, as opposed to its place via an azimuthal observation along the horizon at dawn/dusk or via a reading from the noontime shadows, is difficult, and in his choice of words Pliny indicates an awareness of the need for precision and a facility through the Horologium to demonstrate it.²

With this appreciation of Pliny's sensitivity towards astronomical accuracy, we should therefore approach his description of the purpose of the Horologium — 'observing the shadows of the sun, and thus the lengths of both days and nights' — with care. It makes

1 P. Heslin, "Augustus, Domitian and the so-called *Horologium Augusti*," *JRS* 97 (2007) 1-20.

2 A similar situation arises at *NH* 6.212, where Pliny talks of *aequinoctii die medio*, meaning 'on the middle day of the equinox' (rather than 'in the middle of the day of the equinox'), thereby implying a series of days within which the equinox was held to occur. Unlike the solstice, however, when the sun appears to stand still, at the equinox its position moves rapidly along the horizon, so pinpointing the actual position and then its date is a very difficult matter indeed. One can make a reasonable estimate of the position, and hence the date, by halving the distance along the horizon between the points of sunrise or sunset at the solstices, but this rough-and-ready method is quickly rendered too crude if one's horizon is anything but flat.