LECTURE ON A MASTER MIND

ERATOSTHENES OF CYRENE

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I AM not convinced that Eratosthenes qualifies for discussion as a Master Mind; if he was one, the ancients, who, unlike us, possessed more than the merest scraps of his writings, failed to observe it, and the modern world has on the whole passed him by as a man of many parts with a flair for making good guesses. If I succeed in persuading you that he possessed a mind which was both powerful and unbiased, original yet conservative, I shall have done as much as I hope to do.

Since my aim is to see if we can discover what sort of a person Eratosthenes was, and not what sort of a mathematician or what sort of a geographer, or literary critic, or poet, I must largely take for granted the contents of his various writings; I can only bring to your notice what seems to me to reveal, however disconnectedly, his main personal characteristics.[1]

First, let us try to establish a biographical background. The known facts are extremely scanty. Like other distinguished men of his age, he was a native of Cyrene, the great Greek city of North Africa, and was born there in about 285 B.C.[2] He passed his

[1] For details of the various writings of, and testimonia relating to, Eratosthenes I must refer the reader to my *Ptolemaic Alexandria* (Oxford, 1971), in which I have tried to describe Eratosthenes' individual works in the general context of Alexandrian science and literature. The present very brief sketch is intended to present some biographical aspects, some at least speculative, which fell outside the scope of that work. For reasons of space I largely confine myself here to the quotation of ancient evidence, where possible from Berger's *Die geographische Fragmente des Eratosthenes* (Berlin, 1880; for one or two addenda see Knaack, *RE*, s.v. Eratosthenes (4), cols. 366–7), and Jacoby's collection of the historical fragments (*FGrH* 241). For a select bibliography of Eratosthenes see Bibliographical Note at end, below, p. 34.

[2] Almost the whole biographical tradition is contained in the Suda-*Life*, which I here transcribe (T1): Ἐρατοσθένης Ἀγλαοῦ, οἱ δὲ Ἀμβροσίου· Κυρηναῖος, μαθητὴς Ἀρίστωνος τοῦ Χίου, γραμματικοῦ δὲ Λυσανίου τοῦ Κυρηναίου καὶ Καλλιμάχου τοῦ ποιητοῦ. μετεπέμφθη δὲ ἐξ Ἀθηνῶν ὑπὸ τοῦ τρίτου Πτολεμαίου, καὶ διέτριψε μέχρι τοῦ πέμπτου. διὰ δὲ τὸ δευτερεύειν ἐν παντὶ εἴδει παιδείας τοῖς ἄκροις ἐγγίσαντα Βῆτα ἐπεκλήθη· οἱ δὲ καὶ δεύτερον ἢ νέον Πλάτωνα· ἄλλοι Πένταθλον ἐκάλεσαν. ἐτέχθη δὲ ϙκϛ

youth there, but he spent his early manhood, until he was about 40, in Athens, and then, in about 245 B.C., he was offered by Ptolemy Euergetes, and accepted, the post of Librarian of the Royal Library of Alexandria. There he remained until he died at an advanced age at the very end of the century, to enjoy the posthumous privilege of being listed among the μακρόβιοι.

His life is divided by his move to Alexandria, and it is with the second half of it that his name is traditionally linked, as 'The great Alexandrian scholar', 'The leading figure at Alexandria in the later third century', and so on. However, his name was not pulled out of a hat by Euergetes, and his career, and still more his intellectual interests, before that date, must, if possible, be brought into focus.

Cyrene, μήτηρ μοι ζώουσα Κυρήνη, 'my living mother', as Callimachus called it, no doubt contributed much to his development, though, unlike Callimachus, he seems not to have belonged to a distinguished family—his own name, and that of his father Aglaus, are both otherwise unknown in the city. Cyrene, or her sons, made a major contribution to the intellectual life of Greece in the fourth century; above all in mathematics, but also in philosophy. In philosophy the hedonistic Cyrenaic school had enjoyed a considerable vogue in Athens in the fourth century, but had petered out in the early third century, when its last adherents appeared in Alexandria; and in mathematics no name stood higher than that of Theodorus, teacher of the Elements of geometry and stereometry to

'Ολυμπιάδι καὶ ἐτελεύτησεν π' ἐτῶν γεγονώς, ἀποσχόμενος τροφῆς διὰ τὸ ἀμβλυώττειν, μαθητὴν ἐπίσημον καταλιπὼν Ἀριστοφάνην τὸν Βυζάντιον, οὗ πάλιν Ἀρίσταρχος μαθητής. μαθηταὶ δὲ αὐτοῦ Μνασέας καὶ Μένανδρος καὶ Ἀριστις. ἔγραψε δὲ φιλόσοφα· καὶ ποιήματα· καὶ ἱστορίας· Ἀστρονομίαν ἢ Καταστερισμούς· Περὶ τῶν κατὰ φιλοσοφίαν αἱρέσεων· Περὶ ἀλυπίας· διαλόγους πολλούς· καὶ γραμματικὰ συχνά. The actual date of birth is uncertain, and opinions have varied between *c.* 300 and 275 B.C. Strab. 15 (T10) says that Eratosthenes was a disciple of Zeno of Citium, in Athens, and Zeno died in 260. It is particularly on this account that the date of birth given in the *Life*, Ol. 126 = 276–273 B.C., has been rejected. No correction to the last figure can be certain, and the adoption of $\overline{\rho\kappa\delta}$ (284–281) rather than e.g. $\overline{\rho\kappa\varepsilon}$ (280–277) indicates only (*a*) that he was probably about 20 when he was a disciple of Zeno, and (*b*) that the date of death early in the reign of Epiphanes (διέτριψε μέχρι τοῦ πέμπτου) corresponds to [Lucian's] statement that he died at the age of 82: *Macr.* 27 (T3): γραμματικῶν δὲ Ἐρατοσθένης μὲν ὁ Ἀγλαοῦ Κυρηναῖος, ὃν οὐ μόνον γραμματικὸν ἀλλὰ καὶ ποιητὴν ἄν τις ὀνομάσειε καὶ φιλόσοφον καὶ γεωμέτρην, δύο καὶ ὀγδοήκοντα οὗτος ἔζησεν ἔτη. Jacoby's dates for him, born in the 90s of the third century and died in 214/3 (the date given by Eusebius for his *floruit*), are too early: see *Ptol. Alex.*, ch. 6, note 205.

Theaetetus and Plato, and architect, it has been argued, of the Treasury of the Cyrenaeans at Delphi. Thus in the classical period the traditions of a varied intellectual activity were strong.

Side by side with this, however, and in spite of various revolutions which disturbed the city during the fifth century, there existed a deeply conservative vein in Cyrenaean life, which found expression socially and politically in the strong hold kept by the descendants of the Dorian settlers on military and civil offices, and in religion in the lasting reverence felt for Apollo, the Founder God, who had guided Battus to his new home, and whose rituals were celebrated in the splendid sanctuary on the terrace below the Acropolis.[1] This conservatism is also reflected in the magnificent funerary monuments, the free-standing and rock-cut tombs, mostly with Doric façades, cut in the escarpment on which the city stands, and in the gullies to east and west.[2] These Doric tombs of the Cyrenaeans formed at all periods a focal point of deep feeling for the sons of the city away from home. Dionysius of Cyzicus, who wrote the very fine epitaph on Eratosthenes, who died in Alexandria, laments that Cyrene has not received the bones of the old man and again invokes Cyrene as 'mother': οὐδὲ Κυρήνη | μαῖά σε πατρώιων ἐντὸς ἔδεκτο τάφων.[3] Such deep feeling also occurs with profound pathos in the epigram of Callimachus in which he mourns the death of a noble Cyrenaean brother and sister, envisaging the whole city as joining in the lament: κατήφησεν δὲ Κυρήνη | πᾶσα τὸν εὔτεκνον χῆρον ἰδοῦσα δόμον.[4] Finally, long centuries afterwards, at the time of the barbarian invasions of the Pentapolis, Synesius laments, ὦ μοι τῶν τάφων, ὧν οὐ μεθέξω, τῶν

[1] See *Ptol. Alex.* pp. 788–9, with the notes.

[2] See especially J. Cassels, *PBSR* 23, 1955, pp. 1–43, 'The Cemeteries of Cyrene', esp. pp. 17 ff.

[3] *AP* vii, 78 (Gow–Page, lines 1441 ff.):

Πρηύτερον γῆράς σε καὶ οὐ κατὰ νοῦσος ἀμαυρὴ
ἔσβεσεν, εὐνήθης δ' ὕπνον ὀφειλόμενον,
ἄκρα μεριμνήσας, Ἐρατόσθενες· οὐδὲ Κυρήνη
μαῖά σε πατρώιων ἔντὸς ἔδεκτο τάφων,
Ἄγλαοῦ υἱέ· φίλος δὲ καὶ ἐν ξείνηι κεκάλυψαι
πὰρ τόδε Πρωτῆος κράσπεδον αἰγιαλοῦ.

Dionysius of Cyzicus is not otherwise identifiable (see Gow–Page, ad loc., introdn.) but the epitaph seems to reflect a historical fact, and was no doubt composed, if not as the epitaph for Eratosthenes' tombstone, at least shortly after his death. The poet assures the name of Eratosthenes' father as Aglaus, as opposed to the alternative tradition (Ambrosios) recorded in the Suda, *Life*, above, p. 3, note 2.

[4] *Ep.* 2 (*AP* vii, 517; Gow–Page, lines 1193 ff.).

Δωρικῶν, 'Alas, for the Doric tombs in which I shall have no share'.[1] The voice of the exile is rare in Greek literature.

In the early Hellenistic period Cyrene became subject to Ptolemy I, and remained Ptolemaic almost uninterruptedly until the last century before Christ, when it passed under Roman rule. During the early part of Eratosthenes' life, however, from about 280 to 245, its ruler, Magas, Ptolemy Philadelphus' half-brother, established some degree of independence from Egypt, and it was not until the accession of Philadelphus' son, Euergetes, he who called Eratosthenes to Alexandria, that the city became once more, through the marriage of Euergetes to Magas' daughter, Berenice, a fully integrated part of the Ptolemaic Empire.[2] In spite of Magas' revolt, from the early third century onwards Cyrenaeans turned towards Alexandria, as before to Athens, as the natural centre of study and cultivated life, encouraged no doubt by the pre-eminence there of Callimachus. By the middle of the century they formed one leading intellectual group in the city.[3]

In view of the close link between Cyrene and Egypt it may seem surprising that Eratosthenes went to Athens for his student years, and not to Alexandria. If it was his own decision, it suggests that he had already determined to study philosophy; for that you had to go to Athens, to the great schools there. Alexandria was never a centre of philosophy until the minor schools of the New Academy and of the Neo-Sceptics developed there in the first century B.C. So to Athens the young man went, in about 270 B.C.

Strabo tells us that in Athens Eratosthenes frequented the Porch and the Academy, hearing Zeno, 'the Wise Swan', at the one, and the eloquent but undistinguished Ariston of Chios, dubbed 'the Siren', at the other.[4] Evidently neither Zeno nor

[1] See the references in *Gnomon*, 29, 1957, p. 20, note 2.

[2] See the brief summary in *BSAAlex.* 39, 1951, p. 135, note 1; cf. also Machu, *Rev. Hist.* 205, 1951, pp. 49–50.

[3] See *Ptol. Alex.*, pp. 777 ff.

[4] Strab. 15 (T10): ἔστι δ' ὁ Ἐρατοσθένης οὐχ οὕτως εὐκατατρόχαστος ὥστε μηδ' Ἀθήνας αὐτὸν ἰδεῖν φάσκειν, ὅπερ Πολέμων ἐπιχειρεῖ δεικνύναι, οὔτ' ἐπὶ τοσοῦτον πιστός, ἐφ' ὅσον παρεδέξαντό τινες, καίπερ πλείστοις ἐντυχών, ὡς εἴρηκεν αὐτός, ἀγαθοῖς ἀνδράσι. "ἐγένοντο γάρ," φησίν, "ὡς οὐδέποτε κατὰ τοῦτον τὸν καιρὸν ὑφ' ἕνα περίβολον καὶ μίαν πόλιν οἱ [καὶ] κατ' Ἀρίστωνα καὶ Ἀρκεσίλαον ἀνθήσαντες φιλόσοφοι." . . . ὁ δὲ Ἀρκεσίλαον καὶ Ἀρίστωνα τῶν καθ' αὐτὸν ἀνθησάντων κορυφαίους τίθησιν, Ἀπελλῆς τε αὐτῶι πολύς ἐστι καὶ Βίων, ὃν φησι πρῶτον ἀνθινὰ περιβαλεῖν φιλοσοφίαν· ἀλλ' ὅμως πολλάκις εἰπεῖν ἄν τινα ἐπ' αὐτοῦ τοῦτο "οἵην ἐκ ῥακέων ὁ Βίων". ἐν αὐταῖς γὰρ ταῖς ἀποφάσεσι ταύταις ἱκανὴν ἀσθένειαν ἐμφαίνει τῆς ἑαυτοῦ γνώμης· ἧι τοῦ Ζήνωνος τοῦ Κιτιέως γνώριμος γενόμενος Ἀθήνησι τῶν μὲν ἐκεῖνον διαδεξαμένων οὐδενὸς μέμνηται, τοὺς δ'

Ariston satisfied him. His criticisms of them, in his work, the *Ariston*, bring us face to face with the question of his philosophical standpoint, and, I may add, standing. As so often, we have to see the problem through the comments of Strabo. He quotes Eratosthenes as saying that in Athens 'more philosophers were gathered together in my time within one city—I mean the contemporaries of Ariston and Archelaus—than at any previous time', and he apparently went on to criticize not only Ariston himself, but also Bion, the Cynic. To Strabo's annoyance, he did not include Zeno or his successors among those who were eminent at the time. Strabo greatly admired Eratosthenes, but he was a devoted Stoic, and Eratosthenes' tacit dismissal of Zeno ruled him out of consideration as a serious philosopher—he describes him as a vacillating dilettante: 'all his philosophical writings', he says, 'go to show his point of view; it is that of a man who is caught midway between his desire to be a philosopher and his reluctance to devote himself entirely to his calling, and who advances only so far as to appear to be one; or of a man who has taken up philosophy as an instructive hobby; and in some ways', he ends up, 'he shows the same features in his other work'.[1] Those are strong words. They at any rate crystallize at once the issue of the dilettanteism of Eratosthenes. Unfortunately, as far as philosophy is concerned, where the charge is pressed, we can hardly form a judgement, for almost nothing survives of the writings which evoked Strabo's criticism. I would only say that his attitude, as it appears from Strabo, seems to have been essentially one of individual eclecticism—I stress the word 'individual', which seems to give the key to most of Eratosthenes' intellectual activities. The Stoics, the

ἐκείνωι διενεχθέντας καὶ ὧν διαδοχὴ οὐδεμία σώιζεται, τούτους ἀνθῆσαί φησι κατὰ τὸν καιρὸν ἐκεῖνον. Polemon's rhetorical claim in his Περὶ τῆς Ἀθήνησιν Ἐρατοσθένους ἐπιδημίας that Eratosthenes had never been in Athens, was evidently an exaggerated form of attack, probably on account of some errors of Eratosthenes in his work on Attic comedy, and is not to be taken seriously: see the discussion in Preller, *Polem. Iliens. Fragm.*, pp. 85–7, and *Ptol. Alex.*, ch. 6 note 13, for a bibliography of the problem. Apelles was a Chian γνώριμος of Arcesilaus who survives only as a slightly ridiculous figure: see the anecdotes in Athen. 420 C–E and Plut. *Mor.* 63D.

[1] Strab., in continuation of the passage in the previous note: δηλοῖ δὲ καὶ ἡ Περὶ τῶν ἀγαθῶν ἐκδοθεῖσα ὑπ' αὐτοῦ πραγματεία καὶ μελέται καὶ εἴ τι ἄλλο τοιοῦτο τὴν ἀγωγὴν αὐτοῦ· διότι μέσος ἦν τοῦ τε βουλομένου φιλοσοφεῖν καὶ τοῦ μὴ θαρροῦντος ἐγχειρίζειν ἑαυτὸν εἰς τὴν ὑπόσχεσιν ταύτην, ἀλλὰ μόνον μέχρι τοῦ δοκεῖν προϊόντος, ἢ καὶ παράβασίν τινα ταύτην ἀπὸ τῶν ἄλλων τῶν ἐγκυκλίων πεπορισμένου πρὸς διαγωγὴν ἢ καὶ παιδιάν· τρόπον δέ τινα καὶ ἐν τοῖς ἄλλοις ἔστι τοιοῦτος. ἀλλὰ ἐκεῖνα εἰάσθω· πρὸς δὲ τὰ νῦν ἐπιχειρητέον, ὅσα δύναιτ' ἄν, ἐπανορθοῦν τὴν γεωγραφίαν.

Cynics, the Epicureans, were all criticized by him—but for what? Not exactly for philosophical incompetence or unawareness, but for a common quality of what he regarded as intellectual pretence. Of Ariston, his own teacher in Stoicism, who, like other Hellenistic philosophers, tended to ostentation and self-indulgence, he says: 'I caught him too once red-handed, undermining the party-wall between pleasure and virtue, and emerging on the side of pleasure',[1] in brief, not living up to his claims as a practising philosopher. And again, his description of Bion, the Borysthenite popular teacher and tub-thumper, that though he dressed his message in the flowery robes of a harlot,[2] his dry shanks showed through, seems to show a disapproval or contempt that is moral rather than intellectual.

The main product of the varied philosophical training of these years probably lay not in his biographical sketch of Ariston, but in his *Platonicus*, from which several quotations survive. The nature of this treatise is not certain, but it seems to have contained both Eratosthenes' own mildly Platonic philosophical views and some mathematical speculation of a Platonic

[1] Athen. 281 (F17): Ἐρατοσθένης γοῦν ὁ Κυρηναῖος, μαθητὴς γενόμενος Ἀρίστωνος τοῦ Χίου, ὃς ἦν εἷς τῶν ἀπὸ τῆς Στοᾶς, ἐν τῶι ἐπιγραφομένωι Ἀρίστωνι παρεμφαίνει τὸν διδάσκαλον ὡς ὕστερον ὁρμήσαντα ἐπὶ τρυφήν, λέγων ὧδε· "ἤδη δέ ποτε καὶ τοῦτον πεφώρακα τὸν τῆς ἡδονῆς καὶ ἀρετῆς μεσότοιχον διορύττοντα καὶ ἀναφαινόμενον παρὰ τῆι ἡδονῆι."

[2] Strab., loc. cit., p. 178 note 4 (cf. also D. L. iv. 52). Although Strabo says that Bion, like Apelles, was 'much mentioned' (πολύς) by Eratosthenes, presumably with approval, it is likely that in this particular context at least Eratosthenes was speaking disapprovingly of Bion, for ἀνθινὰ περιβαλεῖν surely refers to the flowery robes of the hetaera, described by Phylarch., *FGrH*, 81, F 45, speaking of Syracuse: παρὰ Συρακοσίοις νόμος ἦν τὰς γυναῖκας μὴ κοσμεῖσθαι χρυσῶι μηδὲ ἀνθινὰ φορεῖν μηδ' ἐσθῆτας ἔχειν πορφυρᾶς ἐχούσας παρυφὰς ἐὰν μή τις αὐτῶν συγχωρῆι ἑταίρα εἶναι κοινή; cf. also *IG* xi. 1300 (*lex sacra* of the Delian Serapeum): ἀπ' οἴνου μὴ προσιέναι μηδ' ἐν ἀνθινοῖς (cf. *IG* v (2), 514, line 6, *lex sacra* of Lycosura). In *LS*[8–9] Eratosthenes is taken to be referring to the fact that Satyrs wore ἀνθινά at the Anthesteria, and hence to Bion's verses as sarcastic, 'he clothed his philosophy in motley'—disapproving, too, no doubt, but less so. In either case, Strabo's ἀλλ' ὅμως suggests that he misinterpreted Eratosthenes' opinion of Bion, for the use of ἀνθινά and the parody of the description of Odysseus are in accord with one another; cf. the discussion by Bernhardy, *Eratosthenica*, pp. 188–9. Schwartz, *Charakterköpfe*,[4] p. 193, takes the reference as entirely complimentary: 'Auch Eratosthenes huldigte dem neuen Gestirn und verglich Bion mit Odysseus, dessen kraftvolle Muskeln die Freier anstaunen, als er seine Lumpen zum Faustkampf mit dem Bettler Iros schürzt.' The same words are attributed to Theophrastus in *P. Hercul.* 1055, line 15, Βίωνος τοῦ κατὰ Θεόφραστον π⟨ρώ⟩του φιλοσοφίαν ἀνθινοῖς κοσμήσαντος, but Susemihl, *Gesch. Alex. Lit.* i, p. 100 (note 449) is probably right in regarding this as an error of the author (Demetr. Lacon?)

kind. It has therefore been plausibly argued that it was a dialogue in which the ideas of the *Timaeus* loomed large. The substance was, however, not wholly Platonic, for the principle expressed in it, of the harmony of the Universe, which found its reflection in the mathematical principles of interval, ratio, and proportion, was peculiarly Eratosthenes'.[1]

Let us suppose, then, that the philosophical part of Eratosthenes' work was written, or at least formulated, in Athens, and that he did not develop those studies in Alexandria; during his long residence there his interests were turned in other directions, and, in any case, even if he was not disillusioned by his Athenian experiences, Alexandria was not the place for philosophy. In addition, while some of Eratosthenes' mathematical work is expressly linked with his Alexandrian period, it is quite certain from the *Platonicus* that he learnt his mathematics in Athens, in the school of Plato, as Euclid had before him.[2] Although Plato himself had little time for geometrical demonstrations, the mathematical traditions of the Academy were very strong, and this Platonic tradition, which was transferred to Alexandria in the first place by Euclid, was thus strengthened by Eratosthenes.

If I am right, then, Eratosthenes' philosophical studies and writings, and some, though not all, of his mathematical works, were already known, when Euergetes' invitation to become Librarian of the Royal Library reached him shortly after 245.[3]

for Ἐρατοσθένους. For another very sharp criticism by Eratosthenes see F 32, his description of Demosthenes as an orator as παράβακχος, 'theatrical'.

[1] For the *Platonicus* see especially Solmsen, *TAPA* 73, 1942, pp. 192–213, and E. P. Wolfer, *Eratosthenes von Kyrene als Mathematiker und Philosoph* (Gröningen, 1954), pp. 4 ff.; more briefly, *Ptol. Alex.*, ch. 7 (ii), p. 410, and notes 269 ff.; ch. 9, pp. 482–3, and notes 29 ff. Wolfer argues convincingly that the work was a dialogue (the Suda-*Life*, above, p. 176, note 1, lists διαλόγους πολλούς among the writings of Eratosthenes), on the ground that it seems to have attributed to Plato theories, particular regarding harmony, which are in contradiction with his known views, and correspond with those attributed elsewhere to Eratosthenes.

[2] For Euclid's Platonic links see Procl. *In Eucl. Elem.* i, p. 68 (Ivor Thomas, *Hist. Greek Maths.* i, p. 154): νεώτερος μὲν οὖν ἐστι τῶν περὶ Πλάτωνα, πρεσβύτερος δὲ Ἐρατοσθένους καὶ Ἀρχιμήδους . . . καὶ τῇι προαιρέσει δὲ Πλατωνικός ἐστι καὶ τῇι φιλοσοφίαι ταύτηι οἰκεῖος, ὅθεν δὴ καὶ τῆς συμπάσης Στοιχειώσεως τέλος προεστήσατο τὴν τῶν καλουμένων Πλατωνικῶν σχημάτων σύστασιν. For the interpretation of this passage, and the undoubted Platonic bias of Proclus here see *Ptol. Alex.*, ch. 7 (ii), pp. 389–90 with notes 105 ff.

[3] See the Suda-*Life*, quoted above, p. 176, note 1. For the complex problem of the sequence of the Librarians, in which the assumption of office by Eratosthenes forms a reasonably fixed point, see *Ptol. Alex.*, ch. 6, pp. 331 ff. There is no evidence at what point in the reign of Euergetes (245–221) the summons

In the past others had refused such invitations, for in the early Hellenistic age life at court was not to everybody's liking. Diphilus had written at that time:

> αὐλὰς θεραπεύειν δ' ἐστιν, ὡς ἐμοὶ δοκεῖ,
> ἢ φυγάδος ἢ πεινῶντος ἢ μαστιγίου.[1]

but times changed, and in the mid third century the average feeling was perhaps rather that of the bawd in Herodas' First Mime:

> τὰ γὰρ πάντα
> ὅσσ' ἔστι κου καὶ γίνετ' ἔστ' ἐν Αἰγύπτωι·
> πλοῦτος, παλαίστρη, δύναμις, εὐδίη, δόξα,

—and all the other allurements that she then recounts, including 'the good king'.[2] There was no reason then for Eratosthenes to refuse. As a child he had been familiar with Ptolemaic rule in Cyrene, and now Alexandria and the Kingdom of the Ptolemies were at their zenith, and the new king, Euergetes, had but recently returned from his dramatic military campaign against his Seleucid counterpart, far into Mesopotamia; Alexandria was enjoying that 'golden calm', that εὐδίη, to which Herodas referred—the word was almost a slogan in Alexandria in the third and second centuries.[3] The offer, moreover, was of a post which carried unique prestige in the capital: the Librarian was, in addition to his professional duties, customarily tutor to any royal children there might be, and lived in the closest intimacy with the Royal family.[4] Scholarly reasons were also compelling. The Library could offer unrivalled material for his own studies,

to Eratosthenes came, but a date much later than 245/4 is unlikely because of the very extended tenure of office this imposes on Apollonius of Rhodes, who preceded him; and if my conjecture as to Euergetes' reasons for choosing Eratosthenes happens to be correct, then a date very shortly after his accession is most natural.

[1] *CAF* ii, p. 572 no. 97, an isolated quotation, from Athen. 189E (who also quotes an isolated line of Menander (*CAF* iii, p. 235, fr. 897; fr. 668, Körte), αὐλὰς θεραπεύειν καὶ σατράπας (cf. also *CAF* ibid., p. 437, Adesp. 145: τὰς σὰς θεραπεύω μᾶλλον ἀγκάλας ἐγὼ | ἢ τὰς ἁπάντων τῶν σατραπῶν καὶ βασιλέων | αὐλάς)). On chronological grounds it is hardly possible that Diphilus' gibe refers to Greek service with the Persian kings and satraps.

[2] *Mim.* i, lines 26 ff. For the relevance of these lines to the question whether Herodas was writing in Egypt see *Ptol. Alex.*, ch. 10 (iv) note 30.

[3] For εὐδία see *OGIS* 90 (Rosetta Stone), line 11, of Epiphanes: ἕνεκα τοῦ τὴν Αἴγυπτον εἰς εὐδίαν ἀγαγεῖν καὶ τὰ ἱερὰ καταστήσασθαι; in Hedylus' poem about the figure of Bes in the temple of Arsinoe at Zephyrion, Athen. 497D–E (Gow, lines 1843 ff.), Arsinoe herself is called εὐδίη. Cf. further, *Ptol. Alex.* ch. 10 (iv) note 157.

[4] See *Ptol. Alex.*, pp. 308 ff.

and Alexandria headed the field in almost all branches of learning, other than philosophy; and philosophy, as I have suggested, no longer claimed his closest interests. On the personal side too the move must have been welcome; many Cyrenaeans frequented the Alexandrian court and sat at the feet of Callimachus, and it was natural for Eratosthenes to join the circle, though it was not in his nature to wish to lead it.

Yet there is a question. Why did Euergetes invite him? What had he accomplished to justify this invitation to step into the shoes of his predecessor, the poet Apollonius? How much had he achieved by the age of 40? Some minor and possibly unmethodical philosophical writing and mathematical work in the Platonic tradition: beyond that it is difficult to say. The great geographical work certainly belongs to his Alexandrian period, and I would have difficulty in believing that his chronography and his studies in Attic Comedy do not also, for they entailed detailed research most easily carried out in the Library. In any case, I suspect that the answer does not lie solely, or even primarily, in his achievement, but in two different considerations. First, I think it likely that, just at this time, Euergetes wished to make a gesture of reconciliation towards his newly united province of Cyrene;[1] and second, that he wished to gratify in particular two people close to him, his wife Berenice, daughter of Magas, by his marriage to whom the regions of Egypt and Cyrenaica had been reunited, and whose deep love and concern for him had been expressed in the dedication of her lock of hair, the loss of which, in turn, had been eloquently celebrated by Callimachus—the other person he wished to gratify. With Callimachus Euergetes must have stood on the most intimate terms since he was a young Crown Prince thirty years before, and in spite of a lifetime spent in the capital Callimachus never lost his love of Cyrene; and it would be natural in him to wish to see a Cyrenaean at the head of the Library and to use his influence with Euergetes to that end. These factors, I suggest, conspired to lead Euergetes to seek at this juncture a Cyrenaean to fill the post conveniently vacated by Apollonius. Eratosthenes was certainly the most distinguished of the younger generation of Cyrenaeans—Philostephanus and Ister, his contemporaries, were men of limited attainments, who owed much to their master, Callimachus, and hardly stood in

[1] For the acquisition of Cyrene by Euergetes see the references in p. 178, note 2 above.

their own right as men of significant achievement;[1] while Callimachus himself, who had avoided administrative duties so long, is not likely to have wanted them now, when he was hardly less than sixty. Moreover, the choice of Eratosthenes is perhaps to be related to one yet further consideration. As Pfeiffer has reminded us,[2] the first scholars of the Hellenistic world—of Alexandria—were the poets: Philitas, the Coan, the first poet and the first grammarian on the Alexandrian scene, as well as the tutor of Philadelphus; Zenodotus, the first Librarian, who had a shadowy reputation as a poet as well as being a scholar; Apollonius of Rhodes, Librarian after Zenodotus; Callimachus himself; and finally Eratosthenes, man of varied learning, φιλόλογος, as he called himself,[3] and poet. As long as poets were available—the supply ran out in the second century—the Ptolemies sought poets as Librarians, and, as Cyrenaean and as poet, Eratosthenes was in the circumstances Euergetes' natural choice. It is sad that so little of Eratosthenes' poetry remains that we can hardly estimate its quality; but let us at least remember that the author of the *De Sublimitate* referred to his *Erigone*, a story with an Attic theme, as 'an altogether faultless little poem', διὰ πάντων ἀμώμητον ποιημάτιον.[4]

[1] For Philostephanus and Ister as pupils of Callimachus see *Ptol. Alex.*, pp. 777 ff.

[2] See R. Pfeiffer, *History of Classical Scholarship* (Oxford, 1968), pp. 87 ff. On p. 152 Pfeiffer writes that Eratosthenes 'seems to have been the first scholar and poet who was primarily and truly a scientist; for his poetry was, if we compare it with the bewildering width and variety of his other works, no more than a small πάρεργον. . . . So far scholarship had been the domain of poets and their pupils. But in the middle of the third century B.C. the union of poetry and scholarship split up; learning was advancing, poetry was in retreat.' This excellent statement seems to me to need a little qualification: what was true at the end of Eratosthenes' long career was not necessarily true at the beginning, and the circumstances which led to the appointment of indifferent 'career' (and 'non-career', even military) librarians in the second century did not exist in the middle of the third. Euergetes naturally looked for a poet, and, in the framework I have tried to construct, Eratosthenes passed primarily as a poet, or equally as a poet and as a mathematician.

[3] For the term, and its application by Eratosthenes to himself, see *Ptol. Alex.*, ch. 6 note 90.

[4] *De Sublim.* 33, 5 (part of his discussion of the contrast between genius and faultlessness; cf. D. A. Russell's edn. (Oxford, 1964), pp. 157 ff.): ἆρ' οὖν Ὅμηρος ἂν μᾶλλον ἢ Ἀπολλώνιος ἐθέλοις γενέσθαι; τί δέ; Ἐρατοσθένης ἐν τῇι Ἠριγόνηι (διὰ πάντων γὰρ ἀμώμητον τὸ ποιημάτιον) Ἀρχιλόχου πολλὰ καὶ ἀνοικονόμητα παρασύροντος, κἀκείνης τῆς ἐκβολῆς τοῦ δαιμονίου πνεύματος ἦν ὑπὸ νόμον τάξαι δύσκολον, ἆρα δὴ μείζων ποιητής; as Russell points out, ad loc., Plut. *Mor.* 699A, calls Eratosthenes κομψός in quoting a line of his poetry (fr. 25, Powell). The uninspired faultlessness of the *Erigone*, if it had already been published, no doubt recommended Eratosthenes to his prospective patron.

The invitation from Euergetes was addressed, then, primarily to a poet, and not to a scientist, and it was as a poet that he became Librarian. But his mind was, and continued to be, preoccupied with mathematical problems. As poet and as mathematician, in due course he paid his new master homage in the remarkable composition in which he provided a solution to the familiar 'Delian Problem', the problem how to double a cube, which had been reduced by Hippocrates of Chios to the problem how to find two mean proportionals in continued proportion between two straight lines of which the greater is double the lesser. Many geometrical solutions of this problem had been propounded, but none worked; that is to say, none could be mechanically constructed.[1] Eratosthenes proposed a geometrical proof by means of parallelograms, and constructed an instrument which he called a mesolabe (μεσόλαβον), on which 'means' (μεσόγραφα) could be calculated. The proof, accompanied by an elegiac poem recommending the mesolabe, was inscribed on a stele dedicated by the poet to Euergetes, which also carried a bronze model of the instrument.[2] This lively little poem ends with a personal profession of the poet, his seal, *sphragis*, in which he shows his ability to write laureate verse:[3]

Εὐαίων Πτολεμαῖε, πατὴρ ὅτι παιδὶ συνηβῶν
πάνθ' ὅσα καὶ Μούσαις καὶ βασιλεῦσι φίλα,
αὐτὸς ἐδωρήσω· τὸ δ' ἐς ὕστερον, οὐράνιε Ζεῦ,
καὶ σκήπτρων ἐκ σῆς ἀντιάσειε χερός·
καὶ τὰ μὲν ὥς τελέοιτο, λέγοι δέ τις ἄνθεμα λεύσσων,
"Τοῦ Κυρηναίου τοῦτ' Ἐρατοσθένεος".

[1] For the 'Delian Problem', and a detailed discussion of Eratosthenes' contribution to it, see *Ptol. Alex.*, pp. 410 ff. The poem is preserved in Eutocius' Commentary on Archimedes' *De Sphaera et Cylindro* (Archim. *Op.* iii, pp. 88 ff.; Ivor Thomas, op. cit. i, pp. 290 ff.; Powell, *Coll. Alex.*, p. 66).

[2] The only indication of the date of composition of the poem lies in lines 13–15, παιδὶ συνηβῶν | ... αὐτος ἐδωρήσω, which, if taken literally, indicate that Philopator was no longer an infant and probably at least ten years old. Unfortunately the date of his birth is uncertain (see Blum, *BCH* 39, 1915, pp. 19 ff., and the summary by Volkmann, *RE*, s.v. Ptolemaios (iv), col. 1678 (where Blum's article is wrongly assigned to *BCH* vol. 49)). Blum argued for a late date, after 238/7, on account of the absence of any reference to the children of the royal couple in the Canopus Decree (*OGIS* 56 line 8); they are first mentioned in Greek papyri in 236/5 (*PPetr.* iii, 10).

[3] The lines preceding those quoted in the text are:

Εἰ κύβον ἐξ ὀλίγου διπλήσιον, ὠγαθέ, τεύχειν
φράζεαι, ἢ στερεὴν πᾶσαν ἐς ἄλλο φύσιν

Blessed art thou, Ptolemy [the word 'blessed', εὐαίων, is another typically Alexandrian word][1]—because, a father enjoying his son's youth with him, thou didst bestow on him all that is beloved by the Muses and by Kings; and for the future, heavenly Zeus, may he also receive the sceptre from thy hands. Thus may it come to pass, and may whoever sees this dedication say, 'This is the offering of the Cyrenaean Eratosthenes.'

The monument and the poem are not the only indication that Eratosthenes' mathematical studies continued in Alexandria. They were indeed probably intensified and deepened in his early years there by a close friendship which developed between him and Archimedes.[2] During a brief stay in the city, probably at about the time that Eratosthenes moved there, Archimedes formed friendships with two young and brilliant mathematicians, Dositheus and Conon, to whom he submitted many of his proofs before publication. The letters, written from Syracuse, with which he prefaced his published works, provide a lively and attractive picture of the relationship between the great man and his pupils; in them he explains, in deceptively rustic Doric, the problems he is trying to solve, the difficulties he is encountering, and the value that he places on his young friends' criticisms. Then suddenly, to his great grief, Conon died; he says in his introduction to the *De Sphaera et Cylindro*, addressed to Dositheus, that that work should have been published while Conon was still alive—'for he, more than anyone, would have appreciated these problems and have been able to decide suitably about

εὖ μεταμορφῶσαι, τόδε τοι πάρα, κἂν σύ γε μάνδρην
ἢ σιρὸν ἢ κοίλου φρείατος εὐρὺ κύτος
τῆιδ' ἀναμετρήσαιο, μέσας ὅτε τέρμασιν ἄκροις
συνδρομάδας δισσῶν ἐντὸς ἕλῃις κανόνων.
Μηδὲ σύ γ' Ἀρχύτεω δυσμήχανα ἔργα κυλίνδρων
μηδὲ Μεναιχμείους κωνοτομεῖν τριάδας
διζήσηι, μηδ' εἴ τι θεουδέος Εὐδόξοιο
καμπύλον ἐγ γραμμαῖς εἶδος ἀναγράφεται.
Τοῖσδε γὰρ ἐν πινάκεσσι μεσόγραφα μυρία τεύχοις
ῥεῖά κεν, ἐκ παύρου πυθμένος ἀρχόμενος.

[1] Cf. Call. *Ep.* 51 (Gow–Page, lines 1121 ff.) lines 3–4, of Berenice, Euergetes' wife:

Εὐαίων ἐν πᾶσιν ἀρίζηλος Βερενίκα
ἆς ἄτερ οὐδ' αὐταὶ αἱ Χάριτες Χάριτες.

Cf. also Page, *Greek Lit. Pap.* I, no. 105, *a*, a poem commemorating the dedication of a temenos to Homer by Ptolemy Philopator, line 2: εὐαίων Πτολεμ[αῖε . . .]. The occurrence of the phrase in the poem of Eratosthenes is a guarantee of the poem's authenticity. Cf. also Pfeiffer, *Hist. Class. Schol.*, p. 155.

[2] For what follows see *Ptol. Alex.*, pp. 400 ff.

them'.[1] Conon's place as confidant was taken in part by Eratosthenes, and Archimedes' *Method*, dealing with mechanical problems, addressed to Eratosthenes, contains a judgement on him which, in view of the august source from which it comes, we shall do well to remember, when we weigh the charge of dilettanteism:

> I sent you on a former occasion some of the theorems discovered by me, merely writing out the enunciations and inviting you to discover the proofs which at that moment I did not give . . . These proofs I now send you. Seeing in you a zealous student of philosophy and a man who gives due value to any mathematical investigations that may arise, I have thought fit to write to you . . .[2]

Archimedes' openhanded and unselfish readiness to share his mathematical inquiries with his colleagues in Alexandria not only gave an impetus to such studies there in the period between Euclid and Apollonius of Perge, but also created a community of mathematically interested persons from Sicily to Egypt. In Alexandria Eratosthenes evidently stood at the centre of these studies, though he does not seem to have contributed to the formal development of the Elements of plane or solid geometry. In mathematics, as in all other fields, he went his own way, and though his writings exercised considerable influence on some who came after him, he did not, as Euclid and others did, create a school of followers by lecturing and teaching.

It is, however, not as a philosopher, nor as a mathematician, but as a geographer that Eratosthenes is a household name. It is, I think, certain that his geographical work was the main occupation of the second, Alexandrian half of his life—both the

[1] *De Sphaera et Cylindro* (Archim. *Op.* ii, pp. 262 ff.; Ivor Thomas, op. cit. ii, pp. 229–33), p. 262: Ἀρχιμήδης Δοσιθέωι εὖ πράττειν· ἀκούσας Κόνωνα μὲν τετελευτηκέναι, ὃς ἦν οὐδὲν ἐπιλείπων ἁμὶν ἐν φιλίαι, τὶν δὲ Κόνωνος γνώριμον γεγενῆσθαι καὶ γεωμετρίας οἰκεῖον εἶμεν, τοῦ μὲν τετελευτηκότος εἵνεκεν ἐλυπήθημες ὡς καὶ φίλου τοῦ ἀνδρὸς γεναμένου καὶ ἐν τοῖς μαθημάτεσσι θαυμαστοῦ τινος, ἐπροχειριζάμεθα δὲ ἀποστεῖλαί τοι γράψαντες ὡς Κόνωνι γράφειν ἐγνωκότες ἦμες, γεωμετρικῶν θεωρημάτων, ὃ πρότερον μὲν οὐκ ἦν τεθεωρημένον, νῦν δὲ ὑφ' ἁμῶν τεθεώρηται, πρότερον μὲν διὰ μηχανικῶν εὑρεθέν, ἔπειτα καὶ διὰ τῶν γεωμετρικῶν ἐπιδειχθέν.

[2] *Meth.* (op. cit. ii, pp. 426 ff.; Ivor Thomas, ii, pp. 220–8), p. 426 lines 2 ff.: ἀπέστειλά σοι πρότερον τῶν εὑρημένων θεωρημάτων ἀναγράψας αὐτῶν τὰς προτάσεις φάμενος εὑρίσκειν ταύτας τὰς ἀποδείξεις, ἃς οὐκ εἶπον ἐπὶ τοῦ παρόντος . . . (p. 428 lines 18 ff.) ὁρῶν δέ σε, καθάπερ λέγω, σπουδαῖον καὶ φιλοσοφίας προεστῶτα ἀξιολόγως καὶ τὴν ἐν τοῖς μαθήμασιν κατὰ τὸ ὑποπῖπτον θεωρίαν τετιμηκότα, ἐδοκίμασα γράψαι σοι καὶ εἰς τὸ αὐτὸ βιβλίον ἐξορίσαι τρόπου τινὸς ἰδιότητα, καθ' ὃν σοι παρεχόμενον ἔσται λαμβάνειν ἀφορμὰς εἰς τὸ δύνασθαί τινα τῶν ἐν τοῖς μαθήμασι θεωρεῖν διὰ τῶν μηχανικῶν.

Geography itself and the preliminary work called the Ἀναμέτρησις τῆς γῆς, *On the Measurement of the Earth*, which contained his geometrical calculation of the circumference of the earth. Their Alexandrian origin is clearly reflected in both works, though the *Geography* naturally contained autopsy dating from his Greek period.

The central calculation of the *Anametresis* presupposes that Eratosthenes was in Alexandria at the time, for it is based on simple observations made there and at Syene at the summer solstice, interpreted according to Euclid's propositions regarding the equality of alternate angles and the similarity of arcs subtended by equal angles.[1] Eratosthenes was the first to employ this method, and Cleomedes, who has left us the fullest record of it, states that because of its geometrical form, it gave the impression of obscurity[2]—a comment which does Cleomedes no credit. Dicaearchus, or another pre-Archimedean geometer, who attempted to reach an approximation of the earth's circumference at the end of the fourth century, had measured the supposed segment of the heavens between the constellations in the zenith at Lysimachia and at Syene—that is, one-fifteenth of the celestial sphere—and multiplied the supposed distance between the two points by the figure fifteen.[3] This calculation produced a figure of 300,000 stades, i.e. some 50,000 stades in excess of Eratosthenes' own very precise measurement, the original stimulus to which may, however, have come to him from study of the earlier procedure. It is, once more, characteristic

[1] See *Ptol. Alex.*, pp. 413–15, with notes, for the relevant texts and bibliography (note 301) of this calculation, a discussion of which may be found in any handbook of ancient geography.

[2] Cleom., *De Motu corp. cael.*, p. 94, lines 23–96, line 2 (Ivor Thomas, op. cit. ii, p. 266; IIB, 34 Berger; Prell, *Abh. Sächs. Akad.*, Math. Kl. 46 (1), 1959, pp. 69 ff.): καὶ ἡ μὲν τοῦ Ποσειδωνίου ἔφοδος περὶ τοῦ κατὰ τὴν γῆν μεγέθους τοιαύτη, ἡ δὲ τοῦ Ἐρατοσθένους γεωμετρικῆς ἐφόδου ἐχομένη, καὶ δοκοῦσά τι ἀσαφέστερον ἔχειν. This is followed by a simple statement of the assumptions necessary to Eratosthenes' method. That of Posidonius, with which Cleomedes unfavourably compares it, was by the measurement of the difference in latitude calculated by the difference in the meridian altitude of the star Canopus at Rhodes (nil) and at Alexandria ($7\frac{1}{2}°$ [$=\frac{1}{48}$ of the Zodiac circle], actually $5\frac{1}{4}$), the distance between the two points being accepted at 5,000 stades; the circumference of the globe thus being $5{,}000 \times 48 = 240{,}000$ stades.

[3] The calculation in question is also given by Cleomedes, p. 78, quoted in full, *Ptol. Alex.*, ch. 7 (ii) note 305, but without naming its source. It was already known to Archimedes, and Dicaearchus, Eudoxus, and Aristarchus have all been suggested. In view of Eratosthenes' debt to the first named in other respects, he seems the most likely candidate.

of him to take an old problem and provide a new and practical, even a daring solution of it—Pliny called it 'improbum ausum', 'an audacious venture'[1]—in this instance by the geometrical formulation of the relationship between the shadow cast at the summer solstice on the sundial at Alexandria and the absence of the shadow at Syene. His procedure was considerably helped by his position in Alexandria; he used earlier celestial observations made by leaders of Ptolemaic elephant-hunts in the region of the Tropics,[2] and the basic ground-measurement between his two points of reference, Syene and Alexandria, was calculated by royal bematists.[3] That is a very good example of the direct contribution made by the Ptolemies to scientific progress—a contribution well emphasized by a contemporary of Eratosthenes, Philon of Byzantium, the writer on artillery weapons, who says that advances in his subject were achieved in Alexandria 'in abundance through the help given by ambitious kings liberal to the sciences'.[4]

The *Anametresis* forms a bridge between Eratosthenes' strictly mathematical work and his great *Geographica*, his account of the inhabited earth, the *oikoumene*, conceived as a rough quadrilateral island surrounded by the ocean on a spherical globe, a conception which differed little in some respects from those of

[1] Plin. *NH* ii. 247 (IIB, 31 Berger): universum autem hunc circuitum Eratosthenes in omnium quidem litterarum subtilitate et in hac utique praeter ceteros sollers, quem cunctis probari video, ccliim stadiorum prodidit, quae mensura Romana computatione efficit trecentiens quindeciens centena milia pass., improbum ausum, verum ita subtili argumentatione conprehensum ut pudeat non credere.

[2] See Strab. 77 (IIB, 36 Berger; Hipp. fr. 17, Dicks): τὸ μὲν οὖν κατὰ Μερόην κλίμα Φίλωνά τε τὸν συγγράψαντα τὸν εἰς Αἰθιοπίαν πλοῦν ἱστορεῖν, ὅτι πρὸ πέντε καὶ τετταράκοντα ἡμερῶν τῆς θερινῆς τροπῆς γίνεται ὁ ἥλιος, λέγειν δὲ καὶ τοὺς λόγους τοῦ γνώμονος πρός τε τὰς τροπικὰς σκιὰς καὶ τὰς ἰσημερινάς, αὐτόν τε Ἐρατοσθένη συμφωνεῖν ἔγγιστα τῶι Φίλωνι.

[3] The reference to Eratosthenes' use of *mensores regii* is in Mart. Cap. vi. 598 (IIB, 41 Berger): 'Eratosthenes vero a Syene ad Meroen per mensores regios Ptolemaei certus de stadiorum numero redditus', but it seems improbable that the bematists should have extended their activities beyond the requirements of Eratosthenes' calculation, and even perhaps beyond the limits of Ptolemaic authority at that date (see *Ptol. Alex.*, ch. 4 note 341), and the measurement was no doubt from Syene to Alexandria, though the text must not be emended.

[4] See Philo, *Belop.* (ed. Diels and Schramm, *Berl. Abh.* 1918 (16)), ch. 3, quoted in full, *Ptol. Alex.*, ch. 7 (ii) note 428, speaking of the recent practical experiments in the calibration of catapults: τοῦτο δὲ συμβαίνει ποιῆσαι τοὺς ἐν Ἀλεξανδρείαι τεχνίτας πρώιην μεγάλην ἐσχηκότας χορηγίαν διὰ τὸ φιλοδόξων καὶ φιλοτέχνων ἐπειλῆφθαι βασιλέων.

previous centuries.[1] The *Geographica* must have occupied long years of preparation and composition, and it is obviously not possible to assign a single date to it, any more than we can to any other large work—the exact year of publication is, one might say, of little interest or relevance. If, however, we suppose that the active preparation began after his arrival in Alexandria, then it is not unreasonable to give the work a focal point after, and not before, 220 B.C., and to regard it as reflecting in general terms the world of the last quarter of the third century: the time when the 'Cloud from the West' was becoming visible on the horizon and the golden age of Philadelphus was already a generation behind.

This work, which was in three books, is not known to us in direct transmission, but we have numerous long quotations from it in the first two books of Strabo's *Geography*, in which that worthy man carries on a three-cornered debate between himself, Eratosthenes, and Eratosthenes' formidable critic in the following generation, Hipparchus. Although we know little of the political and human geography contained in it, the general outlines are clear, in spite of Strabo's discussion, and we can see that the work embodied a great deal of accepted teaching in the first two books, as well as an entirely new cartographical construction in the third.

The first book began with a historical introduction, followed by a discussion of the value of the *Odyssey* as a guide to the geography of the Mediterranean—a discussion in which, with clear realization of the proper boundaries of myth and reality in poetry and science, Eratosthenes stood out firmly against the widely accepted view, currently espoused by Callimachus, that the wanderings of Odysseus were located by the author in the region of the Ionian and the Adriatic Seas, and propounded his theory of exoceanism, ἐξωκεανισμός, that is, that Homer had placed his hero's wanderings in the outer ocean so as to give his imagination free rein. In this context he made his famous criticism of the *Homeri perennis auctoritas*: 'You will find the scene of Odysseus' wanderings when you find the cobbler who sewed up the bag of the winds', and expressed his anti-Stoic view of the aim or function of poetry (in this context the Homeric poems), that it is solely to entertain, not to instruct.[2] This

[1] See *Ptol. Alex.*, pp. 525 ff., for a general analysis and estimate of the Γεωγραφικά.

[2] For the 'bag of the winds' see Strab. 24 (IA, 16 Berger), quoting Polybius (xxxiv, 2, 11): οὐκ ἐπαινεῖ δὲ οὐδὲ τὴν τοιαύτην τοῦ Ἐρατοσθένους ἀπόφασιν,

Homeric criticism was followed by a section on physical geography, in which he discussed the origin of the irregularities on the spherical surface of the globe and the hydrographical changes that the Mediterranean and the Black Sea had undergone in the remote past. He seems here to have followed closely the theories of Aristotle, as subsequently developed by Straton, the Lampsacene physicist, who had been tutor to Philadelphus, and had returned to Athens as the head of the Lyceum, where Eratosthenes may have heard him in his early days.[1]

The second book dealt with a number of fundamental topics of physical geography and geodesy—the division of the globe into zones, the relation of the ocean mass to the earth mass, and, above all, the dimensions of the *oikoumene*. Here too he seems in the main to have followed the lines laid down by others, notably, once more, Dicaearchus.

It was in the third book that he drew his new map of the earth. He rejected the traditional division of the earth into three continents, Europe, Asia, and Africa, which he maintained were unsuitable for permanent reference as being liable to variation owing to political change and increased geographical knowledge.[2] For it he substituted an entirely new division into

διότι φησὶ τότ' ἂν εὑρεῖν τινα, ποῦ 'Οδυσσεὺς πεπλάνηται, ὅταν εὕρῃ τὸν σκυτέα τὸν συρράψαντα τὸν τῶν ἀνέμων ἀσκόν; the same passage is quoted (φασί) by Eustath. on κ19 (Berger, ibid.). For the sole function of poetry see Strab. 6–7 (IA, 20 Berger): οὐδὲ γὰρ ἀληθές ἐστιν, ὅ φησιν 'Ερατοσθένης, ὅτι ποιητὴς πᾶς στοχάζεται ψυχαγωγίας, οὐ διδασκαλίας; ibid. 15 (ibid. Berger): ποιητὴν γὰρ ἔφη πάντα στοχάζεσθαι ψυχαγωγίας, οὐ διδασκαλίας; ibid. 16 (IA, 21 Berger): οὐκοῦν ἐχρῆν οὕτως εἰπεῖν, ὅτι ποιητὴς πᾶς τὰ μὲν ψυχαγωγίας χάριν μόνον ἐκφέρει, τὰ δὲ διδασκαλίας· ὁ δ' ἐπήνεγκεν, ὅτι ψυχαγωγίας μόνον, διδασκαλίας δ' οὔ. Cf. also 25 (IA, 17 Berger): τὸ δὲ πάντα πλάττειν οὐ πιθανόν, οὐδ' 'Ομηρικόν· τὴν γὰρ ἐκείνου ποίησιν φιλοσόφημα πάντας νομίζειν, οὐχ ὡς 'Ερατοσθένης φησι, κελεύων μὴ κρίνειν πρὸς τὴν διάνοιαν τὰ ποιήματα, μηδ' ἱστορίαν ἀπ' αὐτῶν ζητεῖν. For a fuller discussion of Eratosthenes' theory of poetry see *Ptol. Alex.*, pp. 759–60. For the *Homeri perennis auctoritas* see Amm. Marc. xxvii, 4, 3.

[1] Eratosthenes' use of Straton for the change of sea-levels of the Mediterranean and connected seas is attested in detail by Strab. 49–50 (IB, 15 Berger). That Straton based himself on Aristotle's *Meteorologica* is not stated by Strabo, but it is clear from a comparison of the text of Strabo with *Meteor.* i. 14 and especially ii. 1, though Aristotle's speculations are largely couched in more general terms.

[2] Eratosthenes' objections to the division into continents is given in Strab. 65–6 (IIc, 22 Berger), along with Strabo's inept defence of the system. Eratosthenes seems to have maintained (i) that the existing division into continents was largely a matter of chance, 'some dividing them by rivers, the Nile and the Tanais, calling them [the continents] islands, others by

'seals', *sphragides*, land-masses divided by boundaries determined not by the supposed course of fixed natural features but on the basis of their supposed geometrical shapes. A latitudinal diaphragm, also adopted from Dicaearchus, running from the Pillars of Hercules to India, divided the *oikoumene* into northern and southern regions. For the northern regions we have no details; in the southern part the first two seals consisted of India and Ariana—the former conceived as a rhomboid and oriented as lying wholly east of the Persian Gulf, without a southward projection, the latter as a rough parallelogram—the third embraced the Persian Gulf and a vast tract running north towards the Caspian, and eluded geometrical definition, while the fourth, which alone corresponded approximately to true geographical form and was probably regarded as a parallelogram, comprised Syria, Egypt, and Arabia.

I need not stress that, in the absence of astronomical observation and scientific survey, neither Eratosthenes nor any other ancient geographer before Ptolemy had any idea of the approximate orientation or dimensions of the eastern world, though individual land-distances could be, and were, measured, and were available in written form: first and foremost in the 'Royal Stations', the distance-charts originally compiled by the Persians and adopted and improved by Alexander and his successors; and in the second place in the published accounts of the Greek travellers, mainly envoys to Indian kings, who had visited those distant regions. These sources, unreliable and contradictory though they might be, provided the substance of Eratosthenes' map of Asia, which thus contained the harvest of new knowledge which the conquests of Alexander had made available. Hipparchus, attacking him a century later, seems jealously to have said that such information was available to

isthmuses, that between the Caspian and the Pontic Seas, and that between the Red Sea and the Ecregma (Serbonian Lake), calling them peninsulas', adding that he did not understand where this discussion could lead in the absence of clearly marked and accepted boundaries; and (ii) that the recognized continental boundaries were in any case (ἄλλως τε) the result of a false way of looking at the world on the part of the early Greeks: instead of looking at the *oikoumene* as a whole, they first looked only at their own and adjacent lands, and then gradually extended their division into continents to its present form. These two observations provided the justification for Eratosthenes' geometrical division of the *oikoumene* into Seals which were independent both of the physical features of the earth and of a particular vantage-point (Greece and Asia Minor). Strabo's answer to these objections is too involved and obscure to be discussed here.

Eratosthenes in the great library over which he presided, and nowhere else.[1] However, it was not only that the material was available. There was also the man to use it. Eratosthenes evidently stated that he undertook the *Geographica* specifically to meet modern needs, for a new projection of the *oikoumene* (the eastern *oikoumene*) was necessary as a result of the conquests of Alexander,[2] and to this end he devised his new projection by means of seals, the aim of which was to create an unvarying framework, or system of geographical reference, for the eastern world. We cannot but wonder how early the need for this undertaking was formed in Eratosthenes' mind. Did he arrive in Alexandria with the project in mind, or was it his reaction to the new environment in which he found himself, an environment itself created by the conquests of Alexander?

There is, however, another side to the picture. The western world, so near at hand, evoked no interest. Strabo goes out of his way to emphasize Eratosthenes' ignorance of the western Mediterranean, and indeed of all continental Europe. He classes him along with writers of fifty or a hundred years earlier, Dicaearchus and Timosthenes.[3] This ignorance of western geography is surprising, for unlike the geographers of a previous generation, Eratosthenes and his contemporaries of the last quarter of the third century were aware of Rome and Carthage,[4]

[1] Strab. 69 (IIIA, 8 Berger): ταῦτα γὰρ ὁ Ἐρατοσθένης λαμβάνει πάντα ὡς καὶ ἐκμαρτυρούμενα ὑπὸ τῶν ἐν τοῖς τόποις γενομένων, ἐντετυχηκὼς ὑπομνήμασι πολλοῖς, ὧν εὐπόρει, βιβλιοθήκην ἔχων τηλικαύτην, ἡλίκην αὐτὸς Ἵππαρχός φησιν.

[2] See Strab. 14 (IB, 10 Berger): καὶ γὰρ δὴ πολύ τι τοῖς νῦν ἡ τῶν Ῥωμαίων ἐπικράτεια καὶ τῶν Παρθυαίων τῆς τοιαύτης ἐμπειρίας προσδέδωκε· καθάπερ τοῖς προτέροις μέγα τι ἡ Ἀλεξάνδρου στρατεία, ὥς φησιν Ἐρατοσθένης; cf. 48 (IB, 11 Berger) εἰπὼν δὲ καὶ αὐτὸς (sc. ὁ Ἐρατ.) ὁπόσον προῦβη τὰ τῆς οἰκουμένης εἰς γνῶσιν τοῖς μετ' Ἀλέξανδρον καὶ κατ' αὐτοῦ ἤδη, κ.τ.λ.

[3] Strab. 92 (IIIB, 97 Berger; Hipp. fr. 32 Dicks): εἶτ' ἐκτίθεται (sc. ὁ Ἵππαρχος) τὰ λεχθέντα ὑπὸ τοῦ Ἐρατοσθένους περὶ τῶν μετὰ τὸν Πόντον τόπων, ὅτι φησὶ τρεῖς ἄκρας ἀπὸ τῶν ἄρκτων καθήκειν· μίαν μέν, ἐφ' ἧς ἡ Πελοπόννησος, δευτέραν δὲ τὴν Ἰταλικήν, τρίτην δὲ τὴν Λιγυστικήν, ὑφ' ὧν κόλπους ἀπολαμβάνεσθαι τόν τε Ἀδριατικὸν καὶ τὸν Τυρρηνικόν . . . ἔστι δὲ τοσοῦτον τῶν ἁμαρτανομένων ἐν αὐτοῖς ὑπὸ τοῦ Ἐρατοσθένους τὸ πλῆθος, καὶ ὑπὸ Τιμοσθένους τοῦ τοὺς λιμένας συγγράψαντος . . . ὥστ' οὐκ ἄξιον ἡγοῦμαι διαιτᾶν οὔτ' ἐκείνους, ἐπὶ τοσοῦτον διαμαρτάνοντας τῶν ὄντων, οὔτε τὸν Ἵππαρχον; 104 (IIIB, 96 Berger): Ἐρατοσθένους δὲ εἴρηται ἡ περὶ τὰ ἑσπέρια καὶ τὰ ἀρκτικὰ τῆς Εὐρώπης ἄγνοια· ἀλλ' ἐκείνωι μὲν καὶ Δικαιάρχωι συγγνώμη, τοῖς μὴ κατιδοῦσι τοὺς τόπους ἐκείνους.

[4] See *Ptol. Alex.*, pp. 763 ff., for a detailed discussion of Alexandrian knowledge of Rome in the third century B.C. Of course, there was a tradition of Greek knowledge of the Carthaginian constitution, found in Isocrates, Plato, and Aristotle, but here we are concerned, like Strabo, only with geographical knowledge.

and Eratosthenes, as a Cyrenaean, can hardly have failed to hear tales of voyages to Carthage already in his childhood. But their ignorance was not confined to the west. To say nothing of Celtic Europe, most of the Balkan peninsula was geographically unknown to them: the routes assigned in the third century to the return of the Argonauts, involving the bifurcation of the Danube, is sufficient indication of that.[1] The conquests of Alexander, which had opened the way to a vast expansion of the Greek people eastward, and thus laid the foundation of a geography of Asia, had no counterpart in the west or the north before the Roman period. The gradual Roman penetration of the northern Balkans and western Europe from the second century B.C. onwards is the counterpart, in terms of geographical knowledge, to Alexander's conquest of the East generations earlier.

Eratosthenes' opinions about a variety of topics, only indirectly connected with geography, which found their way into the book, have survived. I have already mentioned in passing his statement of his 'theory of poetry', that its end was entertainment (ψυχαγωγία) and not instruction (διδασκαλία),[2] which formed the basis of his attack on the Stoics who used Homer as a geographical handbook. I wish now to call your attention to two other items of particular interest. First there is

[1] For the return route of the Argonauts see Delage, *La Géographie dans les Argonautes d'Apoll. Rhod.* (Bibl. Univ. du Midi, 19, 1930), pp. 192 ff., and the further bibliography in *Ptol. Alex.*, ch. 10 (iv), note 75. That Eratosthenes himself accepted the bifurcation of the Danube, with one arm issuing in the Adriatic and one in the Black Sea, is probable, but not certain: see the discussion by Berger, pp. 347 ff. The main evidence to that effect is the passage in which Hipparchus criticizes Eratosthenes (Strab. 57; Hipp. fr. 10 Dicks) for his views about the level of the Mediterranean, and says that if the whole area had been filled with water to the extent supposed by Eratosthenes before the outbreak of the waters at the Pillars of Hercules, then the Black Sea and the Adriatic would have been confluent, ἅτε δὴ τοῦ Ἴστρου ἀπὸ τῶν κατὰ τὸν Πόντον τόπων σχιζομένου καὶ ῥέοντος εἰς ἑκατέραν τὴν θάλατταν διὰ τὴν θέσιν τῆς χώρας. It is, as Berger says, difficult to believe that if the bifurcation had been doubted or contradicted by Hipparchus, he would not have mentioned the fact, or alternatively not have referred to this aspect of the argument. Strab. 47 (IIIB, 114 Berger) says in general of Eratosthenes' knowledge of the Adriatic, τοῦ τε Ἀδρίου καὶ τὰ ἀρκτικὰ καὶ τὰ ἔσχατα διεξιὼν οὐδενὸς ἀπέχεται μυθώδους. It is typical of Eratosthenes that he used the Argonautic myth as evidence for the early history of sea-voyaging: Strab. 48 (IB, 8 Berger): εἰπών τε τοὺς ἀρχαιοτάτους πλεῖν καὶ κατὰ λῃστείαν ἢ ἐμπορίαν, μὴ πελαγίζειν δέ, ἀλλὰ παρὰ γῆν, καθάπερ τὸν Ἰάσονα, ὅνπερ καὶ μέχρι τῆς Ἀρμενίας καὶ Μηδίας ἐκ τῶν Κόλχων στρατεῦσαι ἀφέντα τὰς ναῦς, ὕστερόν φησι τὸ παλαιὸν οὔτε τὸν Εὔξεινον θαρρεῖν τινα πλεῖν οὔτε παρὰ Λιβύην καὶ Συρίαν καὶ Κιλικίαν.

[2] For a further discussion see *Ptol. Alex.*, pp. 759–60.

his famous statement that the true division of mankind should be according to their moral qualities—good and bad—and not according to whether men are Greeks or barbarians;[1] and he illustrated this by reference to the excellent constitutions of the Romans and the Carthaginians, of which the latter had already been praised by Isocrates and Aristotle. The significance of this passage in the history of oecumenical ideas, and its relation on the one hand to Zeno's *Politeia* and on the other to Alexander's prayer at Opis and to Aristotle's advice to his pupil, have been much discussed, and I have nothing to add to those discussions.[2] As far as Eratosthenes is concerned I wish only to stress one aspect of the matter: however much Eratosthenes may be repeating or reformulating the views of others, it is clear that we must see this passage in its context, in the context, precisely, that Strabo assigns to it; that is, apropos of Eratosthenes' theory regarding the division of the inhabited world into continents, or, alternatively, seals. His view of mankind, I believe, was to him a logical and practical application of the geometrical principles underlying the seals. The abolition of continents with their natural boundaries and their replacement by largely geometrical figures in his scheme meant to him that, geometrically conceived as it were, all men were on a plane, like the figures they inhabited, and might be divided on a fresh and universally valid basis, that of virtue, or civilized qualities. Such a concrete application of his geometrical seals is characteristic of him, and, though he may have been influenced by the

[1] Strab. 66 (IIc, 24 Berger): ἐπὶ τέλει δὲ τοῦ ὑπομνήματος οὐκ ἐπαινέσας τοὺς δίχα διαιροῦντας ἅπαν τὸ τῶν ἀνθρώπων πλῆθος εἴς τε Ἕλληνας καὶ βαρβάρους, καὶ τοὺς Ἀλεξάνδρωι παραινοῦντας τοῖς μὲν Ἕλλησιν ὡς φίλοις χρῆσθαι τοῖς δὲ βαρβάροις ὡς πολεμίοις, βέλτιον εἶναί φησιν ἀρετῆι καὶ κακίαι διαιρεῖν ταῦτα. πολλοὺς γὰρ καὶ τῶν Ἑλλήνων εἶναι κακοὺς καὶ τῶν βαρβάρων ἀστείους, καθάπερ Ἰνδοὺς καὶ Ἀριανούς, ἔτι δὲ Ῥωμαίους καὶ Καρχηδονίους οὕτω θαυμαστῶς πολιτευομένους. διόπερ τὸν Ἀλέξανδρον ἀμελήσαντα τῶν παραινούντων, ὅσους οἷόν τ' ἦν ἀποδέχεσθαι τῶν εὐδοκίμων ἀνδρῶν καὶ εὐεργετεῖν, followed by Strabo's ineffective retort to the effect that the division into Greeks and barbarians was made because the respect for law and a civilized sense (τὸ νόμιμον καὶ τὸ πολιτικόν) prevails among the one, while the opposite characteristics prevail among the others. The context of Eratosthenes' remarks is clearly that of the division of the *oikoumene*; it forms the closing part of the discussion in Strabo. The opening words mean 'Towards the end of the second book' (cf. 69, ἔτι φησὶν ὁ Ἵππαρχος ἐν τῶι δευτέραι ὑπομνήματι αὐτὸν τὸν Ἐρατοσθένη διαβάλλειν τὴν τοῦ Πατροκλέους πίστιν), and in the next section (II, *init.*) Strabo turns to the third book of Eratosthenes: ἐν δὲ τῶι τρίτωι τῶν Γεωγραφικῶν καθιστάμενος τὸν τῆς οἰκουμένης πίνακα, κ.τ.λ. It is wrong to translate, as does the Loeb edn., 'Towards the end of his treatise'.

[2] See *Ptol. Alex.*, ch. 9, p. 483, and notes 39–41.

notions of others or by his own philosophical ideas as expressed perhaps in the work entitled *On Good and Evil Qualities* stigmatized by Strabo as dilettante,[1] these influences were probably secondary.

The second item is his fundamental criticism of the Indian legends of Heracles and Dionysus. This criticism, known to us not only from Strabo, but also, more directly, from Arrian, evidently also occurred in the *Geography*.[2] He did not accept these legends, rejecting them on rational grounds: he maintained that the story of the 'divine possession' of the Macedonian Companions of Alexander by Dionysus at Nysa was invented to gratify Alexander; that the transference of the location of the Cave of Prometheus from the Caucasus to the Hindu Kush (thence allegedly called Mt. Caucasus, as indeed it is already

[1] Strab. 15, quoted above, p. 179 note 1.

[2] Arr. *Anab.* v. 3, 1, after the description of Alexander's *pour-parlers* with Acuphis, leader of the city of Nysa, and the Dionysiac revels of the Macedonians: καὶ ταῦτα ὅπως τις ἐθέλει ὑπολαβὼν ἀπιστείτω ἢ πιστευέτω. οὐ γὰρ ἔγωγε Ἐρατοσθένει τῶι Κυρηναίωι πάντηι ξυμφέρομαι, ὃς λέγει πάντα ὅσα ἐς τὸ θεῖον ἀναφέρεται ἐκ Μακεδόνων πρὸς χάριν τὴν Ἀλεξάνδρου ἐς τὸ ὑπέρογκον ἐπιφημισθῆναι. . . . ὅμοια δὲ καὶ ὑπὲρ Διονύσου τῆς πλάνης ἀπιστεῖ Ἐρατοσθένης· ἐμοὶ δὲ ἐν μέσωι κείσθων οἱ ὑπὲρ τούτων λόγοι. A very similar, but more elaborate, passage of Strabo (687) also gives Eratosthenes as the chief opponent of Megasthenes and others regarding the Indian legends of Dionysus and Heracles: καὶ τὰ περὶ Ἡρακλέους δὲ καὶ Διονύσου Μεγασθένης μὲν μετ' ὀλίγων πιστὰ ἡγεῖται, τῶν δ' ἄλλων οἱ πλείους, ὧν ἔστι καὶ Ἐρατοσθένης, ἄπιστα καὶ μυθώδη, καθάπερ καὶ τὰ παρὰ τοῖς Ἕλλησιν. Strabo then quotes lines 13 ff. of the *Bacchae* and the comparable fragment of Sophocles (fr. 959, Pearson). He then adds the story of Heracles' assault on Aornus, and the tradition of the transplantation of the scene of the legend of Prometheus to the Paropamisadae, which he dismisses as πλάσματα τῶν κολακευόντων Ἀλέξανδρον, calling attention to their absence from the Alexander-historians, and assigning them to the authors of *Heracleia*, εἴτε Πείσανδρος ἦν, εἴτ' ἄλλος τις. A parallel passage to this occurs in 505–6, his account of the Caucasus: καὶ τὰ πρὸς τὸ ἔνδοξον θρυληθέντα οὐκ ἀνωμολόγηται παρὰ πάντων, οἱ δὲ πλάσαντες ἦσαν οἱ κολακείας μᾶλλον ἢ ἀληθείας φροντίζοντες . . . ἡ δὲ ἐπὶ Ἰνδοὺς στρατεία Διονύσου καὶ Ἡρακλέους ὑστερογενῆ τὴν μυθοποιίαν ἐμφαίνει, κ.τ.λ. All three passages no doubt reproduce Eratosthenes' arguments, and since Strabo says in 688 (IIIB, 6 Berger) that Eratosthenes described India as it was when Alexander passed through it, and that he reproduces Eratosthenes' account, which occurred in Bk. III of the *Geographica* (μάλιστα δ' ἐκ τῆς διαίτης ἔδόκει τῆς τότε πιστότατα εἶναι τὰ ὑπὸ τοῦ Ἐρατοσθένους ἐν τῶι τρίτωι τῶν Γεωγραφικῶν ἐκτεθέντα κεφαλαιωδῶς περὶ τῆς τότε νομιζομένης Ἰνδικῆς, ἡνίκα Ἀλέξανδρος ἐπῆλθε . . . ἔστι δὲ τοιαῦτα ἃ λέγει ὁ Ἐρατοσθένης . . .) it is natural to suppose that his reference to the legends about Alexander occurred in the same context, though Berger preferred to assign them to the historical account in Bk. I (see p. 77, and IB, 23, 24). For an attempt to give substance and name to the flatterers of Alexander see Tarn, *Alexander* ii, pp. 55 ff., 'The Poetasters'.

so-called in the list of Alexander's satrapies in Diodorus) was also effected τῆς Ἀλεξάνδρου ἕνεκα δόξης; and that the story of Heracles in India was an invention for a similar purpose.

This criticism is of course analogous to his rejection of the authority of Homer; in both cases he stands against the use of legend as scientific evidence. That in itself is of sufficient interest. But to appreciate the full burden of his criticism we must remember that it was published in Alexandria, where the Indian legend of Heracles, and, still more, that of Dionysus, which though already known earlier (it is referred to by Euripides in the *Bacchae*) owed much of its vogue to the conquests of Alexander, had been officially cultivated from Philadelphus onwards, and that the Ptolemies claimed direct descent from both Heracles and Dionysus. The Indian triumph of Dionysus had been a conspicuous feature of the great Procession of Philadelphus described by Callixeinus;[1] Euergetes, Eratosthenes' first patron, called himself 'descendant of Heracles and Dionysus', and Philopator, in whose reign Eratosthenes was probably writing, devoted himself fervently to the worship of Dionysus, and renamed some of the demes of Alexandria after the family of the God. Nor is that all. Eratosthenes criticized Alexander himself openly in this same context, making it quite clear that, fully as he appreciated Alexander's achievements and his great qualities,[2] he accepted neither the Ptolemaic

[1] Athen. 198c (*FGrH* 627). For the tableau of the 'Return of Dionysus from India' (ἡ ἐξ Ἰνδῶν κάθοδος Διονύσου) see 200D. The image of the god, 12 cubits high, reclining on the back of an elephant wearing a purple cloak, is the earliest appearance of the image which later became so popular a feature of Roman sarcophagi: see Turcan, *Les Sarcophages romains à repr. dionys.* (Publ. des écol. franc. d'Ath. et de Rome, 210, 1966), pp. 441 ff., 462; cf. Matz, *Der Gott auf dem Elefantenwagen* (Mainz. Abh. 1952 (10)), pp. 737 ff.

[2] In a passage quoted by Plut. *De Fort. Alex.*, 229–30 (*FGrH* 241, F30) Eratosthenes says that the adoption of a mixture of the Persian (rather than the more lavish Median) and Macedonian style of dress was of no interest to Alexander as a philosopher, but of significance to him as a ruler, since it helped him to acquire the goodwill of the conquered: τὰ γὰρ ἔξαλλα καὶ τραγικὰ τοῦ βαρβαρικοῦ κόσμου παραιτησάμενος, οἷον τιάραν καὶ κάνδυν καὶ ἀναξυρίδα, ἐκ τοῦ Περσικοῦ καὶ Μακεδονικοῦ τρόπου μεμειγμένην τινὰ στολὴν ἐφόρει, καθάπερ Ἐρατοσθένης ἱστόρηκεν, ὡς μὲν φιλόσοφος τοῖς ἀδιαφόροις χρώμενος, ὡς δὲ ἡγεμὼν κοινὸς καὶ βασιλεὺς φιλάνθρωπος τῇ περὶ τὴν ἐσθῆτα τιμῇ τὴν τῶν κεκρατημένων ἀνακτώμενος εὔνοιαν, ἵνα βεβαίως παραμένωσιν ἀγαπῶντες ὡς ἄρχοντας Μακεδόνας, μὴ μισοῦντες ὡς πολεμίους. This moderate and reasonable appraisal of Alexander is probably a fair reflection of Eratosthenes' considered view of him. The passage is quoted by Plutarch in the context of the 'brotherhood of man' and the *Politeia* of Zeno (see *Ptol. Alex.*, loc. cit. above, p. 195 note 2),

equation of Dionysus and Alexander, nor, by implication, the divinity of Alexander, who was the central figure of the dynastic worship of the Ptolemies.[1] It is remarkable that Eratosthenes should have published these overt criticisms in the very hearth of the worship of Dionysus and Alexander, and that no punishment should have befallen him (as we shall see, he continued in favour until the end of his life). His position, far from protecting him, must have made his open rejection the more obvious, and it says much for Euergetes' or Philopator's liberalism that his outspoken criticisms of the whole Indian stage-scenery of the mythical Dionysus–Heracles–Alexander identification should have been tolerated—or did the *Geography* go unread in such exalted circles?[2]

Alongside the *Geography* it is natural to set the *Chronographiai*, or *Chronographical Tables*, the product, like the *Geography*, of long study in the Library.[3] In this work, of which again we know only the outline, Eratosthenes set out to replace the multifarious local systems of chronology by a universal chronology of Greek history embracing the period from the Sack of Troy to the death of Alexander the Great—the conqueror here, as in the whole concept of the *Geography*, marking an epoch.[4] From it he excluded

but he does not state its origin. It may come from the end of Bk. II of the *Geographica*, along with the passage regarding the division of mankind by moral qualities, in which he referred critically to those who advised Alexander to distinguish between Greeks and barbarians, but there is no reason why it should do so, rather than from a philosophical work.

[1] See *Ptol. Alex.*, pp. 213 ff.

[2] In view of Eratosthenes' essentially rational approach to Alexander, it is remarkable to find him credited with circulating the story of the fatherhood of Ammon: see Plut. *Alex.* 3 (*FGrH* 241 F28; cf. *Ptol. Alex.* ch. 10 (v), note 25, 2nd para.): ἡ δὲ Ολυμπιάς, ὡς Ἐρατοσθένης φησί, προπέμπουσα τὸν Ἀλέξανδρον ἐπὶ τὴν στρατείαν καὶ φράσασα μόνωι τὸ περὶ τὴν τέκνωσιν ἀπόρρητον. Like Jacoby (note on F 28), I am unable to offer any convincing explanation of this; it is even difficult to imagine a work from which it might be quoted. Andreotti, *Historia*, 5, 1956, p. 267, speaking of Eratosthenes' critical view of Alexander's claim to divinity ('Eratostene . . . manifesta un profondo scetticismo sul fondamento delle pretese divine del figlio di Filippo'), adds (note 55), 'Non contraddicono a questo attegiamento altri testi di Eratostene (fr. 28–30 Jacoby), giacchè essi riportano non giudizî personali del poligrafo alessandrino, ma semplici dati pragmatici'; but it is evident that Eratosthenes accepted the story as recorded by Plutarch.

[3] *FGrH* 241 F1–8; cf. *Ptol. Alex.*, ch. 8, pp. 456–7, and notes 74 ff. for bibliography and discussions, and below, Bibliographical Note. For the pseudo-Eratosthenic Egyptian King-List in Syncellus see ibid., ch. 6 note 182.

[4] F1 (Clem. Al., *Strom.* i. 138, 1–3): Ἐρατοσθένης δὲ τοὺς χρόνους ὧδε ἀναγράφει . . . μετὰ δὲ ταῦτα ἐπὶ τὴν Ἀλεξάνδρου μεταλλαγὴν ἔτη δώδεκα. Clement's

all purely mythical chronology, just as in the *Geography* he had rejected the use of Homer as a geographical source.[1] Once more his intention was to create a valid general framework, this time for historical reckoning. There was no historical narrative, but it contained varied historical and literary information under the chronographical entries, and, like the *Geography*, it may have had an introductory section on the method and system of chronography.[2] The basis of the work was once again traditional: for the period from the Sack of Troy to the First Olympiad, various versions of the Successions of the Spartan Kings, calculated in terms of pre-Olympiad years, and for the subsequent period the Olympic lists themselves, drawn up originally by Hippias and revised by Aristotle and finally by Eratosthenes himself in a preliminary work, the *Olympionikai*, which bore the same relation to the *Chronography* as the *Anametresis* bore to the *Geography*.[3] The system of Olympiads had already been used to provide a comparative Greek chronology by Timaeus, but the earlier writer did not construct lists of the Eratosthenic type. His work[4] seems indeed to have been of little significance and the extent of Eratosthenes' indebtedness to him is very uncertain.

next point of reference is the Battle of Actium: ἐντεῦθεν ἐπὶ τὴν Αὐγούστου νίκην, ὅτε Ἀντώνιος ἀπέσφαξεν ἑαυτὸν ἐν Ἀλεξανδρείαι, ἔτη διακόσια ἐνενήκοντα τέσσαρα, ὅτε ὑπάτευεν Αὔγουστος τὸ τέταρτον.

[1] Schwartz, *Charakterköpfe*[4], p. 203, well points out that Eratosthenes' employment of the date of the Fall of Troy as a starting-point for his system was in fact illogical in a critic who rejected the geographical and historical authority of Homer: 'Es ist ein Beweis für die unzerstörbare Herrschaft des Epos, daß ein so wissenschaftlicher Geist wie Eratosthenes, der weit davon entfernt war, in Homer einen Historiker zu sehen, doch es nicht für geraten hielt, den Zug der Hellenen gegen Ilion aus der durch feste Daten gesicherten Geschichte zu entfernen, und lieber seinen Prinzipien etwas vergab, als ein Datum wegließ, um das jeder Hellene die Fachgelehrten der Chronologie befragte.'

[2] The fragments (F3 ff.) show the sort of information that was included: F3, Eratosthenes distinguishes two Eueni, both Parians; F13, the genealogy of Hippocrates of Cos; F14, phyllobolia. It has been suggested that the work contained a 'methodological' and historical introduction to the subject on the analogy of the *Geographica* (see Jacoby, *FGrH* 241, Komm., p. 707). F10, in which Eratosthenes referred to Pherecydes the γενεαλόγος, might well have stood in such an introductory section.

[3] For the *Olympionikai* see F4–8. It is evident that Eratosthenes gave a good deal of information about the games themselves and the equipment used (see F5; 10). Some of the chronological items (F9–15) printed by Jacoby as coming from either the *Chronographiai* or the *Olympionikai* more naturally belong to the latter, since overlapping on a large scale between the two works is not likely: F10, 11, 14.

[4] See Polyb. xii. 11, 1: ὁ γὰρ τὰς συγκρίσεις ποιούμενος ἀνέκαθεν τῶν ἐφόρων πρὸς τοὺς βασιλεῖς τοὺς ἐν Λακεδαίμονι καὶ τοὺς ἄρχοντας τοὺς Ἀθήνησι καὶ τὰς ἱερείας

Eratosthenes' employment of the Olympiad reckoning as the general basis of Greek chronology was later extended to comparative chronology in the wider sense of Roman–Greek, Christian–Roman, and other equivalences, and his fundamental work was largely lost sight of in the accumulating chronographical tradition. For our purpose we need only compare his system with the slightly earlier, rather amateurish scheme, or lack of scheme, represented in the Parian Marble, which includes purely mythical dates such as that of the foundation of the palace of Cadmus in Thebes in 1518 B.C. and the arrival of Demeter in Attica in 1409 B.C., and in which all dates are calculated by intervals from the date of compilation, 264/3, reckoned by Athenian kings and archons, without reference to any general scheme of chronology such as Olympiads.[1] The comparison reveals at once the decisive significance of Eratosthenes' work. Here, fortunately, he, or the system, prevailed, whereas the scheme of 'seals', equally intended to remove supposedly subjective, variable elements, failed.

There are other, literary and philological fields whence I might draw further illustrations of Eratosthenes' independent and practical approach to problems and theories, old and new, but time does not permit me to deal with these. Instead, we may briefly consider a topic which, though not important in itself, reveals his power of criticism very clearly, namely the way he reacted to the growth of the pseudo-scientific attitude towards natural phenomena, which developed, especially in Alexandria,

τὰς ἐν Ἄργει παραβάλλων πρὸς τοὺς Ὀλυμπιονίκας, καὶ τὰς ἁμαρτίας τῶν πόλεων περὶ τὰς ἀναγραφὰς τὰς τούτων ἐξελέγχων, παρὰ τρίμηνον ἐχούσας τὸ διάφορον, οὗτός ἐστι. Unfortunately this comprehensive sentence is ambiguous, and the different interpretations of the scope of Timaeus' work depend on the punctuation adopted: see Walbank, ad loc. (Jacoby quotes the passage, Komm, p. 663, top, without any commas, except after Ὀλυμπιονίκας, whereas in 566, loc. cit. below, he places a comma after Ἀθήνησι), but in any case there can be no doubt that Timaeus used the Olympic lists as a check against one or more of the major local systems. The passage probably refers to Timaeus' Ὀλυμπιονῖκαι ἢ Χρονικὰ πραξιδικά (*FGrH* 566 T1; cf. Jacoby, note ad loc.) rather than to the *Histories* itself, but there is no indication of the structure of the former; references to it (ibid. F125–8) give no sign of a comparative chronology.

[1] *FGrH* 239, A7: ἀφ' οὗ Κάδμος ὁ Ἀγήνορος εἰς Θήβας ἀφίκετο . . . ἔκτισεν τὴν Καδμείαν, ἔτη ΧΗΗ [Δ]ΙΓ, βασιλεύοντος Ἀθηνῶν Ἀμφικτύονος; A12: ἀφ' οὗ Δημήτηρ ἀφικομένη εἰς Ἀθήνας καρπὸν ἐφ[εῦρ]εν, καὶ πρ[οηροσία ἐ]πρά[χθη πρ]ώτη, δ[είξαντος Τ]ριπτολέμου τοῦ Κελεοῦ καὶ Νεαίρας, ἔτη ΧΗΔΔΔΔΓ‹Ι›, βασιλεύοντος Ἀθήνησιν Ἐριχθέως. The terminal year is dated as well by the Parian archon of 264/3: *init.*: ἀρξάμενος ἀπὸ Κέκροπος τοῦ πρώτου βασιλεύσαντος Ἀθηνῶν εἵως ἄρχοντος ἐμ Πάρωι [μὲν . . .]υάνακτος, Ἀθήνησι δὲ Διογνήτου.

in the third century, and which resulted in what is called paradoxography: in the collecting and recording of the supposed 'marvels', παράδοξα, of the physical world—in the preparation of lists (they are little more) of rivers that ran red, or changed the colour of human hair, lakes that vanished, wild beasts that behaved like humans, the customs of remote tribes, and so on.[1] The seed of this degenerate type of writing, which lasted into the Byzantine period,[2] is to be found in the genuinely scientific writings of Aristotle, notably the *Historia Animalium*. The earliest paradoxographical works, the *On Wonderful Things heard*, which is transmitted as Aristotle's, but is of the third century, and Callimachus' *Collection of Wonders*,[3] represent a slight but fatal deviation from the pattern of Aristotle's great work, a deviation due to the fact that neither author had a scientific purpose—they were interested in recording alleged marvels, not so as to explain them rationally according to supposed physical laws, but simply as marvels for their own sake. It is not part of my task to discuss why Callimachus should have fallen a victim to, and become the leading exponent of, this puerile activity, but there is little doubt that, both in Alexandria and further afield, he exercised greater immediate influence as a paradoxographer than as a poet, and his paradoxographical and antiquarian interests formed the vogue of his own and of succeeding generations.

Against this predominantly Alexandrian fashion, and others associated with it, as against so many other cranky ideas, Eratosthenes set his face. He expressed his views on this in Book I of the *Geography*, in connection with the *Sacred Record*, the book by Euhemerus, the opponent of the Olympian Gods.[4] This work,

[1] See *Ptol. Alex.*, ch. 8, pp. 454 ff., ch. 11, pp. 770 ff., for the early stages of paradoxography. The notes to the latter section provide a detailed analysis of the relationship between the various Hellenistic paradoxographers. The fullest collection of the texts is now that of A. Giannini, *Paradoxographorum Graecorum reliquiae* (Class. gr. e lat., Sezione Test. e Comm., Milan, 1967); cf. *Ptol. Alex.*, ch. 11 note 376.

[2] See the Περὶ ζώιων ἰδιότητος of Manuel Philes, dedicated to the Emperor Michael Palaeologus, composed in iambic trimeters, which is largely based on Aelian's *De Nat. Anim.* (separately edited by Lehrs and Deubner, at the back of *Poetae bucolici et didactici* (Paris, Didot, 1846)).

[3] Fr. 407, Pfeiffer (chs. 129 ff. of Antigonus of Carystus' Ἱστοριῶν παραδόξων Συναγωγή).

[4] For the Ἱερὰ ἀναγραφή see *Ptol. Alex.*, pp. 289 ff., with accompanying notes. For Eratosthenes' verdict see Strab. 47 (Ib, 6 Berger): ὁ δὲ Δαμάστηι χρώμενος μάρτυρι οὐδὲν διαφέρει τοῦ καλοῦντος μάρτυρα τὸν Βεργαῖον [ἢ τὸν Μεσσήνιον] Εὐήμερον καὶ τοὺς ἄλλους οὓς αὐτὸς εἴρηκε διαβάλλων τὴν φλυαρίαν; cf. ibid. 104

written in the early years of the third century, was couched in the form of a Utopian romance, describing Panchaea, a collectivist island Utopia set somewhere in the Indian Ocean south of Aden, the cults of its chief city, Panara, and the story of the life and death of a mortal Zeus as recounted by the priests of Panara. Euhemerus' doctrine found many followers, but he earned the disapproval of Eratosthenes, who, as a geographer, objected to the notion of unlocated Utopias, not only that of Euhemerus, but also Theopompus' *Land of Meropis* and Hecateus of Abdera's account of the city of Cimmeris. He classes all such works contemptuously along with 'Aristotle's' account of 'river-stones of sand that are melted by the rain', as unscientific nonsense, and likens them to the fantasies of Antiphanes of Berge, a writer of improbable fables.[1] No such passage occurs in the preserved writings of Aristotle, and I cannot help thinking that when Eratosthenes talked about the writings of 'Aristotle' in this context he was referring (deliberately

(Ib, 7): Ἐρατοσθένη δὲ τὸν μὲν Εὐήμερον Βεργαῖον καλεῖν, Πυθέαι δὲ πιστεύειν, καὶ ταῦτα μηδὲ Δικαιάρχου πιστεύσαντος. The use of Βεργαῖος in this sense is already attested by Alexis, quoted in the glossary in *POxy* 1801, l. 50: Βεργαῖος· Ἄλεξις ἐν Ἡσιόν[ηι–]. See also next note.

[1] The passage in question, Strab. 299 (Ia, 6 Berger; cf. *Ptol. Alex.*, ch. 5 note 830), is in fact part of a quotation from Apollodorus of Athens: ἀπὸ δὲ τούτων ἐπὶ τοὺς συγγραφέας βαδίζει (*sc.* ὁ Ἀπολλόδωρος) Ῥιπαῖα ὄρη λέγοντας καὶ τὸ Ὠγύγιον ὄρος καὶ τὴν τῶν Γοργόνων καὶ Ἐσπερίδων κατοικίαν καὶ τὴν παρὰ Θεοπόμπωι Μεροπίδα γῆν, παρ' Ἑκαταίωι δὲ Κιμμερίδα πόλιν, παρ' Εὐημέρωι δὲ τὴν Παγχαίαν γῆν, παρ' Ἀριστοτέλει δὲ ποταμίους λίθους ἐξ ἄμμου, ἐκ δὲ τῶν ὄμβρων τήκεσθαι, but there can be little doubt that Apollodorus is, as frequently, reproducing the words and ideas of Eratosthenes, whom in any case he quoted at the beginning of the section, Strab. 298, ὃ δ' Ἀπολλόδωρος ἐν τῶι δευτέρωι Περὶ νεῶν προοιμιαζόμενος εἴρηκεν, ἥκιστα λέγοιτο ἄν. ἐπαινεῖ γὰρ Ἐρατοσθένους ἀπόφασιν, κ.τ.λ., and Eratosthenes' own hostility to Euhemerus and other such writers is stated by Strabo in the passage quoted in the previous note. Berger regards the identity between the viewpoints of the two authors as so close that it is impossible to determine how much of the entire passage, 298–300, should be assigned to Eratosthenes and how much to Apollodorus. For Theopompus' Μεροπὶς γῆ (*FGrH* 115 F75) and Hecataeus' Κιμμερὶς πόλις, not otherwise expressly mentioned, see *Ptol. Alex.*, loc. cit. The passage about the sandstones melted by rains does not recur in any of the paradoxographers, but there are several passages in Callimachus' own *Thaumasia* (Ant. Car. §§129 ff.; Call., fr. 407; Giannini, op. cit., pp. 88 ff.) concerned with the supposed physical properties of stones (§§ 136; 168; 171), so the passage would be very suitable to him. The sections on stones in the *De Mir. Ausc.* (§§ 115; 157; 162; 166, etc.) are by contrast almost entirely confined to stones possessing magical properties in the manner of the later amulets. The later paradoxographers have less to say about stones: see the references in Giannini, p. 404, s.v. λίθος.

or carelessly) not to the genuine scientific works of Aristotle himself, but to pseudo-Aristotelian paradoxography as a whole, and perhaps to its most influential exponent in Alexandria, his own countryman, Callimachus, or to one of his pupils. Here, as in his early days in Athens, when he dismissed the pretentiousness of Ariston and Bion, he dismisses such footling pseudo-scientific paradoxographers briefly, as so many 'Bergaeans'. We know too little of the intellectual history of the disturbed and unproductive second century B.C. in Alexandria to say how much success Eratosthenes had in his stand against the 'Marvel-Books', but I suspect that it was very little. Most of the post-Callimachean specimens of this tawdry writing appear to belong to the second and first centuries and to be closely based on Callimachus' own work.[1]

In fact, although Eratosthenes held the most eminent position in Alexandria, he seems to have had only slight influence in all spheres. It lay of course partly in the nature of his basic studies that they were soon replaced by subsequent, similar works, inferior or superior. His mathematical geography was heavily assailed on the basis of more advanced, or more accurate, mathematical knowledge by Hipparchus; his physical and human geography was absorbed and improved by Artemidorus of Ephesus; his contributions to philology and to literary criticism were submerged in the achievements of Aristophanes and Aristarchus; his chronological system was partly abandoned and partly absorbed in the inferior systems of Apollodorus and, still more, of Castor, in whose scheme mythical chronology, expelled by Eratosthenes, was reinstated; his opposition to paradoxography went unheeded. By the end of antiquity he had been fatally dubbed with the unfortunate nicknames, Beta and 'The Second Plato', though some wiser men put him in the first place.[2] He had few pupils, he founded no school; there were no Eratostheneioi, as there were Callimacheioi, Aristophaneioi, Aristarcheioi, and the rest, and his views find echo

[1] See *Ptol. Alex.*, pp. 776 ff.

[2] For the various terms applied to him—Βῆτα, δεύτερος ἢ νέος Πλάτων (hardly opprobrious, and no doubt due largely to his authorship of the *Platonicus*), Πένταθλος, see the Suda-*Life*, quoted above, p. 175 note 2, and Marc. Heracl., *GGM*, i, p. 565, § 2, Ἐρατοσθένης, ὃν Βῆτα ἐκάλεσαν οἱ τοῦ Μουσείου προστάντες; cf. also *Ptol. Alex.*, ch. 11 note 425. The sources are all of late date and it is impossible to tell whether any of the terms were current in his lifetime. For Pliny, quoted above, p. 189 note 1, he was 'in omnium quidem litterarum subtilitate et in hac utique praeter ceteros sollers'; cf. also Arr. *Ind.* 3, 1: ἐμοὶ δὲ Ἐρατοσθένης ὁ Κυρηναῖος πιστότερος ἄλλου ἔστω.

rarely outside geographical writers.[1] His achievement, as I have tried to indicate, went almost unappreciated in the ancient world, but in spite of our having only fragments by which to judge him, it is clear that he cannot be dismissed as a secondary figure. He considered the fundamental problems of almost all branches of learning with detachment and integrity, and though he built on the foundations of Platonic mathematics and Aristotelian natural science and historical and geographical research, his practical solutions, mathematical, chronographical, or geographical, were, right or wrong, essentially his own. He owed much to his predecessors, but he owed most to his own inborn independence and to his power to recognize and openly to resist nonsense and pretentiousness.

One last glimpse we have of the old man. In his biography of Arsinoe, the wife of Philopator, who died in about 205 B.C., and which Eratosthenes must have written towards the end of his life, he records an incident in the palace at which he and the Queen were present together.[2] Philopator was indulging his

[1] The pupils with whom he is credited are given in the Suda-*Life*, quoted above, p. 176 note: Aristophanes of Byzantion, Mnaseas of Patara, Menander (of Ephesus, probably), and Aristis. Of these Aristophanes alone is a major figure; Mnaseas was a minor geographer with paradoxographical leanings (*Ptol. Alex.*, pp. 524–5), and Menander, if the Ephesian, a historian whose account of the Kings of Tyre was based on the archives of that city and who migrated to Pergamon (ibid., p. 510); Aristis cannot be identified. It is a meagre list, and does not include those who, though not his formal pupils, were nevertheless much influenced by him, notably Apollodorus of Athens and Agatharchides of Cnidus (see *Ptol. Alex.*, pp. 456–7, 538–9 (Apoll.), 548 (Agatharch.)), of whom the first is mentioned by Strabo 44 as συνηγορῶν τοῖς περὶ τὸν Ἐρατοσθένη, which may mean no more than Eratosthenes himself.

[2] F16 (Athen. 276A–C): περὶ ἧς (the Alexandrian Lagynophoria) ἱστορεῖ Ἐρατοσθένης ἐν τῶι ἐπιγραφομένωι συγγράμματι Ἀρσινόη· λέγει δὲ οὕτως· τοῦ Πτολεμαίου κτίζοντος ἑορτῶν καὶ θυσιῶν παντοδαπῶν γένη καὶ μάλιστα περὶ τὸν Διόνυσον, ἠρώτησεν Ἀρσινόη τὸν φέροντα τοὺς θαλλούς, τίνα νῦν ἡμέραν ἄγει καὶ τίς ἐστιν ἑορτή· τοῦ δ' εἰπόντος "καλεῖται μὲν Λαγυνοφόρια, καὶ τὰ κομισθέντα αὐτοῖς δειπνοῦσι κατακλιθέντες ἐπὶ στιβάδων, καὶ ἐξ ἰδίας ἕκαστος λαγύνου παρ' αὐτῶν φέροντες πίνουσιν"—ὡς δ' οὗτος ἀπεχώρησεν, ἐμβλέψασα πρὸς ἡμᾶς "συνοίκιά γ'", ἔφη, "ταῦτα ῥυπαρά. ἀνάγκη γὰρ τὴν σύνοδον γίνεσθαι παμμιγοῦς ὄχλου, θοίνην ἕωλον καὶ οὐδαμῶς εὐπρεπῆ παρατιθεμένων". εἰ δὲ τὸ γένος τῆς ἑορτῆς ἤρεσκεν, οὐκ ἂν ἐκοπίασε δήπου τὰ αὐτὰ ταῦτα παρασκευάζουσα ἡ βασίλεια καθάπερ ἐν τοῖς Χουσίν· εὐωχοῦνται μὲν γὰρ κατ' ἰδίαν, παρέχει δὲ ταῦτα ὁ καλέσας ἐπὶ τὴν ἑστίασιν. This well-known passage clearly refers to Arsinoe Philopator and not to Arsinoe Philadelphus. If Eratosthenes was born in *c.* 285 B.C. he was only fifteen when Arsinoe II died, and still in Cyrene, and even if born earlier there is no good reason to suppose that he was in Alexandria before he was called there by Euergetes (cf. *Ptol. Alex.*, ch. 6 note 205). The whole story indicates that he was in a position of trust and intimacy at court, and that is

taste for festivities by holding a private celebration of the Lagynophoria, the 'Feast of the Beakers', so named because the participants each brought with them a *lagynos* of wine. The party was in full swing, when the Queen passed by with Eratosthenes beside her. He tells us what happened:

> The Queen asked an attendant what festival it was; he told her that it was the so-called Lagynophoria, at which everybody brought their own *lagynos*. When the servant moved off she looked at me and said 'What a squalid festival—συνοίκιά γ', ἔφη, ταῦτα ῥυπαρά; the reunion of a miscellaneous mob which has brought along its own stale, disgusting food.'

This is an intimate glimpse of the neglected wife of Philopator, as seen through the eyes of an old and loyal, but frank servant of her father and her husband, at the end of his long life. He seems to have felt her position deeply, and this brief, revealing episode tells us much of both of them.

How much longer he himself survived after her death we do not know. A few years at most passed before he died, and was buried in Alexandria, within sight of the Library where the most busy and useful years of his life had been spent, close to the sea which separated him from the Doric tombs of his native Cyrene. Somewhere nearby lay already the bones of his illustrious fellow countryman, Callimachus, the son of Battus. There we may in the mind's eye leave them, creative and self-absorbed the one, critical and detached the other, the greatest of the sons of the old city on the Libyan plateau who brought their talents to the new city on the banks of the Nile; 'Cyrenaeans, both honoured by the Kings of the Egyptians', as Strabo said of them.[1]

only reconcilable with the time of Arsinoe III; at the same time the festival itself suits Philopator better than Philadelphus. On the Lagynophoria see *Ptol. Alex.*, ch. 5, pp. 203–4, and note 112, and also note 423. Arsinoe's remark, συνοίκιά γε ταῦτα ῥυπαρά may perhaps have carried a particular connotation. The word συνοίκια is known only as used of the festival celebrated in Athens to commemorate the unification of Attica by Theseus, on 16 Hecatombaeon (Thuc. ii. 15, 2; Charax, *FGrH* 103 F43; cf. Nilsson, *RE*, s.v. Συνοίκια, col. 1435, who, unnecessarily, doubted whether the festival celebrated the synoecism, and regarded it as a feast of neighbours like the Metageitnia; Deubner, *Att. Feste*, pp. 35 ff.). Arsinoe was presumably exaggeratedly comparing Philopator's festival with the Attic *synoikia*, because of the large number of people present (παμμιγὴς ὄχλος). She cannot be referring to an Alexandrian *synoikia* since she would not ask what a normal Alexandrian festival was called.

[1] 838: Κυρηναῖος δ' ἐστὶ καὶ Καλλίμαχος καὶ Ἐρατοσθένης, ἀμφότεροι τετιμημένοι παρὰ τοῖς Αἰγυπτίων βασιλεῦσιν.

BIBLIOGRAPHICAL NOTE

It may be of some help if I give here a brief, and very selective, bibliography of Eratosthenes. More, particularly references to individual articles, will be found in the notes to *Ptol. Alex.* according to subject-matter, and in *L'An. Phil.* under *Eratosthenes.*

(*a*) The old work of G. Bernhardy, *Eratosthenica* (Berlin, 1822), composed when the author was twenty-two years of age, remains the completest collection of the fragments, and though it is outmoded in many ways, his sound judgements are still valuable.

(*b*) I have already referred to the two current collections of the historical and geographical fragments, Jacoby, *FGrH* 241 and Berger, *Die geographische Fragmente des Erat.* (Berlin, 1880). The latter is a full and indispensable guide through the labyrinth of Strabo's quotations of Eratosthenes, and the other quotations. Also important in this respect is D. R. Dicks's edition, *The Geographical Fragments of Hipparchus* (London, 1960), which consists largely of Strabo's quotations of Hipparchus' attack on Eratosthenes. (Berger, it may be noted, had already published the fragments of Hipparchus in 1869.) I need not refer here to the numerous histories of ancient geography, all of which deal in greater or less detail with Eratosthenes (see *Ptol. Alex.*, ch. 7 (ii) note 301), but Berger's other major contribution to the study of Eratosthenes deserves honourable mention: *Geschichte der wissenschaftl. Erdkunde der Griechen* (ed. 2, 1903), pp. 384–441. The only specialized work to be noted is that, in two separate volumes, of A. Thalamas, *La Géographie d'Ératosthène* and *Étude bibliographique de la Géographie d'Érat* (Versailles, 1921). I may also mention the recent study of G. Aujac, *Strabon et la science de son temps* (Paris, 1966), which contains, pp. 49–64, a general appreciation of Eratosthenes of considerable interest, though I disagree with a good deal in her estimate of him.

(*c*) On Eratosthenes as a philosopher see especially E. Solmsen, *TAPA* 73, 1942, pp. 193–213, and E. P. Wolfer, *Eratosthenes von Kyrene als Mathematiker u. Philosoph* (Groningen, 1954); cf. further *Ptol. Alex.*, ch. 9 note 29.

(*d*) For the fragments of the work on Attic Comedy, about which I have said nothing in this brief paper, see C. Strecker, *De Lycophrone Euphronio Eratosthene Comicorum Interpretibus* (Greifswald, 1884), which remains the only collection of this material, though incomplete and antiquated. The chapter by R. Pfeiffer on Eratosthenes in his *History of Classical Scholarship*, pp. 152–70, is an appreciation of outstanding importance.

(*e*) The mathematical fragments are well represented in Ivor Thomas's indispensable *Greek Mathematical Writings* (Loeb, 2 vols.), while the brief discussion by Heath, *Greek Mathematics*, is still the best general statement. Wolfer's work, noted above, is essential for the particular problems it deals with, notably the tradition regarding the duplication of the cube.

(*f*) The verse is separately published by E. Hiller, *Eratosthenis carminum Reliquiae* (Leipzig, 1872), and subsequently by J. U. Powell, *Collect. Alexandr.* (Oxford, 1925), pp. 58 ff. See also E. Maass, *Analecta Eratosthenica* (*Philol. Unters.* 6, 1883), concerned especially with the *Erigone*, and G. A. Keller,

Eratosthenes und die alexandrinische Sterndichtung (Zurich, 1946). For the very complex problems of the *Catasterismi* attributed to Eratosthenes see C. Robert, *Eratosthenis Catasterismorum Reliquiae* (Berlin, 1882), and the work of J. Martin, *Histoire du texte des Phénomènes d'Arate* (Études et Comm. 22, 1956), *passim*; cf. also *Ptol. Alex.*, ch. 7 (ii) note 303.

(*g*) The two most detailed general documented studies of Eratosthenes after Bernhardy's edition (and his subsequent article of 1845 in Ersch and Gruber's *Allgemeine Encyclopaedie*, s.v. Eratosthenes, pp. 221–33, which does not add a great deal to his earlier work) are those of Susemihl, *Gesch. Alex. Lit.* i (1891), pp. 409–28, and Knaack's article in *RE*, s.v. Eratosthenes (4), cols. 358–88 (1907), both of which are very full and careful treatments of the subject. Eduard Schwartz, who had dealt with Eratosthenes' chronography in his work on the later chronographers, *Die Königslisten des Eratosthenes und Kastor* (*Gött. Abh.* 40, 1894), later wrote a general appreciation of Eratosthenes in the 1909 edition of *Charakterköpfe aus der Antike* (various subsequent editions; 4. Auflage der Neuausgabe, herausgeg. v. J. Stroux, Leipzig, 1956), pp. 183–209. This is an outstandingly eloquent and imaginative reconstruction, not only of Eratosthenes' thought and activity, but also of Alexandrian culture in the third century, comparable with that of Wilamowitz, in *Die hellenist. Dichtung*, i, pp. 152 ff.