

SOME WATCHERS OF THE SKIES

Meleager, in assembling the poetic garland of his first epigram, picked palm-leaves to represent Aratus:¹

ἄστρον τ' ἴδριν Ἀρατον ὁμοῦ βάλεν οὐρανομάκευς
φοίνικος κείρας πρωτογόνους ἔλικας.

Much of his botanical symbolism seems haphazard, but here, as in his choice of the thistle to represent the prickly Archilochus,² it is peculiarly apt.³ The connection of palm-leaves with astronomy seems to have escaped notice, but emerges clearly in Clement's famous description of Egyptian priests in procession:⁴ μετὰ δὲ τὸν ὥδον ὁ ὠροσκόπος, ὠρολόγιόν τε μετὰ χεῖρα καὶ φοίνικα ἀστρολογίας ἔχων σύμβολα, πρόεισιν. Clement appears to find nothing odd in the φοῖνιξ as part of the astronomer's equipment, though its function, for the modern reader, is by no means as obvious as that of the clock, and we might easily suppose it to be more symbolic than useful. However, more than eighty years ago the painstaking researches of Ludwig Borchardt identified an example of this instrument in the Egyptological collections of the Berlin Museum, and explained its use;⁵ others have been discovered since. It consists of a straight palm-rib with a V-shaped slot cut in the wider end; the Berlin specimen is c. 34 cm. long and dated c. 600 B.C. This was regularly employed as a sighting-instrument, in conjunction with a plumb-line, and could be used for surveying as well as for astronomical observations; it was known as the *bay* (*en imy unut*) ('palm-rib (of the observer of hours)'). Even without the complementary plumb-line it would be of some use to an observer, since it would concentrate the vision and so give a sharper image. The device was cheap, and easy to demonstrate. Clement's description does not suggest that he regarded it as a provincial oddity, unlikely to be recognized outside Egypt, though by his time it must have appeared rather quaint; there seems no difficulty in supposing that it was familiar not only to Meleager himself, but also to his readers. The palm thus qualifies for its epithet οὐρανομάκευς on the strength of its longstanding services to astronomy.

For Vergil the astronomer's characteristic equipment is the *radius*:

Ecl. 3. 40–2:

in medio duo signa, Conon et – quis fuit alter,
descripsit radio totum qui gentibus orbem,
tempora quae messor, quae curvus arator haberet?

Aen. 6. 849–50:

caelique meatus
describent radio et surgentia sidera dicent.

¹ *Ep.* 1. 49–50 = Gow–Page, *HE* 3975–6.

² 37, cf. Archil. fr. 201.

³ Thus Gow (*Hellenistic Epigrams* ii. 104): 'The palm is perhaps selected with reference to Aratus' residence in Syria at the court of Antiochus I.'

⁴ *Strom.* 6. 4.

⁵ 'Ein altägyptisches astronomisches Instrument', *Zeitschr. f. Aeg. Sprache* 37 (1899), 10–17; see also his *Altägyptische Zeitmessung* (Berlin, 1920), pp. 53–4, Tafel 16. A convenient account may be found in I. E. S. Edwards, *The Pyramids of Egypt*² (Harmondsworth, 1961), pp. 258 ff.

Commentators from C. G. Heyne onwards appear unanimous in taking this to be a rod used for drawing figures and diagrams on the ground:⁶ Menalcas and Anchises, we are to suppose, envisage the astronomer lecturing to his pupils, like a geometrician. No doubt advanced instruction in applied mathematics might offer matter for poetry, but it lacks the immediate appeal of observational astronomy. That Conon's name comes so readily to Menalcas' mind may be seen (like much else in the *Eclogues*) as a tribute to Catullus, who depicts him in a manner appropriate to a great astronomer in poetry:⁷

Omnia qui magni dispexit lumina mundi,
qui stellarum ortus comperit atque obitus,
flammeus ut rapidi solis nitor obscuretur,
ut cedant certis sidera temporibus,
ut Triviam furtim sub Latmia saxa relegans
dulcis amor gyro devocet aereo.

From contemplation of the night sky the poet passes on swiftly to computation. He assumes readers sufficiently acute to realize that the study of solar eclipses (3) was a matter for calculation, not simple observation.⁸ Justice is done to the scientific nature of Conon's researches without the poet abandoning his cosmic panorama. With this splendid model before him, did Vergil really choose to represent his astronomers with their eyes fixed not on the starry heavens but on the dust of the earth?

It is clear that Servius interpreted *Ecl.* 3. 41 otherwise: '*Radius* id est virga philosophorum, per quam geometrica inventa est. Quando Nilus totam Aegyptum operuit, inde philosophi in aere mensurabant fines singulorum, qui deturbati fuerunt per aquae diluvium.' He evidently understood the *radius* to be a surveying instrument. Technology had advanced since the Egyptian observer of hours first split his palm-rib, and the basic sighting and measuring instrument of Hellenistic science was the *dioptra*, used for both surveying and astronomy. It is described thus by a recent writer:⁹ 'The dioptra consisted essentially of a long rod with two sights, one a fixed plate with a pin-point aperture, through which the observer looked, the other a movable plate which was aligned with the target.' *Radius* is clearly the right word for anything which 'consisted essentially of a long rod'; this, surely, was what Servius had in mind. His interpretation deserves attention all the more just because the usual blackboard-pointer theory gives a reasonable sense: there was no need for him to invent something to

⁶ '*Radius* enim proprie geometrarum virga est, qua in pulvere formas delineabant; nec in aliam rationem intelligendum videtur, quando Uraniae signis, aut, uti solenni more fit (cf. *Aen.* 6. 851), astronomis tribuitur, cum et figuris et numeris opus habeant.' This sounds slightly defensive, and the use of 'radius' in Avienus, *Arat.* 53–4, which Heyne quotes just before this, certainly does not favour his interpretation: 'hic (Jupiter) primum Cnidii radium senis intulit astris | mortalesque loqui docuit convexa deorum.' Later commentators appear to have had no qualms.

⁷ 66. 1 ff. Catullus' opening line is so far removed from his model that guesses about what Callimachus said where his text is not actually preserved are unrewarding. Callimachus presents Conon consulting his charts, at once more bookish and more realistic (fr. 110. 1): πάντα τὸν ἐν γραμμαῖσιν ἰδὼν ὄρον, ἧ τε φέρονται. Since Catullus clearly allowed himself considerable freedom, and by-passed Callimachus' more technical phraseology, it is perhaps legitimate to wonder whether Callimachus might have used κανὼν in this context in a way which suggested 'radius' to Vergil as the proper equipment for an astronomer.

⁸ This was not perhaps so safe an assumption with Roman readers as it might have seemed at Alexandria; experience shows that the point does not strike undergraduates as self-evident, and the astronomical vagaries of Roman poets suggest a rather low level of general knowledge in this area. But though the reader who fails to appreciate this misses something interesting, he will not be puzzled, and there would have been obvious disadvantages in attempting to bring it out more explicitly.

⁹ G. E. R. Lloyd, *Greek Science after Aristotle* (London, 1973), pp. 67–8, cf. fig. 10.

fill a vacuum. For Vergil's readers, who must have been familiar with the instrument concerned, the terminology was surely no more puzzling than are the periphrases for telescopes in *Paradise Lost*.¹⁰

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¹⁰ 1. 287 ff.: 'Like the moon, whose orb | Through optic glass the Tuscan artist views | At evening from the top of Fesole | Or in Valdarno to descry new lands, | Rivers or mountains in her spotty globe'; 3. 588 ff.: 'There lands the fiend, a spot like which perhaps | Astronomer in the sun's lucent orb | Through his glazed optic tube yet never saw'; 5. 261 ff.: 'As when by night the glass | Of Galileo, less assured, observes | Imagined lands and regions in the moon'. When he came to write *Paradise Regained* Milton was more specific and technical: 4. 40 ff. (Satan shows Christ the kingdoms of the world) 'By what strange parallax or optic skill | Of vision multiplied through air or glass | Or telescope, were curious to enquire', 4. 55 ff. (Satan boasts) 'Many a fair edifice besides, more like | Houses of gods (so well I have disposed | My aery microscope) thou mayest behold...' (One would prefer to believe that the last passage was intended to indicate some confusion on Satan's part rather than that Milton himself did not understand the difference between the two instruments: a parade of technical terminology disguising an inadequate grasp of the subject is just what one might expect of the Father of Lies. But the alarming implications of *PL* 3. 588 ff. (quoted above) indicate that Milton himself could make dangerous mistakes in this area.) See further M. Nicholson, 'Milton and the Telescope', *Journal of English Literary History* 2 (1935), 1 ff. I owe this reference to Mr Clay Jenkinson.