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Part I

"THE FRAGMENTS OF ERATOSTHENES OF CYRENE"

Thesis submitted for the Ph.D. Degree
by
R.M.Bentham

1948.

He died suddenly before this thesis was examined.

Part 1: Introduction
Text and translation

Supervisor
E H Warmington

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Prof. E.H. Warmington.

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THE FRAGMENTS OF ERATOSTHENES OF CYRENE

Thesis submitted for the Ph.D. Degree

by R. M. Bentham

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INTRODUCTION

Dates bearing
the chief authorit

Birth of Eratosthe

Arrival at Athens

Death of Zeno

Death of Arsinoe I

Accession of Euerg

Arrival at Alexand

Birth of Philopato

Death of Callimach

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Accession of Epiph

Death of Eratosthe

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II

Dates bearing on the life of Eratosthenes according to the chief authorities.

	Busch	Knaack	Thalamas	Jacoby
Birth of Eratosthenes	276	284	273	296-2
Arrival at Athens	265	264		266
Death of Zeno	264	262-1	264-256	262-1
Death of Arsinoe II	250			
Accession of Euergetes		245		
Arrival at Alexandria	252-1	245	245-4	246
Birth of Philopator			244	
Death of Callimachus	245		236-5	
(Death of Zenodotus and (Appointment of Eratos-(thenes as librarian.	236-3	?	235-4	246[x]
Accession of Epiphanes			204	
Death of Eratosthenes	195	204-2	192	214-3

[x] As successor to Apollonius Rhodius (no mention of Zenodotus)

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2 Fr. B.
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I

LIFE

As little is known about the life of Eratosthenes as about that of Shakespeare. In both cases there are traditions in plenty, but few facts. Little can be induced about either from his writings, and in the case of Eratosthenes we have not even a corpus of admittedly genuine work.

At first sight the account given by Suidas[1] is reasonably complete, even to the Olympiad of his birth. Yet even this definite statement has been questioned, and the omissions are many. Suidas makes no mention under the name of Eratosthenes of his librarianship at Alexandria, whereas under that of Apollonius Rhodius[2] he does; while his account of the writing of Eratosthenes is, as we shall see later, misleading. The account of his death by self-starvation is in sharp contradiction with the epigram[3] which describes him as yielding gracefully to gentle old age.

The date given by Suidas is, however, the only detailed guide we have. This places the birth of Eratosthenes in the 126th Olympiad, or 276-2 B.C. He is said to have died at the age of 80 (by Suidas), 82 (by Ps.-Lucian)[4], in his 81st year (by Censorinus)[5]. According to Vitruvius[6] he died in the 12th year of Ptolemy Epiphanes, who came to the throne somewhere between 206 and 203: this agrees sufficiently well with the foregoing. Thalamas,[7] basing his calculations on the accession of Epiphanes in 204, places his birth with some precision between April and June 273, his death between April and June 192, but few scholars would care to bind themselves within such narrow limits.

Born and given his early education at Cyrene in North

1 Fr. A.
2 Fr. B.
3 Fr. G.
4. Fr. J.
5 Fr. F.
6 See Butsch: de Bibl. Alex p.29, nn. qq. 10.
7 Géog. d'E. p. 26-28.

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THESIS

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8 Fr. H,42.
9 Fr. 42,43.
1 Fr. 25.
2 Fr. 102.

Africa, perhaps, as Suidas says, under Lysanias, Eratosthenes proceeded to Athens as one would now to Oxford or Cambridge. How long he stayed there and what he did is quite uncertain, for there is a natural tendency to associate him with all the scholars of the period; of whom, as he himself seems to have written[8], there was a very considerable number. We may accept Ariston the Peripatetic, for not only does Suidas mention him but Eratosthenes wrote a book about him[9]. He appears also to have studied under Arcesilas and Apelles, the Academics, and Bion the Cynic. One thing, however, is quite obvious from his own writings, if we may rely on them sufficiently at second hand, and that is that he was not attached or particularly attracted to any single school. It was probably at Athens that he developed the taste and ability for mathematics which never left him, and it is reasonable to suppose that some of his literary works, such as the poem "Erigone" and the mathematical - philosophical work "Platonicus" may have been published there. It is at least fairly certain that he had established sufficient reputation to attract attention as far away as Alexandria when he was summoned there, probably at the instance of his fellow-countryman Callimachus.

When this happened is not clear, but the consensus of conservative scholarship points within a few years either way of 245 B.C. when Eratosthenes was about thirty. At Alexandria he spent the remainging half-century of his life, partly as tutor to the young Ptolemy Philopator[1], later in attendance on Queen Arsinoe III[2], and from the death of Zenodotus in about 235 B.C. as the librarian in charge of the two libraries, already great and expanding. All this time he was producing original work, in all the fields of literature and

8 Fr. II,42.
9 Fr. 42,43.
1 Fr. 25.
2 Fr. 102.

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3 F.Susemihl: Ges
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4 W.Busch: De bib
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5 G.Knaack: Pauly
6 F.Jacoby: Die F
241: Berlinx,
7 Fr. 42.

science practised at that time. About 194 B.C. he died, probably in the course of nature as described in the epigram. Eratosthenes was, as Strabo frequently complains, no Stoic, to consider it his duty to commit suicide at the end of a long and useful life, nor yet so unbalanced as to fall into frantic despair at the thought of gradual blindness. Suidas ascribes the same self-destruction to Aristarchus: it is not impossible that two librarians out of three should starve themselves to death, but when an alternative account is at hand it seems unlikely.

Though Susemihl[3], Busch[4], Thalamas and others agree on most points of this account of his life, it has been seriously called in question by some scholars. Basing their attack principally on the statement by Strabo that Eratosthenes was γνώριμος of Zeno, Knaack[5] puts back the date of his birth to at least 284 B.C. Jacoby[6], assuming that ρκς′ in Suidas is a copyist's error for ρκα′, even to 296-3. The point of the argument is that γνώριμος must mean "a pupil", that Zeno died in 262-1, and that even Eratosthenes can hardly have studied in a philosophical school before the age of 15. This hypothesis deserves serious attention, for Strabo was almost certainly writing with the "Geography" of Eratosthenes beside him if none of the other works, and, though frequently opposing his statements, apparently reports them with a reasonable degree of honesty. There are, however, objections. Strabo himself at this point[7] is not quoting Eratosthenes, but complaining that, although he was γνώριμος of Zeno, he has not mentioned

3 F.Susemihl: Gesch. der Griech. Litt. in der Alexandrinerzeit: Leipzig 1891 (I, pp.409-12)
4 W.Busch: De bibliothecariis Alexandrinis qui feruntur primis: Schwerin 1884.
5 G.Knaack: Pauly-Wissowa Encyclopedia s.v. "Eratosthenes"
6 F.Jacoby: Die Fragmente der Griechischen Historiker, 241: Berlin, 1929.
7 Fr. 42.

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8 E.A.Knight: Erat
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9 Wilamowitz: He
1 Ambros.c.22 (pr
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certain Stoic philosophers, whom Strabo considers he ought to have mentioned. Although the word γνώριμος can be and frequently is used in the sense of "a pupil", it need mean no more than "acquainted with", and it is by no means impossible that Eratosthenes might have gone to Athens and seen or spoken with Zeno before his death. Moreover, as Thalamas has pointed out, the sources for Zeno's death vary widely, and may be taken as placing it anywhere from 264 to 256 - the latter date making it quite possible for γνώριμος to be used in the more technical sense. In any case, it must be remembered that Strabo is indulging in Stoic special pleading, and might easily have stretched the facts a little, implying nothing more than close association with Zeno's school and personal influence. The whole theory involves the assumption that Vitruvius's statement is also false.

There is a further argument against the death of Eratosthenes[8], according to Knaack in 204-2 and to Jacoby in 214-213. In the quotation from his "Arsinoe" reflections are made upon the character and behaviour of Philopator which could hardly have been published until some time after his death; and Philopator died in 205-4 B.C. The older explanation of the passage as referring to Arsinoe II and Euergetes is used by Busch as proving the very early presence of Eratosthenes in Alexandria, Arsinoe II having died about 250 B.C. Even Jaboby after Wilamowritz[9] concedes thatit refers to Arsinoe III Philopator, while reserving judgement about its date of writing and publication.

The statement of Tzetzes[1], that Eratosthenes worked on the library catalogues of plays with Alexander of Aetolia and Lycophron, has also been urged by Busch as evidence of his early presence in Alexandria, and it has even been suggested that he spent a short

8 E.A.Knight: Eratosthenes as a Representative of Hellenistic Culture: London M.A. Thesis 1930.
9 Wilamowritz: Hellenistische Dichtung I, p.207
1 Ambros.c.22 (proleg. ad Arist. schol. et schol. de Plauto); quoted by Busch, op. cit. p.25, Ritschl op. cit. p.7.

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2 F.Ritschl: Die
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3 Wilamowitz: P
4 Fr. 93.

time in Alexandria before his visit to Athens. There is, however, no reason to suppose that both these men were dead by 245 B.C., the date suggested above for His removal from Athens to Alexandria; though Susemihl places it in 235.

There is now very little doubt that Eratosthenes directly suceeded Zenodotus as chief librarian, the former theory of Ritschl[2] and others that Callimachus came between being adequately dealt with by Busch and generally accepted. There can be little doubt that Callimachus was the intended successor, not only on account of his literary eminence but for his outstanding work in cataloguing the libraries, but the evidence is that he died before Zenodotus: according to Thalamas, Zenodotus died in 235-4 B.C., Callimachus a little before; according to Busch, Zenodotus in the 136th Olympiad (236-2) and Callimachus in 245. As a matter of ordinary probability, it seems reasonable to suppose that Callimachus suggested his promising young countryman to PtolemyIII Euergetes for a post in the rapidly growing library, that he served under Callimachus with other more or less eminent men, and, when Callimachus predeceased Zenodotus, succeeded to his place. This would have the advantage of adequately explaining the use by Suidas of the phrase μαθητής.. Καλλιμάχου τοῦ ποιητοῦ. Many scholars have agreed with Wilamowwitz that it was as tutor to Philopator that Eratosthenes was originally summoned to Alexandria, and that there was some connexion between the posts of royal tutor and librarian. The former idea is scarcely tenable as Philopator was not born before 244 B.C., and Eratosthenes held that a child should not begin its education until the age of seven[4]; the latter, for Zenodotus being the first librarian no tradition of the kind could possibly

2 F.Ritschl: Die Alexandrinischen Bibliotheken unter den ersten Ptolemäern: Breslau, 1838.
3 Wilamowwitz: Hellenistische Dichtung,I.p.165.
4 Fr. 93.

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There can, then, be no final agreement upon the exact dates of the life of Eratosthenes, although the main outline is clear. Of his principal works and achievements the doubt is not so great, although even here different emphasis and interpretation have produced pictures of the man some of which must be distorted. A disproportionate amount of attention has been paid by some critics to the nicknames by which Eratosthenes was known to his contemporaries[5]. It appears to be forgotten that an apparently uncomplimentary nickname may be merely a sign of affection, that some nicknames, such as "Little John", are deliberately "lucus a non lucendo", while others arrive so casually that even their owners have forgotten their origin. Indeed, the most likely attribute of anyone possessing a number of nicknames of any kind is personal popularity. Eratosthenes was known as "Pentathlos", which can hardly be interpreted as anything but "all-rounder", whether with an added suggestion of insufficient specialization can hardly be expressed with certainty: it is, however, well to remember that the maxim μηδὲν ἄγαν had not lost its force even in the Hellenistic age, and that polymathy was admired at Alexandria. His title of "New Plato" can hardly be described as anything but complimentary without destroying the meaning of language, whether it referred originally to his "Platonicus" or to his eminence in geometry. Strabo's remarks that he was a mathematician among geographers and a geographer among mathematicians, and not a real philosopher, surely arose from his Stoical antipathy to mathematics, and his irritation, mentioned above, that one who had once seen the light should have deliberately turned his

5 Fr. A.

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6 Herodotus VII
7 Frr. 25,31.
8 See Ritschl,

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THESIS

back on it. The name "Beta" has been taken much too seriously. It could be a jealous jibe of opponents, but it bears more the mark of a family joke, and it is well to bear in mind the story told by Herodotus[6] of the generals after Salamis, each of whom awarded the first prize to himself and the second to Themistocles. A possibility that seems to have occurred to no one is that it was simply a reference to his being the second Librarian.

Of Eratosthenes's valuation of his own work we have fortunately first-hand evidence. To the modern mind it is his geographical work, and especially his measurement of the earth's circumference, that tends to obsure all else. To Eratosthenes it no doubt appeared to have some importance, since he devoted three books to it while to most subjects he gave only one; but there can be little doubt that in literary matters it was his much longer critical works, "The Old Comedy" and "Chronography" that he regarded as his master-pieces, while in science there is no doubt at all that he considered his highest achievement to be the "doubling of the cube"[7]. That was his claim to immortality, and it was to that that he raised a monument and wrote an epigram "more enduring than brass".

From this fact we have an important clue to the personality and outlook of Eratosthenes. He was a scholar in the strictest possible sense; he had control of libraries containing, according to Tzetzes[8], over 40,000 (the Serapeum) and nearly 500,000 (the Brucheum) volumes at the time when they were catalogued by Callimachus, and including Aristotle's own collection which had been acquired by Ptolemy Philadelphus; yet he was no mere consumer and producer of books,

6 Herodotus VIII, 123.
7 Frr. 25,31.
8 See Ritschl, op.cit, p.22.

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9 Fr. L, and no
1 Strabo, Books
2 Fr. 270.
3 Fr. 167.

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in the manner which later made the term "Alexandrian" a reproach. Even his mathematical studies were not the purely theoretical kind of Plato and the normal Greek. He was a friend, associate and correspondent[9] of the applied mathematician in excelsis, and, if all other evidence were lacking, the fact that Archimedes treated him as an equal in mathematics would suffice to indicate his quality. His geographical work was in fact revolutionary and is still bearing fruit to-day. It was based upon, if it did not contain, a great deal of important mathematical and scientific research, and must therefore ~~ha~~ have been written late in his life. It consisted, as we shall see below, of a masterly adaptation of mathematical principles to pitifully inadequate factual information, a magnificent attempt which brought upon him the sneers and opposition of Hipparchus[1]. A century and a half later Eratosthenes was one of the chief authorities that Julius Caesar carried with him on his campaign in Gaul and Britain[2]. On top of all this, the references now existing to the "Geography" are, to those of the other works, out of all proportion to its actual size. In view of all this, it is important to remember that Strabo refers to the individual books of the "Geography" ἀναμνήματα or "essays". If this is the author's own name for them, it suggests that he regarded the whole work as tentative and suggestive, and, like many other authors, differed widely from posterity in estimating the relative value of his own works. As for his measurement of the earth[3] that was an approximation and he knew it, but the "gadget" on the memorial at Alexandria was fit in his opinion to rank with the inventions of Archimedes though the pure mathematicians had nothing but contempt for a practical solution not reached with ruler and compasses.

9 Fr. 1, and note.
1 Strabo, Books I,II, passim.
2 Fr. 270.
3 Fr. 167.

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4 Fr. 134 - 14
5 Fr. 23.

X65-43
THESIS

It is always a temptation to trace "influences" in the work of any great writer, but quite apart from the fact of having almost all our sources at second hand there is not much to be gained in the case of Eratosthenes. His was an independent and original spirit. He irritated Strabo by insufficient reverence for Stoicism, and his manner in writing of his old master Ariston is scarcely respectful. He was not a "real philosopher" - that is to say, he neither followed nor founded a school. He was subject to some of the normal limitations and preconceptions of the Greeks, as will be seen particularly in relation to his geographical work; he would otherwise scarcely have been human. He was, in fact, no revolutionary for revolution's sake, but if a new idea seemed better than an old one he was ready to adopt the new. In none of his works is this so well exemplified as in his remarks on Homer[4], which it must have required some degree of moral courage to publish; but they opened the way for the "higher criticism" of Aristarchus and Aristophanes.

Two men there were who commanded his respect and must, to some extent at least, even if without his knowledge, have influenced his work: his master and fellow-citizen Callimachus, whose maxim μέγα βιβλίον μέγα κακόν he followed (in its more obvious sense) in nearly all his works, and to whose writing it is possible, though unnecessary, to trace a slight similarity in the only two complete elegiac couplets we have, those on wine[5]; and his correspondent Archimedes, whom Eratosthenes had sufficient intellect and sense of proportion to recognize as his superior in the imaginative scientific application of mathematics.

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4 Fr. 134 - 147.
5 Fr. 23.

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THESIS

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It has been shown that there can be no certainty in the chronology of Eratosthenes's life. The following dates are, however, assumed here as approximate:

Birth	276-5 B.C.
Arrival at Athens	263-2
Death of Zeno	262-1
Accession of Ptolemy Euergetes	247
Arrival at Alexandria	245
Birth of Ptolemy Philopator	244-3
Death of Callimachus	236
Death of Zenodotus and appointment of Eratosthenes as librarian	235[x]
Accession of Ptolemy Epiphanes	205-4
Death of Eratosthenes	194-3

[x] This date is adopted by Susemihl (loc. cit.) for the arrival in Alexandria.

K65.43
THESIS

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6 Ath. Tat. p.15
7 Ath. II p.36

K65.43
THESIS

II

WORKS

All that can be said with certainty about the works of Eratosthenes is that they were numerous, and covered almost every field of learning. So far as can be determined from the extremely slight fragments that remain of his verses, he wrote verse because (a) it was the fashion to do so, and (b) some kinds of didactic writings were normally put into verse, not only in earlier times by people like Parmenides, but later by Lucretius. The longest fragment,[6] that on the zones, is first class verse but hardly poetry, while the epigram[7] on wine is at a competent level. His prose writings are, even at second-hand, very much more voluminous. A fairly close guess may be made at the original style by studying some of the longer quotations in Strabo: according to the custom of antiquity these are likely to be very nearly if not absolutely verbatim, and from them it may be gathered that the language used by Eratosthenes was as simple and lucid as might be expected of one whose chief interest was in applied mathematics.

It is ~~xax~~ easy enough to make generalisations about the contents of the prose works of Eratosthenes. The difficulty arises when a serious attempt is made to sort out the few certain quotations, the many certain allusions and the welter of possible allusions into definite works with known titles. For us, his chief work is the "Geography"; but, as will be seen later, even in dealing with this it is impossible to state with certainty of many references to which book of the three they belong, or even whether they belong to the "Geography" at all. The preparation of a "text" of the Works of Eratosthenes is, therefore,

6 Ath. Tat. p.153 c
7 Ath. II p.36 E

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THESIS

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8. A. Thalamas:
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9. L. Ancher: E
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1. C. F. Seidel
tingen, 17
2. G. Bernhardy
3. J. Bergk: An
4. C. Müller: G
5. E. Hiller: E
168-173
6. F. Jacoby: E
19

THESIS

a matter of assessing probabilities, and of fitting a jig-saw of increasingly battered pieces round a lamentably few fixed points. The personal element enters so much into the selection and arrangement that it can never be definitive.

The history of the reconstructed text of Eratosthenes is the history of its editors and commentators, most of them German. A bibliography of commentaries would require a book of its own, a feat actually performed by Thalamas[8], although even he treats the subject only from the point of view of the "Geography": a complete bibliography would contain the names of most critics of repute in England, France and Germany. Few, however, have made any substantial attempt at reconstructing the text. Ancher[9] in 1770 made a good beginning which he did not follow up, and Seidel[1] in 1789 made a somewhat half-hearted attempt at collecting the geographical fragments. It was not until 1822 that Bernhardy published the remarkable work[2] which still remains the only attempt to gather the complete remaining works of Eratosthenes into one book. At the age of twenty-two he produced a corpus of fragments which, though naturally not perfect, has provided a starting-point for research until to-day, and was not afraid to express his views in forcible, though at times turgid, Latin.

The prose extracts have been augmented by Bergk[3], Muller[4], Hiller[5] and, most recently, Jacoby[6], but the most important contribution is that of Hugo Berger, in his monumental collection of and commentary on the "Geography". Occasional fragments, notably that on the "wind-rose", have been contributed by individuals and will be noted in their places. On the verso side, notable contributions

8. A. Thalamas: Etude Bibliographique de la Geographie d'Eratosthene: Versailles, 1921
9. L. Ancher: Diatribe in fragmenta geog. Eratosthenis, Göttingen, 1770
1. C. F. Seidel: Eratosthenis geographicorum fragmenta: Göttingen, 1789
2. G. Bernhardy: Eratosthenica: Berlin, 1822
3. J. Bergk: Analectorum Alexandrinorum: Marburg, 1846
4. C. Müller: Geographi Graeci Minores: Paris, 1855
5. E. Hiller: Der Πλατωνικός des Eratosthenes: Philol. XXX, 168-173
6. F. Jacoby: Die Fragmente der Griechishen Historiker, 241; 1929

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THESIS

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7 F. Osann: de Ei
Göttingen 1840
8 E.Miller: Erato
9 Quoted by Sir E
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have been made by Osann[7] and Hiller[8]. It is now, perhaps, time that, while recognizing the immense debt owed to these editors, in the words of T.E.Page, "having got rid of some of that encumbering mass of Teutonic learning, we may go back to that good honest English system of trying to appreciate what is the real soul and spirit of the ancient writers".9

Bernhardy has some scathing things to say of Fell, and his like, who swelled the number of titles by assigning separate works to every subject mentioned separately by any subsequent writer as having been treated by Eratosthenes. Although it is undesirable to join "isti titulorum scrutatores", with their 28 (Fell), 38 (Gale) or 49 (Fabricius) titles, it is nevertheless desirable to attempt some classification. While such titles as γνωμονικά, Νείλου πηγαί and περίπλους[1] can be dismissed as entirely without foundation, many others cannot be passed over so easily. It therefore seems reasonable, before discussing individual works, to divide them up as follows:

A - works so frequently mentioned as to be beyond reasonable doubt;

B - works whose separate existence is doubtful, but for which a case can be made out;

C - works whose separate existence is unlikely or whose authorship is doubtfully attributed to Eratosthenes.

7 F. Osann: de Eratosthenis Erigona, carmine elegiaco: Göttingen 1846

8 E.Hiller: Eratosthenes carminum reliquiae: Leipsig 1872

9 Quoted by Sir Frank Fletcher, in his Presidential Address to the Classical Association 1946.

1 Based on an emendation of ἐν τῷ περί πλούτου by Vossius, accepted by Fell.

K65 .H3
THESIS

γεωγραφικά
Πλατωνικός
περὶ μεσοτήτων
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Ὀλυμπιονῖκαι
περὶ τῆς ἀρχαί
κωμῳδίας
γραμματικά
Ἀρσινόη
περὶ πλούτου
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2 Fr. A.
3 e. g. Frr.

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Πλατωνικός	Ἀρίστων	Γαλατικά
περὶ μεσοτήτων	πρὸς Βάτωνα	πρὸς Ἀράτου φαινόμενα
χρονογράφιαι	σκευογραφικός	
Ὀλυμπιονῖκαι	ἀρχιτεκτονικός	
περὶ τῆς ἀρχαίας κωμῳδίας	δικαστηρίς	
γραμματικά	περὶ ἀγαθῶν καὶ κακῶν	
Ἀρσινόη	περὶ ἀλυπίας	
περὶ πλούτου	περὶ ἀνέμων	
(καὶ πενίας)	μετρήσεις	
ἐπιστολαί	περὶ τῆς ἀναμετρήσεως τῆς γῆς	
κόσκινον		
VERSE: Ἑρμῆς	VERSE: ἐπιθαλάμιον	
Ἠριγόνη		
Ἀντερινύς (ἢ Ἡσίοδος)		

All the above, although their claims to consideration differ widely, are well-established titles. Before discussing them separately it will be well to make some observations.

Suidas, in his list of writings[2] does not appear to wish to give an exhaustive list of titles. His φιλόσοφα καὶ ποιήματα καὶ ἱστορίας, κ.τ.λ., is a kind of characteristic jumble intended to give an atmosphere of polymathy. No mention is made either of geography or of mathematics: this is sufficient in itself to discredit it as a reliable and full bibliography, and perhaps to indicate something of the relative estimation in which the contributions to learning of Eratosthenes were held in antiquity.

The whole subject of titles is greatly complicated by the habit of citing books, or possibly even smaller parts of a major work, as ἐν τοῖς περὶ . . . . .[3] in the same way as the κλέα ἀνδρῶν were detached from the Iliad or separate incidents from the Odyssey.

2 Fr. A.
3 e. g. Frr. 46, 49.

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THESIS

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4 Fr. 25
5 Fell and Fabr
6 J.L. Heiberg:
p.68.

Further, there was nothing to stop any writer from treating the same subject in different works, any more than there is nowadays to prevent, say, a scientist from publishing some new research in an article in "Nature" and embodying the same material in a standard work later. We know, as surely as anything can be known in this connexion, that Eratosthenes did this in some instances. The "zones" of the "Hermes" were at least mentioned in the "Geography", and the use of the διεσόλαβον[4], whatever its original prose form, is repeated in the epigram[4]. The significance of this will be noted especially in discussing the contents of the "Geography". Leaving this work aside for separate treatment, we may now proceed to examine the other works under their individual titles.

A

Πλατωνικός.

There can be no argument about the existence of this work, which is cited by name repeatedly and appears to have consisted of one book only. Its contents, however, are almost entirely a matter of conjecture. Bernhardy made no real attempt to separate it from the other philosophical writings, and it can be argued that his discretion was commendable. Hiller produced the arrangement of fragments which is ~~followed~~ partly followed below, holding that the book contained the "doubling of the cube" and some general work on proportion, including the musical scales: these have been ascribed to a purely hypothetical work περὶ μουσικῆς[5], but from a mathematical point of view are perfectly relevant to a work on proportion.

J. L. Heiberg[6] describes the "Platonicus" as "a kind of

4 Fr. 25
5 Fell and Fabricius. See Bernhardy p.172-3
6 J.L. Heiberg: "Science and Mathematics in Classical Antiquity" p.68.

K65-43
THESIS

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7 Fr. 38
8 Hirzel: Der D
9Pappus: VII 63
1 B.Niese: Die

commentary on the "Timaeus", agreeing with Hiller more or less on the contents but stressing that the musical doctrine is in opposition to the Pythagorean teaching. Knaack,[7] in Pauly's encyclopedia, detaches the Iamblichus fragment on the relation of soul and body and ascribes it with dogmatic effrontery to a supposititious Eratosthenes, a Neo-Platonist.

It may well be that this work, which Hirzel[8] surmised took the form of a dialogue with Plato as the central figure, was at least partly responsible for the nickname of "The New Plato"; but it is hardly possible that Eratosthenes should have received this merely for restating Plato's views, and if it is to be classed as a commentary it must at least have been constructive. The arrangement of fragments adopted below brings out some close parallels with the Timaeus.

Περὶ μεσοτήτων.

Heiberg states (loc.cit.) that the 'contents of" On Means" are entirely unknown". If it were not cited twice[9] separately by name it might well be supposed that it was an alternative title to the "Platonicus". Hiller considers it a different work, though overlapping in contents: Knaack that it contained the more elaborate geometrical theorems in proportion of which summaries were given in the Platonicus. In the absence of other evidence it may be retained among the accepted works.

Χρονογραφίαι and Ὀλυμπιονῖκαι.

These works, by almost universal consent, were of major size as well as importance, and it can scarcely be doubted in the light of the quotations that the influence of Eratosthenes in establishing the principal dates of ancient history had lasting effects. Niese[1] has insisted, while conceding its importance, that the "Chronography" ~~xx~~ ~~xxx~~ ~~xxxxxx~~ ~~xxxx~~ was of one book only and confined to a sketch of principle. This view he based on a

7 Fr. 38
8 Hirzel: Der Dialog I 405 ff
9Pappus: VII 636,24 and 672,5.
1 B.Niese: Die Chronographie des Eratosthenes: Herm.XXIII,92-102.

X65-43
THESIS

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2 Harpocratio: Ἐ
3 Wachsmuth: De
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4 Plut. Lycurgus,
5 Fr. 122.
6 Syne. p.91c,fr.
7 Frr. 79,85

single reference[2]. Wachsmuth[3], however, disposed of this view, and the plural title bears him out. Bernhardy treats the two works as one.

We may, then, take it that both works were on a considerable scale and based on much careful research: certainly they commanded respect among the immediate successors of Eratosthenes, though the publication of Apollodorus fifty years later put what might be called the rival university of Pergamus ahead. The "Chronographies" was a "popular" work, enlivened by anecdotes, and it is more possible that its composition was prompted by the revision of the Egyptian calendar by the Decree of Canopus in 238. In working out his framework of dates, as Jacoby points out, Eratosthenes used not only the Olympic records but those of the kings of Sparta[4] and, possibly, those of ancient towns.[5] Syncellus[6] attributes to Eratosthenes research in and translation from the Egyptian records of the kings of Thebes: these both Wachsmuth and Jacoby dismiss as a later fabrication. There is nothing that can be called conclusive external evidence either for or against this judgment, but as there is no mention elsewhere of this work and Syncellus attributes it to Eratosthenes at second hand through Apollodorus the balance appears to be in favour of it.

Περί τῆς ἀρχαίας κωμῳδίας.

This work, of the "polymathic" type beloved by Alexandrians and especially by Eratosthenes, consisted of not fewer than twelve books[7]. Its contents ranged over textual criticism, higher criticism such as discussion of the authorship of plays from the dates of performances,

2 Harpocratio: Εὔηνος. (Fr.116) ... ἐν τῷ περὶ χρονογραφιῶν.
3 Wachsmuth: De Eratosthene, Apollodoro, Sosibio: Leipzig, Univ.-Progr. 1891-2, 3-18. (not in B.M.)
4 Plut. Lycurgus, init.
5 Fr. 122.
6 Syne. p.91c, fr.M.
7 Frr. 79, 85.

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THESIS

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8 Strecker: De Ly
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9 Fr. I
1 Fr. 102.
2 Archimedes Vol.

and the meanings and uses of words. Its arrangement seems not to have been based on any system, but to have been built up piecemeal in the manner of a notebook. According to Strecker[8], in this work Eratosthenes opposed his judgment to Lycophron, Euphronius, Duris and Callimachus.

Γραμματικά. It has been thought by many that Eratosthenes received his name γραμματικός from his general contributions to scholarship and in particular for the "Old Comedy". Bernhardy includes all critical fragments under this heading. There are, however, many points of literary criticism attributed to him which could hardly belong to a work on Comedy, and the fact that Clement of Alexandria[9] definitely mentions two books with the title γραμματικά seems conclusive. Knaack (Pauly) believes in the existence of the work.

Ἀρσινόη.

This, presumably brief, biographical sketch is represented for us by one of the few direct quotations[1] from the prose of Eratosthenes. Its intimacy gives in a few words a vivid picture of the author's privileged position at the court of Alexandria, and also of his views on the character of Philopator.

Περὶ πλούτου καὶ πενίας.

The references to this work establish it as a philosophic exercise of no particular value.

Ἐπιστολαί and Κόσκινον.

From the fact that letters from Archimedes[2] to Eratosthenes were current it is fairly safe to deduce that letters of Eratosthenes were also available to the public. Whether the letter from Eratosthenes to Ptolemy on the Doubling of the Cube is genuine or not, the form is a common one and not unnatural for the publication of new scientific work. It is not impossible that such feats as the measurement of the earth might have been originally stated in this way. There is no evidence of the form in which the "Sieve" was published, but the fact that Archimedes wrote at least one letter to Eratosthenes propounding a mathematical problem suggests at least a

8 Strecker: De Lycophrone, Euphronio, Eratosthene comicorum interpretibus (Diss. Greifswald, 1884)
9 Fr. I
1 Fr. 102.
2 Archimedes Vol.II (Teubner): p.426 & p.528.

K65 H3
THESIS

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3 Ath.X.p.416A (
4 Verg. Geog. I,

possibility that the "Sieve" was included in a letter from Eratosthenes to Archimedes. Whether the "Letters" were ever published in a book is uncertain, but it seems likely and one reference in Athenaeus[3] supports this view.

'Ερμῆς, 'Ηριγόνη, 'Αντερινύς (ἢ 'Ησίοδος)

These three titles have been established with some approach to certainty as those of the main poetical works of Eratosthenes. Bernhardy included all references to verse under the heading "Mercurius, poema", expending considerable ingenuity in disparaging other titles. Cesann, however, showed that the "Erigone" at least was written in elegiacs, and later Miller produced what is still the standard edition of all the poems. His order is for the most part followed below.

The general theme of the "Hermes" is well known, being similar in its beginning to that of the Homeric Hymn. The birth of the god was described, followed by his invention of the lyre. He then ascended into the heavens, and was astonished to find that the "music of the spheres" corresponded with that of his own instrument. Eratosthenes went on to make remarkable and imaginative use of this opportunity to draw a picture of the earth and its zones as seen from a distance, a picture so familiar to our atlases that it is now difficult to appreciate how striking it must have been when new. That it was worth Virgil's while to plagiarize the passage two centuries later is some indication of its power over the ancients. How long the poem was and its subsequent contents are utterly unknown: Bernhardy thought the "winds" were also treated, and the whole matter is complicated by confusion with the

3 Ath.X.p.416A (Fr.50)
4 Verg. Geog. I, 233-9.

K 65 .E5
THESIS

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5 Eratosthenica, p
6 " "
"Hesiod and the
7 Fr.23.

"Catasterismi" (q.v.) It is, however, fairly certain that at least some star-legends were included. Hermes, being the god of invention, was a natural subject for a scientist, and in his Egyptian guise of Tot, or Trismegistus, was especially connected with the Royal family . Thalamas suggests that the poem was an adroit courtier's work. Of all the works lost to us, perhaps the greatest loss is the "Hermes".

The "Erigone" is a star-legend. Icarius was presented with wine by Dionysus . Some peasants to whom he offered it became insensible, and their companions, thinking it was poison, killed him. When the victims recovered the others, overcome by remorse, buried the body. His daughter, Erigone, was guided to it by her little dog, and hanged herself. Icarius, Erigone and the dog became the stars Boötes, Virgo and the Dog Star. From the fact that the scene is Athens, and that the conception is a little primitive, it may be conjectured that the poem belongs to the earlier period of Eratosthenes.

"Retribution, or Hesiod" has given rise to much dispute. Bernhardy states, with great vigour that there was no such work, and alters Ἐριννύι to Ἠριγόνη [5]. He also altered the letters ἐνηπόδω to ἐννάτῃ Ὀλυμπιάδι[6], and assigned the fragment giving the story of Hesiod to the "Chronographies". Göttling, however, followed by Bergk and Hiller, emended to ἐν Ἡσιόδῳ, and there can be little doubt that the two titles apply to the same poem.

Of all the poetic fragments, only the couplets [7] on wine are quoted for purely poetical reasons, the others being adduced on linguistic or scientific grounds. It is hardly fair to pronounce judgment on what we have; but it seems likely that Eratosthenes, though a first class poet for Alexandria, was not more

5 Eratosthenica, p.157. Fr.16.
6 " p.241."Contest of Homer and Hesiod": Loeb, "Hesiod and the Homeric Hymns", p.588.
7 Fr.23.

X65.43
THESIS

'Αλέξανδρος

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8 Schwarz: Rhein.
9 Frr. 119-121; 1
1 Fr.43.
2 Fr. H.
3 Sext. Emp. adv.
4 Heerenius, de f
Bernhardy p.19

B

'Αλέξανδρος

It has been suggested[8] that Eratosthenes, besides mentioning Alexander and his followers in connexion with the development of geographical knowledge, also wrote a philosophical work on his upbringing and the aims of his policy to which Plutarch and perhaps Strabo had access. It would be quite possible, if there were any definite evidence of its existence, to assign to this work all the passages[9] dealing with these subjects, including those describing Alexander's attitude to Eastern dress and perhaps even that on the diversion of mankind into Greeks and Foreigners. The treatise is, however, nowhere cited by a separate title, and in the absence of positive evidence it seems better not to accept it.

'Αριστων, Περὶ ἀγαθῶν (καὶ κακῶν), Περὶ ἀλυπίας.

The first of these is mentioned once only as a separate title[1], the second a number of times, including once by Strabo coupled with the term μελέται[2]. The only mention of the third is that in Suidas.

As Eratosthenes apparently studied under Ariston, it is by no means impossible that he write a short memoir of him; although the single fragment we have is by no means complimentary. In any case, Ariston being the originator of the art of fine definition of "indifferents" between the Stoic extremes of good and bad[3], the subjects of the two must at least have largely overlapped. It has been suggested that περὶ ἀλυπίας was in fact part of περὶ πλούτου καὶ πενίας but

8 Schwarz: Rhein. Mus. XL, 252 ff.
9 Frr. 119-121; 162.
1 Fr.43.
2 Fr. H.
3 Sext. Emp. adv. Math. VII,12;XI,64.
4 Heerenius, de fontibus et auct. Vitarum Plutarchi, p.37; Bernhardy p.196.

K65.43
THESIS

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5 Fr.101.
6 Hirzel: Dialog
7 Wilamowitz: Ant
8 Bernhardy: p.20

the subject seems rather more akin to περὶ ἀγαθῶν καὶ κακῶν. There is no evidence for its separate existence.

Suidas also mentions περὶ τῶν κατὰ φιλοσοφίαν αἱρέσεων which Bernhardy unhesitatingly places "inter lexicographi mendacia". No one else, even Diogenes Laertius, mentions such a title; and while hesitating to use Bernhardy's violence we may well assume that it is a collective term to cover all or most of the philosophical treatises. Strabo's term μελέται suggests that there may have been more of these, if it is taken in its usual sense of "academic dissertation". It need not, however, mean anything more precise than the English work "essay", and could easily be a vague term to cover heterogeneous short works, including those to which reference has been made under ἐπιστολαί.

Πρὸς Βάτωνα.

To this title also there is one reference only[5]. This has given rise to a large number of conjectures, all of them entirely lacking in solid foundation. Some of the conjectures are as follows.

(a) Hirzel[6] thinks the Baton indicated was the comic poet, a friend of Arcesilaus at Athens and sharing the philosophical views of Eratosthenes.

(b) Knaack (Pauly-Wissowa) agrees with Hirzel, suggesting that the work was in the form of a letter.

(c) Wilamowitz[7] thinks the passage refers to the "Geography", and that the Baton indicated is the historian, of Sinope.

(d) Menagius[8] emends πρὸς Πλάτωνα , and identifies with Πλατωνικός.

Discretion advises to follow Bernhardy and leave the matter "in medio".

5 Fr.101.
6 Hirzel: Dialog 410
7 Wilamowitz: Antig.v.Kar.28,2.
8 Bernhardy: p.202.

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THESIS

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9 Pollux X,1.
1 Fr.41
2 Fr.176,note.
3 Fr.176

Σκηνογραφικός, Ἀρχιτεκτονικός.

These two titles are included by Strecker as those of sections of "περὶ τῆς ἀρχαίας κωμῳδίας". By the second century A.D. they were apparently treated as separate books[9], but their nature and arrangement are such that they must have been at least sequels or appendices to the major work; and, as the "Old Comedy" contained twelve books at least, these may well have been sub-titles of two of them.

Ὀκταετηρίς.

The second[1] of the two references to this work itself casts some doubt on its genuineness. Knaack includes it, for some reason, with the "chronographical" works, whereas from the title it can only have been an astronomical treatise, presumably early, on the intercalary system of the Athenian calendar and the eight-year period used before the Metonic cycle was introduced. There is nothing inherently improbable, but rather the reverse, in the idea that Eratosthenes wrote a short book on this subject: the evidence is, however, insufficient for a definite judgment.

Περὶ ἀνέμων.

Although there is no positive evidence for a separate treatise on this subject, for the Achilles Tatius fragment[2] is much too vague, it seems more than likely that one existed. The passage we have from Galen[3] may be either a summary of a treatise or an adaptation from the "Geography" (q.v.)

9 Pollux X,1.
1 Fr.41
2 Fr.176,note.
3 Fr.176

K65.43
THESIS

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4 Macrobius: Somn
5 Nissen: die Erd
231-245
6 Hero: Dioptric
7 Osann: op.cit.
Fr. 195, and no

Μετρήσεις and Περὶ τῆς ἀναμετρήσεως τῆς γῆς: XXVI

The phrase "in libris dimensionum" used by Macrobius[4] has prompted a number of scholars to believe in the existence of a specific work on measurements in two or more books, including the measurement of the earth, the distances of the sun and moon and possibly other examples of applied mathematics. Nissen[5], the most thorough of this school, assigns to it such subjects as the lengths of the day and year and the position of the arctic circle and the tropics. Thalamas disagrees with this view in the letter rather than in the spirit: while dismissing the title μετρήσεις he embraces with all possible emphasis the theory that, in a treatise entitled περὶ τῆς ἀναμετρήσεως τῆς γῆς Eratosthenes placed all his major mathematical work on the circumference of the earth, the zones and the winds. In justification of this he stresses the prefix ἀνα- as meaning the "dividing up" not only of the earth's surface but of the wind-rose. He even places under this title the measurements of the sun and moon, and assumes that Berger was unacquainted with the Hero fragment[6], which had been quoted by Osann[7]. The natural inference of this doctrine would be that the "Geography" was a comparatively unimportant pendant to this major work.

The vagueness of the two fragments lends an extremely slender foundation for such a superstructure. "Libri dimensionum" might apply to any of the voluminous writings of Eratosthenes involving mathematics, including much of the "Platonicus". περὶ τῆς ἀναμετρήσεως τῆς γῆς could easily be a sub-heading of an individual book of the "Geography" (in the same way as σκευογραφία of the "Old Comedy"), or the title of a letter or other short work. The suggestion that Eratosthenes saved up all

4 Macrobius: Somn. Scip.I.2o. Fr.166.
5 Nissen: die Erdmessung des Eratosthenes: Rhein. Mus.LVIII 231-245
6 Hero: Dioptric C.35.
7 Osann: op.cit. p.39. Fr. 195, and note.

K65 H3
THESIS

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8 Catullus LX,

K65-43
THESIS

his astronomical and mathematical discoveries to publish them in one work would be contrary to normal practice either in his time or to-day. While hesitating to follow Bernhardy's vehement declaration that "nullum dimensionum opus Eratosthenes unquam extitisse certissime concluditur", we may suggest that a good deal more positive evidence is needed to prove that either of these titles is that of a major work.

'Επιθαλάμιον.

Hiller attempts to show that the reference to an "Epithalamium" is corrupt, and really refers to the "Erigone": in this view he follows Bernhardy. There is no other evidence either positive or negative, but there seems to be no adequate reason for assuming that Eratosthenes did not write such a poem. Indeed, if his "all-round" reputation and the circle in which he lived are taken into consideration, it is extremely likely that he did so. Bergk's quotation of Catullus[8] for the mention of a vine in an epithalamium is hardly necessary to support it, the image of the vine's being "married" to the elm or other tree being a commonplace of ancient poetry.

8 Catullus LX,50.

K65.43
THESIS

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9 Ach. Tat. 24
1 Schol. Nom.

X65.43
THESIS

Καταστερισμοί.

This title involves two problems:
(1) whether Eratosthenes wrote a work of this title;
(2) whether the work we have is that which Eratosthenes wrote. The answer to the first has not yet been satisfactorily answered, but the balance of scholarly opinion gives a decided negative to the second. The various views which have been expressed, in some cases at great length, may be very briefly summed up as follows.

Suidas refers to καταστηριγμοί "arrangements"), Achilles to καταμερισμῶ and the Venetian scholiast to κατάλογοι [1]. Fell discovered the present document in the Bodlian Library and published it, in 1672, under the title of καταστερισμοί. It is quite certain that Eratosthenes did write about mythical persons who were elevated to the heavens. He did so in the "Hermes", although it is unknown to what extent, and the "Erigone". It would be quite possible for any of these "titles" to refer to the "Hermes" itself. The whole question is complicated by the fact that Hyginus is adapted from some work attributed to Eratosthenes.

Bernhardy believed that the present καταστερισμοί was a translation back into Greek from Hyginus, which was adapted from the "Hermes". Bursian refuted this, in the words of Hiller, "argumento gravissimo firmissimoque". Osann pointed out that the "Vita Arati" is preceded by the καταστερισμοί the codices, and that the order of the constellations is the same. He held that it was put together from Scraps of the "Hermes". Letronne believed that the writers of the καταστερισμοί and Hyginus both used the "Hermes" as well as other sources. The most generally accepted theory now, supported by Bergk, Bursian and Hiller,

9 Ach. Tat. 24
1 Schol. Nom.Il.XXII,29.

K65 43
THESIS

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2 Boehme: Rh. M
3 Fragmente des
4 Frr. 239,252 &

K65.43
THESIS

is that Eratosthenes did write a prose work, which may possibly have been called κατασκευαί, although this title is not mentioned in any ancient author, and that the present work is based upon it. Certainly Bernhardy's painstaking list of linguistic faults makes it unlikely that a real γραμματικός could have written it. Boehme[2] agrees with this view.

Γαλατικά. The four references to this work, which mention up to the thirty-third book, are all in Stephanus of Byzantium. Fell accepted it as authentic, while Gale attributed it to Callisthenes of Sybaris on the ground that Prusias (mentioned under Booscephalae) was not yet alive. He confused him with PrusiasII, Prusias I living 237-192 B.C. Berger[3] thinks that Eratosthenes lived long enough after Booscephalae to have written it, and that the unspecified references in Stephanus may also belong to it[4]. Thalamas remarks that the Gauls were a topical subject, and one that would attract Eratosthenes, but is content to leave the matter "en suspens". There is certainly nothing impossible or even improbable in the idea of a work on Gaul, perhaps based on Pytheas but it is hardly credible that our Eratosthenes, whose works apart from the "Old Comedy" occupied from one to three books each, would have run to thirty-three or more on such a subject. Jacoby and Knaack therefore attribute the work to another Eratosthenes, also of Cyrene. This completely arbitrary procedure, though unpalatable, is difficult to oppose without assuming four separate and identical mistakes in Stephanus. This other Eratosthenes may be the "son of Agacles" mentioned in fr. K.

2 Boehme: Rh. Mus. XLII pp.286-309
3 Fragmente des E. pp.336-7
4 Frr. 239,252 & etc.

K65-173
THESIS

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5 Fabricius, Bi
Bernhardy, p

Πρός Ἀράτου φαινόμενα.

Fabricius agreeing with Petau[5], observes of this great work that, as Hipparchus is mentioned in it by name and the month of July is also mentioned, Eratosthenes (or Hipparchus) could not possibly have written it. He adds also as evidence the use of the word ἀλεκτροπόδιον , a late Greek name for Orion.

It is generally considered now that these points are accounted for by later interpolation, but universally admitted that, although Hipparchus may have written some of it, Eratosthenes did not. Knaack merely mentions it as "sicher ein Pseudepigraphon".

In the text, the following arrangement will be used for the sake of convenience. Where and when the works were written is almost entirely a matter of conjecture, but those marked x are perhaps more likely to have been written in the Athenian period.

Poems	Mathematics	Philosophy	Literature & Grammar
Ἑρμῆς	x Πλατωνικός	Ἀρίστων	x Περὶ τῆς ἀρχαίας καμῳδίας
x Ἠριγόνη	μεσότητες	x Περὶ ἀγαθῶν	Γραμματικά
x Ἀντερινύς	x Ὀκταετηρίς	x Περὶ πλούτου	Πρός Βάτωνα.
UNCERTAIN.		(Ἐπιστολαί)	

Biography	History	Geography
Ἀρσινόη	Χρονογραφίαι	Γεωγραφικά
	x Ὀλυμπιονῖκαι	

5 Fabricius, Bibl. Gr. IV, p.120; Petau, Uranologion, p.256; Bernhardy, p.185.

K65 43
THESIS

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6 Frr.152,164 etc

III

The "Geography" of Eratosthenes

A - Early Greek Geography of the Inhabited World

Man is an egoist by nature, and "cogito, ergo sum" the natural starting-point for all his constructive thought. Even the modern man, brought up on Copernicus and Einstein, thinks in his ordinary life of the sun's revolution round the earth, of his own country and environment as the centre to which all the rest of humanity is to be related. When he consciously thinks he knows these things are not really so, but the habit of countless millennia is not easily thrown off.

All Greek geography before Eratosthenes is based not only on the assumption that Greece was the centre of the inhabited world but on a number of other preconceptions of which the Greeks themselves were not conscious. As we shall see, Eratosthenes himself, although he broke with some of these preconceptions, by no means succeeded in freeing himself of all.

To all primitive peoples the earth on which we live appears as a flat surface. The gradual realization that this is an illusion arises from the study of astronomy rather than of geography, and the point at which it first appeared in Greek thought is a matter for further discussion. Before Eratosthenes, the business of the geographer and historian, whose characters were largely identified, was with the inhabited world, or "oecumene", and even centuries later we see Strabo[6] emphasizing this point at Eratosthenes's expense.

Before such a thing as map-making was even thought of, men

6 Frr.152,164 etc.

K65 H3
THESIS

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7 Hesiod, Work
8 1900-1500 B.
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9 Ap. Strab.:
1 Herodotus V,

were conscious of the more obvious celestial phenomena. From time immemorial the sun has measured not only, by its apparent diurnal movement, the day, but by its solstices and equinoxes the four equal seasons of the year[7]. Early astronomical observations of this kind were necessary as soon as men settled on the land, for purposes of measuring out the processes of agriculture; and the orientation, for example, of Stonehenge to the summer sunrise is sufficiently accurate to fix its date within four centuries by calculating the change in the obliquity of the ecliptic.[8]

To primitive man, with his limited range of travel and his notion that the world on which he lived was flat, it naturally seemed that the summer and winter risings and settings were places, or definite points of the horizon. It is not so long since belief in the possibility of reaching the foot of the rainbow was current. To the Greeks, Greece was the centre of the world and Delphi with its sacred ὀμφαλος the centre of Greece, and it is within this framework that we must look for the seeds of Greek geography; the history of which is simply the setting further and further back of the limits of the known and unknown.

It was naturally in Asia Minor, where Greek imagination was cross-fertilized by Oriental wisdom, that systematic science began, and Eratosthenes himself[9] ascribes the first Greek map to Anaximander, the fellow-citizen and perhaps pupil of the father of philosophy himself, Thales of Miletus. It was probably a copy of this map that features in the famous Herodotean story of Aristagoras and Cleomenes[1]. Cleomenes, not unnaturally, was deluded by the fact that three months' journey was represented by a few inches of bronze plate into almost supporting the Ionian

7 Hesiod, Works and Days, passim.
8 1900-1500 B.C. Sir Norman Lockyer, quoted in "Stonehenge: To-day and Yesterday" pp.67-8, by Frank Stevens. H.M. Stationery Office, 1936.
9 Ap. Strab.: fr. 149.
1 Herodotus V, 49-50.

K65-43
THESIS

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5 Fig 2
6 Agathemerus

Ephorus elaborated by Timosthenes[5]. Here the vague open spaces of Boreas and Notus have been subdivided into four sections each, those of Zephyrus and Eurus into two, so as to divide the outlook from the centre, or roughly anywhere in central Greece, into twelve equal parts each with its approximate barbaric tribe except the west. Perhaps the most striking feature of this arrangement is that the equinoctial sunset is already identified with the Pillars of Heracles, so that the whole inhabited world is divided lengthwise into a northern and a southern land-mass. All through this period and beyond can be observed the Greek passion for symmetry: the Ister (Danube) balances the Nile, the Black Sea balances the Red, and to this may likewise be traced the chronic belief that the Caspian Sea, like the Persian Gulf, opened into the "Atlantic".

These figures may afford an explanation why it was that the Greek geographers united in believing that the inhabited world was (approximately) oblong: it was an a priori statement based on the fixing of the "four corners of the world" by the rising and setting of the sun. It can scarcely have been anything else that led, according to Agathemerus, Democritus to the conclusion that the "length" was one and a half times the "width", and Dicaearchus to agree with him. "Eudoxus", the passage[6] continues, "said that the length was double the width, Eratosthenes that it was more than double; Crates, that the inhabited world was semicircular, Hipparchus that it was shaped like a table, others that it was like a tail. Posidonius said that it was the shape of a sling, broad in the middle from north to south, narrow

5 Fig 2
6 Agathemerus I,2.

K65 E5
THESIS

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2 Fr. 176, fin.
3 Herodotus, IV
4 Fig.1.

THESIS

revolt. Anaximander was followed by Hecataeus, who is on the whole regarded as the father of both geography and history. No details are known about either of these maps, but a certain amount may be inferred from Herodotus, who describes the known world to the extent of his knowledge, dividing it into "coasts", "tracts", or "districts" (ἄκται). Here may be seen the four definite directions known to the early Greeks, the summer and winter sunrise and sunset, with the half-way points of the equinoxes corresponding with our east and west. Already at this time the names of the winds were used for vague directions, all the space between the summer rising and setting being given to Boreas and all that between the winter rising and setting to Notus[2]. Just as the risings and settings were regarded as places or fixed points, not as directions which remained constant for any situation, so the winds were imagined as originating from definite countries. None of these ideas had yet been reduced to a hard and fast system, but apparently the Ionians regarded the inhabited world as lying roughly within a rectangle whose corners were the risings and settings, marked out upon a flat disc entirely surrounded by water. Herodotus himself laughs at the perfectly circular maps current in his time[3], but this was merely a fairly obvious way of limiting the unknown as well as the natural impression of the world as viewed from a height. A century or so later the inhabited world was still regarded as lying within a rectangle within the disc, each side of the rectangle being enclosed by unknown tracts inhabited by unknown but certainly existent tribes grouped for convenience under the four headings of Scythians, Indians, Ethiopians and Celts[4]. Early in the third century we see the simple plan of

2 Fr. 176, fin.
3 Herodotus, IV, 36; and even Aristotle, Meteor V,13.
4 Fig.1.

K65.43
THESIS

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7 Agathemerus
8 Fr.187.
9 Frr.152,164;
1 Hip. ap. Str

THESIS

towards the east and west, yet so that the eastern part towards India is wider than the west." In all this may be seen the preconception of symmetry, perhaps especially in the last statement, where there is an obvious effort to force unwilling material into a Procrustean bed.

Further definition of the inhabited world, though exactly how much it is impossible to say through lack of first-hand evidence, was given by Dicaearchus. Taking the same dividing line through the Pillars of Heracles, he defined it, again according to Agathemerus[7], as passing "through Sardinia, Sicily, Peloponnesus, Caria, Lycia, Pamphylia, and Taurus right through to Mount Imaus. Of these districts he named one the northern, the other the southern". Apart from his wisdom in not attempting to define this διάφραγμα any more exactly, the most remarkable point about this statement is its nearness to truth in the absence of astronomical observation and any but the vaguest and most approximate measurements. It was, in fact, good enough to be accepted almost as it stood by Eratosthenes[8]. The main contributions of Eratosthenes to geographical science, as will be seen later, were those for which he was censured respectively by Strabo[9] and Hipparchus[1]: first, setting the inhabited world where it belonged on the spherical earth; and second attempting to lay the foundation, though with woefully inadequate material, for establishing at least the cardinal features of his map by astronomical and mathematical calculation. So far as the inhabited world was concerned, Eratosthenes was content, perhaps unconsciously, to accept the framework of his predecessors

7 Agathemerus I,5.
8 Fr.187.
9 Frr.152,164; C.65 etc.
1 Hip. ap. Strabo., Book II passim.

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2 Fr. 177.
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3 Strabo C.
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4 Fr. 266.
5 Herod. II,

in its main outline. It is significant that, even according to Strabo, it was not an entirely new map that he set out to produce, but a readjustment (διόρθωσις) of the old.

Down to the latest publication on Greek geography (W. W. Hyde, "Ancient Greek Mariners": New York and Oxford, 1947) it has been supposed that the original contribution of Eratosthenes to this readjustment was the introduction of a "prime meridian" for use as a vertical co-ordinate[2]. A careful examination of the fragments shows no evidence for this view: the only examples of measurement from meridians are those quoted from Hipparchus[3], and the measurements attributed direct to Eratosthenes are related only to the "diaphragm", as will appear below. His purpose in carefully establishing his one meridian was principally, if not solely, to establish the "breadth" of the inhabited world and hence the frame for the map, whose construction began from the eastern boundary. The meridian itself is not the centre of the map in any sense, and the real centre of measurement is not Rhodes, where it crosses the diaphragm, but Alexandria; it happened to be the one meridian which Eratosthenes could ascertain with any degree of accuracy, and it is indeed remarkable how nearly accurate, in the circumstances, it was.

The only other "meridian" definitely attributed to Eratosthenes is that of Rome-Carthage, passing through the Sicilian Strait[4]. This amounts to little more than saying that Rome is "opposite" to Carthage, as the Danube (later the Dnieper) was opposite to the Nile[5]; and it divided off the western Mediterranean into a neat unit.

2 Fr. 177. Strabo C. 120 describes this method, but certainly does not ascribe it to Eratosthenes.
3 Strabo C. 70, 81, 82, 86-89, 91. (The "meridian of Thapsacus and Babylon" is an invention of Hipparchus).
4 Fr. 266.
5 Herod. II, 34.

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6 Figg. 1-
7 Arist. Met
8 Fr. 176.
9 Vitr. de

In the meantime attempts had been made to systematize the "winds". It is important for the modern mind, used to the successive bisections of the compass-card which lead from four cardinal points to eight, sixteen and thirty-two, to remember the uneven division of the ancient "wind-rose" by the risings and settings of the sun. It was this that led directly to the division of the circle into twelve, with varying names for the winds. Perhaps the oddest part of this variation is the oscillation of the winds Boreas and Eurus from the, to the modern mind, cardinal directions of North and East to North-north-east and East-south-east[6]. The most important reconstruction before Timosthenes is that of Aristotle[7]: whereas Timosthenes was working out his directions from Greece as a centre in a flat (for geographical purposes) inhabited world, Aristotle was considering the winds from the point of view more of what we should call physical geography, having in mind the spherical earth. Apart from the fact, however, that he does not give a local habitation to each name, his general principle seems to be the same, and so far as can be seen the ancients seem to have been somewhat worried by the fact that, if the observer moves any considerable distance he has to work out a new wind-rose with reference to his new "horizon".

It was left for Eratosthenes[8] to produce a wind-rose which was free from these objections and equally true, like the modern compass-card, for any point north of the tropic; that is to say, for the whole inhabited world. He did this by relating all directions, not to fixed points on the horizon but to a single <u>direction</u>, the south, which is fixed and ascertainable all the year round. He then divided the whole circle into <u>eight</u> in such a way that each whole segment (not the dividing line) faced one of the eight chief points of the compass. It is on this principle that the "Temple of the Winds" at Athens is constructed[9], though again the names of the winds on the eastern side vary curiously.

6 Figg. 1-5.
7 Arist. Met. 2, 6; fig. 4.
8 Fr. 176.
9 Vitr. de Arch. I, 6, 4-5; fig. 3.

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Whether Eratosthenes used this momentous idea in the construction of his map is and seems likely to remain uncertain. Berger, entirely lacking any evidence at all and not knowing the fragment of Eratosthenes cited here, builds up an elaborate argument for his having done so[1]. As the theory is based on a wind-rose for the "horizon" of Rhodes, it falls to the ground of itself. It is difficult to see how, with the method used by Eratosthenes of starting at the eastern end of the map and fitting everything north or south of the diaphragm, such a rose could be used. There is no trace whatever of anything corresponding with the method of triangulation by compass-rose and parallelrulers, and it seems more likely that, in separating the idea of general direction from fixed points on the horizon, Eratosthenes was emphasizing his relation of the inhabited world to its place on the spherical earth.

1 Berger: Fragmente des Eratosthenes, pp. 211, 212.

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THESIS

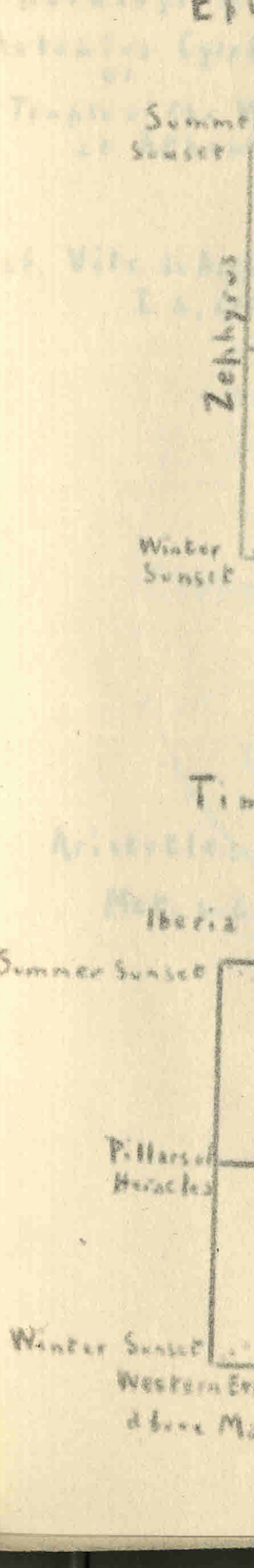

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Figure 1

Ephorus ap. Cosmas Indicopleustes
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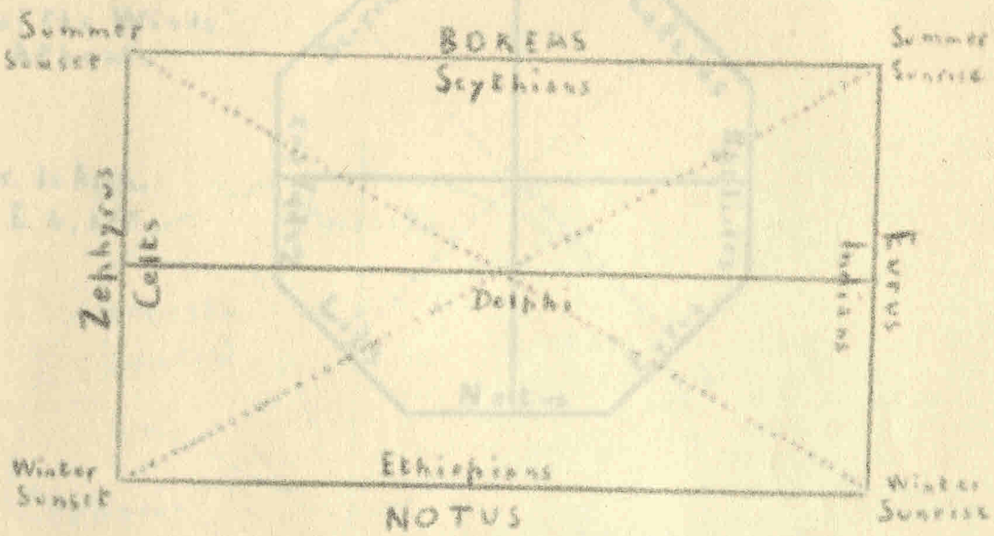

Figure 2

Timosthenes ap. Agathemerus II 6

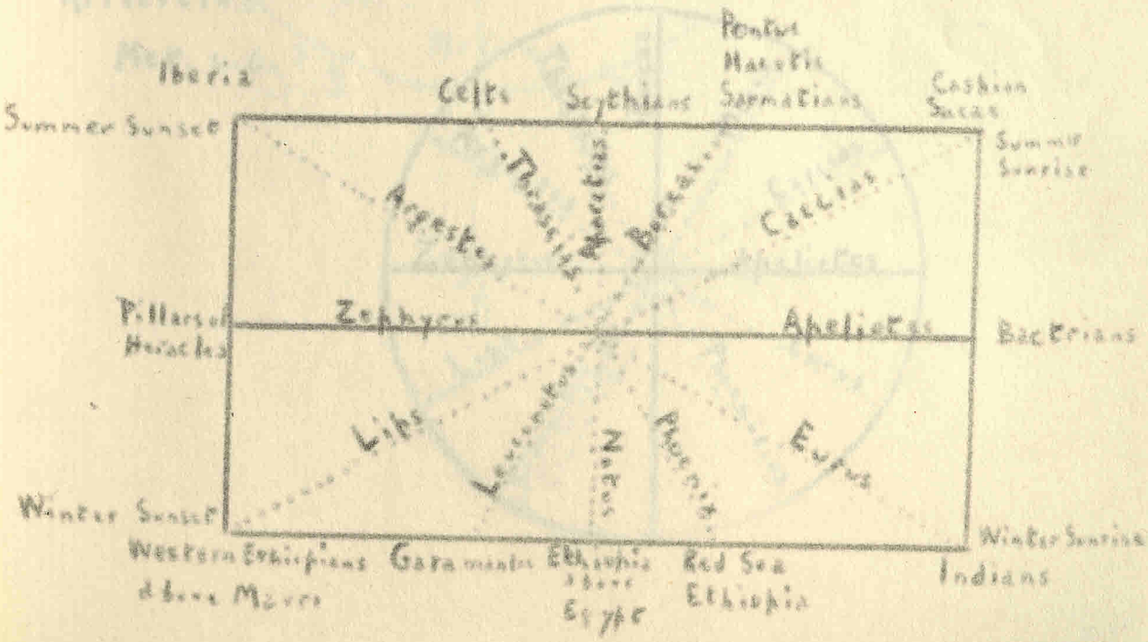

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Figure 3

Horologium of
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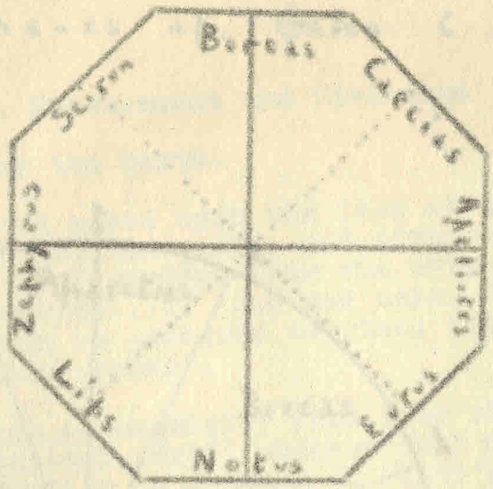

Figure 4

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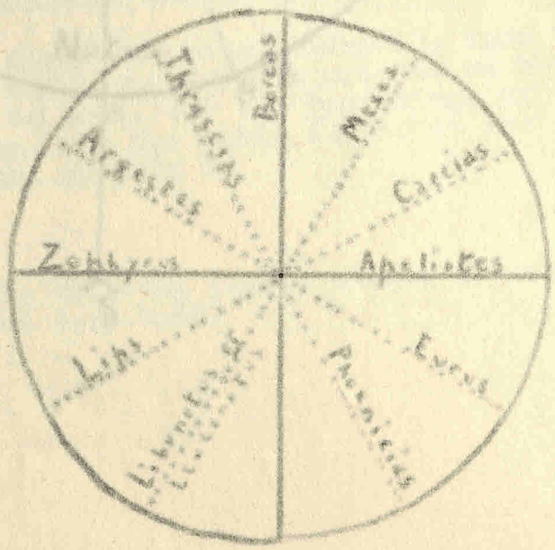

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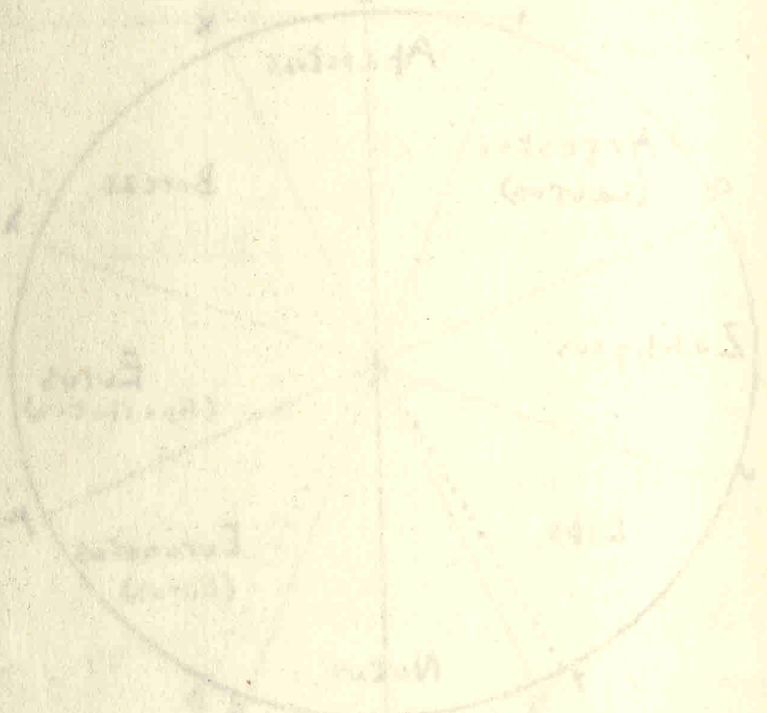

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2 Aristotle:
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B - Sphericity, Measurement and Divisions of the Earth.

"And the Spirit of God moved upon the face of the waters..... And God made the firmament, and divided the waters which were under the firmament from the waters which were above the firmament..... And God said, Let the waters under the heaven be gathered together into one place, and let the dry land appear".

All philosophies must of necessity find some place for an explanation of the physical world, whether as a mystical account of a personal Creation in Genesis or Plato's Timaeus, or as a purely mechanical explanation exemplified by the Ionian philosophers and the present hypothesis of the spiral nebula. In order to understand the attitude of Eratosthenes to the physical world it is essential first to consider, however briefly, the thoughts of his predecessors on the subject.

As we have already seen, the Ionian philosophers believed that the "inhabited world" was flat, and inscribed in a circle. Gradually the study of "geography" became appropriated to the study of the inhabited world and its contents, and separated from that of its relation to the universe as a whole. It was Eratosthenes who brought them together again.

Now Thales, the first Ionian philosopher, came to much the same conclusions about the earth's origins as the writer of Genesis. Water, he said, was the beginning, or foundation (ἀρχή) of everything, and the earth floats on the water[2]. The Ionians' mechanical genesis is

2 Aristotle: Met.I,3; De Caelo II,13. (Diels Fragmente der Vorsokratiker, vol I.pp.9,10).

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3 J.Burnet: Ea
4 Simpl. Phys.
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9 Hip. Ref. I,

due, according to Burnet[3], to an eddy or whirlpool effect (δίνη OR δῖνος), by which the heavier material is concentrated in the centre. He is reputed to have predicted an eclipse of the sun, but can hardly have been aware of the causes of eclipses. The eddy, in other words, has nothing to do with the spherical rotations introduced into cosmography later, but refers to rotation in a plane. His successor Anaximander made what looks like a considerable advance upon this hypothesis: (1) the universe developed from an indeterminate (ἄπειρον) matter[4]; (2) the earth is cylindrical in form, and its depth is one third of its breadth[5]; (3) "the earth swings free, held in its place by nothing. It stays where it is because of its equal distance from everthing. Its shape is hollow and round, and like a stone pillar. We are on one of the surfaces, and the other is on the opposite side". Anaximander believed further that the earth participated in the (plane) rotation; that interaction of hot and dry, cold and moist was responsible for physical effects and objects; and that the heavenly bodies consisted of wheels of compressed air, or vapour, containing fire which showed through holes[7].

Anaximenes was, to a present-day eye, on some points retrograde. His ἀρχή was "air", or vapour, which produced the other elements by condensation and rarefaction. One of the words he used, πνεῦμα or breath, has continued in philosophic language ever since, through the "spirit" of the Stoic pantheism to the Spirit or Ghost of the New Testament. The disc earth rested on this vapour "because of its breadth"[8], and so did the other heavenly bodies. These did not pass right under the earth in their rotation, but round it, "as a cap turns round our head"[9]. The earth

3 J.Burnet: Early Greek Philosophy, ed.3; London, 1920. pp61-2.
4 Simpl. Phys. 24,13; Arist. Phys. III,4. (Diels p.17)
5 Ps.-Plut. Strom. fr.2 (Diels p.17)
6;7 Hippolyt. Ref. I.6. (Diels p.16)
8 Ps.-Plut. Strom. fr.3 (Diels p.17)
9 Hip. Ref. I,7;4-6. (Diels p.23)

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1 Hip. Ref.I,
2 Plac.II,8,1
3 Hip. Ref.I,
4 Stob. Ecl.I
5 W.A.Heidel:
1937. p.74

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THESIS

itself was shaped "like a table", and the northern parts, being "higher" than the southern, obscured the sun and other bodies during the night.

This notion of the flat earth was later adopted by Anaxagoras and the atomists Leucippus and Democritus. According to Anaxagoras the earth "remains suspended because of its size and because there is no vacuum"[1]. The changing seasons, with the changing elevation of the sun, are due to a tilt, ἔγκλισις, of the (flat) earth to the south[2]. The heavenly bodies, however, are large fiery stones. The sun illuminates the moon, and is eclipsed by it[3]. These last points show an intervening Pythagorean influence.

It is not necessary here to discuss at length the individual tenets of Pythagoras, Philolaus and others, for the general body of doctrine known as "Pythagorean" is in its main essentials sufficiently clear. The sun, moon, planets, earth and "counter-earth" revolved round a central fire in a spherical universe contained by the sphere of the fixed stars[4], each emitting a note in the divine scale, ἁρμονία. This is in the main a mystical dogma, having more to do with the theory of music and number than with every-day life; yet it is none the less a definite physical theory as well. As Heidel[5] has pointed out, in all the texts we have concerning the Pythagorean philosophy there is none that states in so many words that the earth is a sphere. This has always been assumed by scholars, although in fact there would be nothing in the theory of bodies rotating to imply, in itself, that the bodies were themselves spherical: indeed, the fact implicit in the theory that the side of the earth on which we live is always turned away from

1 Hip. Ref.I,83. (Diels p.384)
2 Plac.II,8,1....ἐγκλιθῆναι πως τὸν κόσμον ἐκ τοῦ αὐτομάτου πρὸς τὸ μεσημβρινόν.
3 Hip. Ref.I,8,3. (Diels.p.384)
4 Stob. Ecl.I,22,1d.
5 W.A.Heidel: The Frame of the Ancient Greek Maps: New York 1937. p.74.

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6 Op. cit. p.
7 Parm. ap. Si
8 Plat. Phaedo
9 Arist. De Ca

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the central fire would more naturally suggest, if not a disc, at least something like the drum of Anaximander. The same point is put forward by Heidel[6] with regard to Parmenides, who lays down with even more emphatic dogmatism that the universe is spherical[7], but of whom we have no text stating the same of the earth itself. The first really unequivocal statement we have of a spherical earth, as distinct from the whole universe, is, as Heidel himself points out, that in Plato's Phaedo[8]. This account, which describes what must be an enormous sphere containing a number of "inhabited worlds" situated in depressions in its surface, is part of a mythico-mystical discussion about the immortality of the human soul. It is not, however, suggested that there is anything new or original about the idea, and the whole atmosphere and context is distinctly Pythagorean; so that it would seem that, although perhaps Pythagoras and his early followers, who are thought to have placed the earth in the centre, still adhered to the disc theory, the later Pythagoreans must have eventually introduced the sphere. This they would do, not for any reasons which could be called scientific, but on the ground that a sphere, being the perfect figure, is the most suitable shape for the home of man.

By the time we reach Aristotle all doubts have disappeared. The earth is a sphere, at rest in the centre of the universe, on very similar grounds to those of Anaximander - because everything "tends to the centre by nature". Aristotle offers the proofs which are now conventional, from the visible changing horizon, and from the curved shadow seen in eclipses, though surprisingly not the most obvious

6 Op. cit. p.

7 Parm. ap. Simp. Phys. 146, 15 D..... εὐκύκλου σφαίρης ἐναλίγκιον ὄγκῳ
σφαίρης ἰσοπαλὲς πάντη (Diels p.140)

8 Plat. Phaedo, 109 A,B.

9 Arist. De Caelo II,3. ἡ κατὰ φύσιν κίνησις ἦν αὐτοῦ ἐπὶ τὸ μέσον.

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1 Arist. Nub.
2 Aristotle. D
3 Horace, Odes
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one to the modern child, that of the ship gradually "rising" into view over the horizon. It is fairly obvious from the manner of exposition that the sphericity of the earth was by now an accepted hypothesis, at least among philosophers, as it has been ever since.

By Aristotle's time some attempt had even been made to estimate the size of the earth[1]. He himself does not say whose estimate was the 400,000 stades that he puts forward[2] as the outside limit for the earth's circumference, but it seems likely that it was that of Archytas, who is mentioned by Aristophanes and by Horace[3] as a measurer of the earth. There is no trace of any earlier estimate, and the earth of Plato's Phaedo would have to be much greater in size if it were accepted as a serious physical account, whether his own or developed or adapted from the Pythagoreans. Aristotle does not mention either whether the estimate was reached by scientific means or sheer guess-work, though as apparently a first attempt and an <u>outside</u> estimate it is in any case extremely creditable. It is at least likely that it was an attempt to employ the means used to arrive at the next estimate, attributed to Dicaearchus, of 300,000 stades. The method was based on the assumption that the spherical earth was concentric with the spherical heavens. Thus the arc enclosed by any two radii of the earth on the earth's surface would be equal to that enclosed on the celestial sphere by the same radii produced. By noting the fixed star vertically overhead at two fixed points on the earth's surface at the same moment, orx a

1 Arist. Nub. 202.

2 Aristotle. De Caelo II,14 fin. καί τῶν μαθηματικῶν ὅσοι τό μέγεθος ἀναλογίζεσθαι πειρῶνται τῆς περιφερείας εἰς τεσσαράκοντα λέγουσι εἶναι μυριάδας σταδίων.

3 Horace, Odes. I, 28,1. "Te maris et terrae numeroque carentis harenae mensorem cohibent, Archyta..."

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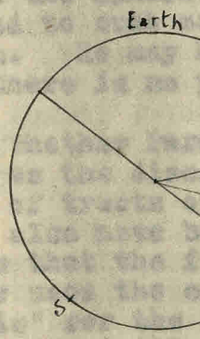

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4 Berger: Gesc

corresponding moment in different years, and by measuring the angle subtended by these stars at the earth's centre, it would become known what arc of the earth's circumference was represented by the distance between the two points on its surface. The two points employed were Syene and Lysimachia, and the arc was found to be 1/15 of the great circle. As Syene and Lysimachia were 20,000 stades apart, the whole circumference was reckoned to be 300,0004. If we consider the complete impossibility of (1) taking an accurate vertical sight (2) measuring with anything but the wildest approximation the celestial angle, not at the centre of the earth but on its surface (3) obtaining anything like an accurate straight measurement between two places so far apart, the result is amazing in its nearness to fact.

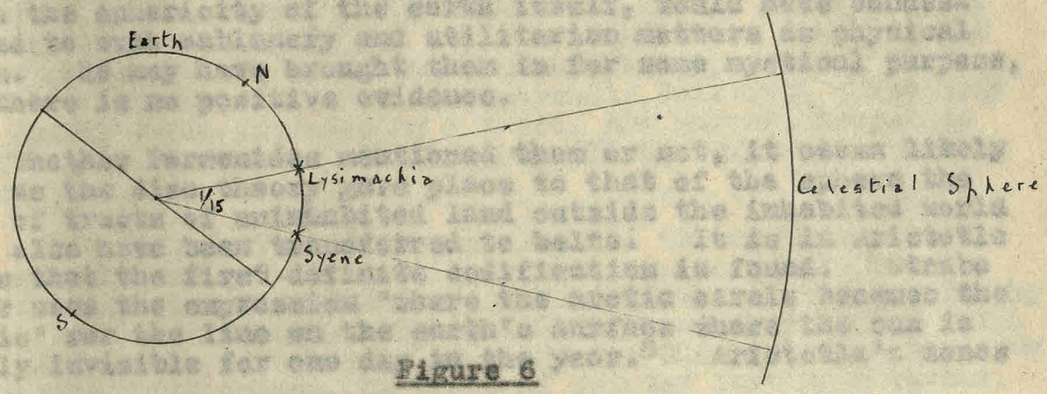

Figure 6

Ever since man was conscious of the heavens he had considered them as a sphere, rotating on an axis and necessarily possessing an equator. To the Greek, however, "Arctic Circle" was not a fixed line either on earth or in heaven, but the circle within which all the stars were visible, without setting, to any particular observer. The tropics were, naturally fixed with ever-increasing accuracy. Now

4 Berger: Gesch. der wiss. Erdkunde der Griechen: volIII,p.44.

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5 Achill. Tat.
6 W.A.Heidel: T
7 Plac. II, 7,1
8 Fr. 182.

as a result of the Greek way of looking at the inhabited world, bounded by more or less straight lines to north and south beyond which normal human life was impossible because of increasing cold or heat, similar lines began at some indeterminate time to be applied to the spherical earth. The conception of "zones" was attributed by later writers to Parmenides[5], but Heidel[6] has pointed out that there is no evidence for this at all near to his own time, and that the idea may have been due to a misunderstanding of his mysterious στεφάναι, or garlands[7]. These were, in a sense, zones or rings in the heavens akin to Anaximander's rings of compressed vapour, and serving much the same purpose. It is difficult to believe that Parmenides, wrapped up as he was in the mystical unity and immobility of his finite spherical universe, even if he did teach the sphericity of the earth itself, would have condescended to such sublunary and utilitarian matters as physical zones. He may have brought them in for some mystical purpose, but there is no positive evidence.

Whether Parmenides mentioned them or not, it seems likely that as the disc theory gave place to that of the sphere the idea of tracts of uninhabited land outside the inhabited world must also have been transferred to belts. It is in Aristotle again that the first definite codification is found. Strabo later uses the expression "where the arctic circle becomes the tropic" for the line on the earth's surface where the sun is wholly invisible for one day in the year.[8] Aristotle's zones

5 Achill. Tat. 153A. Fr. 170.
6 W.A.Heidel: The Frame of the Ancient Greek Maps: p.72.
7 Plac. II, 7,1 op. Stob. Ecl.I,22.... τὴν μὲν ἐκ τοῦ ὑγροῦ, τὴν δὲ ἐκ τοῦ πυκνοῦ.
8 Fr. 182.

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9 Arist. Met.
1 Fr. 170.
2 Strabo. C. 9
3 Diog.II,1.

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THESIS

are "under" the celestial zones described by the revolution of radii from the centre of the earth to the celestial zones, and there they have remained ever since, with the same names latinized, in our modern atlases. Even in Aristotle's time it was still thought that the torrid zone was completely uninhabitable, for he points out that life could not exist south of the tropic, where the sun's shadow falls to the south in midsummer[9]. Syene in upper Egypt was known to be at or about the tropic, yet the Ethiopians were far south of there to say nothing of Meroe on the Nile. The only real disagreement about the zones was to a modern mind somewhat trivial: whether they should be considered as five or six in number, the answer depending on whether the whole belt between the tropics should be counted as one, or as divided into two separate belts by the equator[1]. The matter was not so trivial as it appears at first sight, for it is a question of treating the whole globe as one, or as two separate hemispheres. There was also a minority, including apparently Polybius, which made the number seven, introducing a third, but narrow, temperate belt at the equator[2]. This point will be referred to again later.

Eratosthenes tackled the problem of the earth's size by an entirely new method. Fully realizing, no doubt, the difficulties and inaccuracies inherent in the method previously described, he evolved a method involving one observation only, and one capable of being taken with, for the period, considerable accuracy. The gnomon, or vertical pointer casting a shadow, was, according to Greek tradition, first introduced by Anaximander, but it is at least probable that Thales, who imported so much from Babylon, had used it before him. Its principal use was for determining solstices and equinoxes, though the length of the shadow was also used for rough indication of time. It seems to have been Eratosthenes himself who first saw the immense possibilities of this simple

9 Arist. Met.II,5,10-14.
1 Fr. 170.
2 Strabo. C. 97.
3 Diog.II,1.
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4 Hip. ad Phae
5 Marc. Capell
6 See below,
7 Hipp. ad Pha
8 Fr. 167.

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THESIS

instrument for the calculation of latitude. Pytheas, a Massilian explorer of whom more will be said later, had already recorded a very careful and accurate ~~xxxxx~~ observation of the shadow-to-gnomon relation at his own town[4], but there is no evidence that he knew how to evaluate it even though he must have had at least an inkling of its significance.

Eratosthenes is said, and it is in agreement with what has been said above about his practical outlook on mathematics, to have used a variant of the simple six-foot pointer on a level ground, tested for flatness by pouring on water until it ran off in all directions equally. This consisted of a perfectly hemispherical bronze bowl, with a pointer equal to the radius, placed hollow side uppermost[5]. If we judge by the readings given as his, 1/50 of the complete circle for his measurement of the earth's circumference and 11/83 for the distance between the tropics, it seems unlikely that there was any definite scale marked on the inner surface, for it is reasonably certain that the only regular unit into which Eratosthenes divided the circle was 1/60 [6]. Whether any of his successors used this device is unknown, but it may be noted that all the observations of Hipparchus, the real founder of trigonometry, are recorded in terms of the right-angled triangle[7].

Using this device Eratosthenes, as Cleomedes and several modern writers have described in detail, measured the circumference of the earth[8]. Assuming (1) that Syene, where at the summer solstice there was no shadow and a well was wholly illuminated, was on the tropic (2) that Syene and Alexandria were on the same meridian

4 Hip. ad Phaen. Arati, 178D; Strab C,63.
5 Marc. Capella 6,596.
6 See below, Section 3E.
7 Hipp. ad Phaen. Arati, pp.181B,178D.Strab.C.63.
8 Fr. 167.

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THESIS

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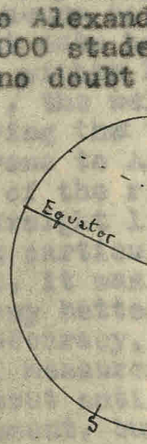

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9 Fr. 167
1 Strab. C. 87

(3) that the sun's rays are parallel to each other, he took a solstitial reading at Alexandria. The gnomon's shadow covered 1/25 of the hemisphere, from which he calculated, as the figure shows, that the alternate angle at the centre of the earth and hence the arc from Syene to Alexandria was 1/50 of the meridian great circle. Taking the distance from Suene to Alexandria at a round figure of 5000 stades, he arrived at 250,000 stades for the circumference of the earth. There can be no doubt at all that he realized that all his data were

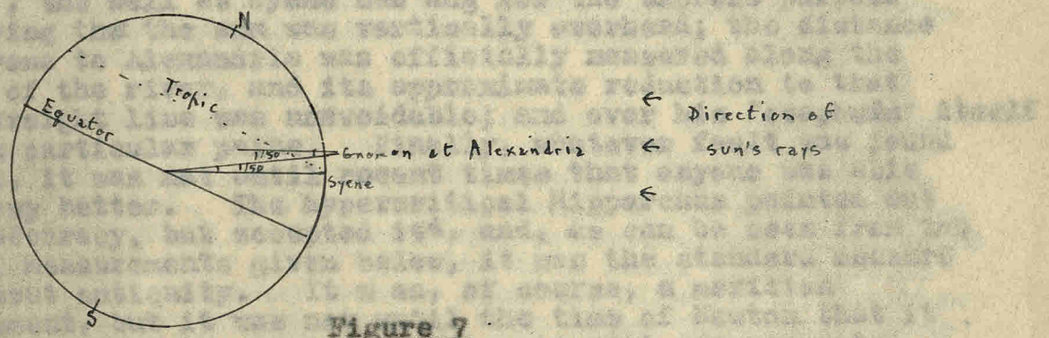

Figure 7

approximate, and it was probably he himself who adopted 252,000 as a more convenient figure with which to work than 250,000, with the obvious advantage of being divisible by sixty. Much serious work has already been spent on indicating the "mistakes" of his method, but it must be remembered (1) that in his own time it was known that the "phenomenon" at Syene was observable over a circle of 300 stades radius[9] (2) that Eratosthenes knew perfectly well that even his latitudes were approximate, and was willing to accept an error of 400 stades in his main diaphragm[1]; a fortiori he was fully aware that the "meridian" through Alexandria and Syene was unlikely

9 Fr. 167
1 Strab. C. 87. Fr. 188.

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THESIS

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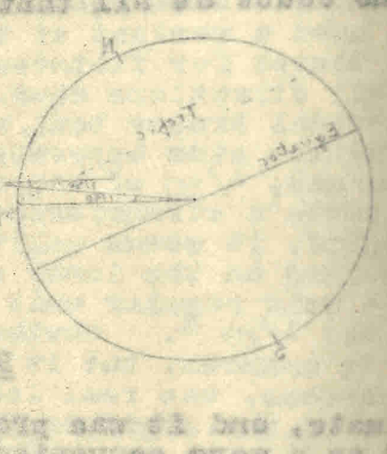

Figure 7

2 Fr. 166
3 Pliny II,
4 Strab. C.13

to be anything resembling exactitude.
(3) that according to his own reckoning the sun was much larger than the earth[2], and hence he must have realized, even if he had not noticed the penumbra in the gnomon's shadow, that all rays could not be parallel. What one would expect a man like Eratosthenes to do, and what he seems to have done, was to take the best data he could, and exercise the utmost care over matters within his control. Thus, if we are to believe Pliny[3], the well at Syene was dug for the express purpose of proving that the sun was vertically overhead; the distance from Syene to Alexandria was officially measured along the course of the river, and its approximate reduction to that of a straight line was unavoidable; and over his "scaphium" itself he took particular pains. Finally, whatever fault was found with it, it was not until recent times that anyone was able to do any better. The hypercritical Hipparchus pointed out its inaccuracy, but accepted it[4], and, as can be seen from the list of measurements given below, it was the standard measure throughout antiquity. It was, of course, a meridian measurement, but it was not until the time of Newton that it was settled that the meridian and equatorial measurements differed. Its nearness to actual fact depends on the precise value of the stade, which cannot be stated with absolute certainty, but at the most probable it amounts to about one-seventh in excess; which, however much was owed to luck in the cancelling out of errors, can hardly be called anything but a most remarkable achievement.

Whether it was the measurement of the earth that suggested to him a work on geography or the other way round cannot

2 Fr. 166
3 Pliny II, 183 ff
4 Strab. C.132.

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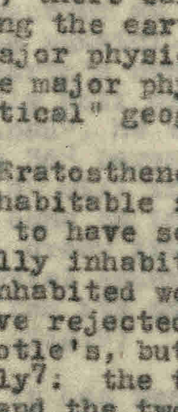

Earth

Figure

5- Strab. C. 49,
6 Strab. C.64,6
7 Gemin. Isag. C

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THESIS

be known, but it is on the shape and size of the earth, and its consequent divisions, (ἀνεκάστους) that his "Geography" is firmly based. To Strabo, who held that the business of the geographer was with the inhabited world, Eratosthenes's insistence on the sphericity of the earth, apart from minor irregularities, was superfluous[5]; but to us, used to the arrangement of a modern atlas, there can be nothing more natural than to begin by placing the earth in the solar system and to proceed by way of its major physical characteristics, zones, winds and currents, to the major physical divisions of the earth and finally to "political" geography.

Eratosthenes, like Aristotle, recognized the possibility of a habitable zone in the southern hemisphere, but neither seems to have seriously examined the possibility of its being actually inhabited. As for the existence of another continent or "inhabited world" in the northern, Eratosthenes himself seems to have rejected it[6]. His division into zones is similar to Aristotle's, but he seems to have been the first to define them exactly[7]: the two frigid zones as $^{6}/_{60}$ each, the temperate as $^{5}/_{60}$ and the two halves of the torrid as $^{4}/_{60}$ each of the great circle. These proportions were calculated by close approximation to the Earth

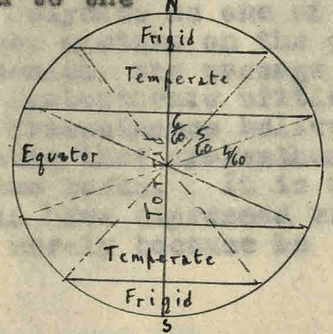

Figure 8

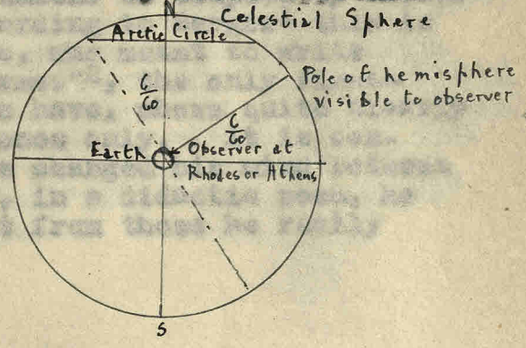

Figure 9

5 Strab. C. 49,62,65.
6 Strab. C.64,65. Fr. 183.
7 Gemin. Isag. C.13: fr.172. Macrob. Somn. Scip. II,c.

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THESIS

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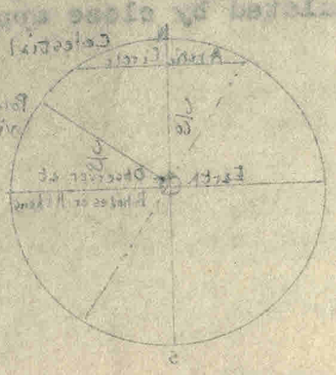

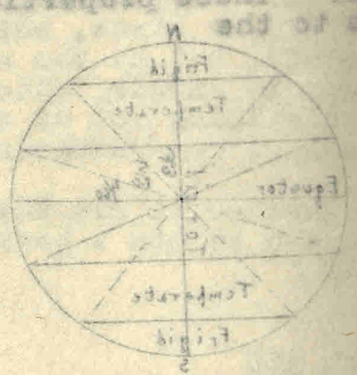

8 The earth i
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9 Fr. 172.
1 H. Berger:
2 Fr. 13.

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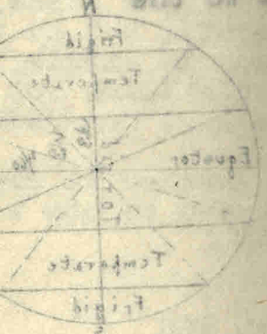
THESIS

actual positions of the tropics and the "arctic circle", and cross-checked, for the first time, with the measurements in stades of the inhabited world used by Eratosthenes and his estimation of the earth's total circumference. "Artic circle" again does not mean the same as the modern term, which in the language of Eratosthenes would give proportions of 4/60 - 7/60 - 4/60, but the circle "under" the celestial "artic circle" of an observer at Rhodes or anywhere on the "diaphragm" 6/60 north of the equator. If we visualize the observer at any point on the earth's surface as able to see, for all practical purposes, exactly half of the celestial sphere with its pole exactly overhead[8], he will, at latitude 36° N., be able to see at all times 36° beyond the north pole; that is to say, his "artic circle" will include all the stars within 36° of the pole. If a cone be imagined on the Aristotelian model composed of radii drawn from the earth's centre to this circle on the celestial sphere, it will intercept on the earth's surface 36° from its pole the circle which bounds Eratosthenes's frigid zone (fig.9)

It has been already mentioned that there were geographers who believed in the existence of a narrow temperate belt at the equator itself. Eratosthenes himself is coupled by Strabo[9] with Polybius as one of these. According to Berger[1] this is a sheer mistake on the part of Strabo, who meant to write Posidonius: the passage from the "Hermes"[2], the only first-hand Eratosthenic writing on zones we have, shows quite clearly that Eratosthenes believed in five zones only. It is conceivable that Eratosthenes might have changed his mind between the two works. It is unlikely that, in a didactic poem, he should have expressed views different from those he really held merely because he



8 The earth in comparison with the celestial sphere was regarded as having in practice no magnitude: πρός ὃν ἡ γῆ μέν στιγμιαία οὖσα... (Cleom. Cycl. theor. I,8;43)
9 Fr. 1,2.
1 H. Berger: Fragmente des E. p.85.
2 Fr. 13.

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3 Frr. 177,1
4 Frr. 177,1
5 Fr. 216.
6 Fr. 216, n
7 Strabo. C.

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THESIS

was writing in verse. A more likely explanation, not previously put forward, is that Strabo's introduction of his name is not a mistake in the sense offered by Berger, but based on a genuine misunderstanding of Eratosthenes's meaning. Eratosthenes knew perfectly well that human life was possible south of the tropic; the town of Meroe[3] and the southern extremities of India[4] were, on his own showing, well to the south. Futher, he knew the upper course of the Nile,[5] with its double bend, better than it was known in modern times until late in the nineteenth century, and was even familiar with the rains in Ethiopia[6] which produce its floods. It is at least possible that he had some inkling of the high land in Kenya, through which the equator does pass and which in fact possesses a "temperate" climate. If he mentioned this in his book, Strabo may well have leapt to the conclusion that it implied a whole temperate zone inside the tropics.

Having dealt with the terrestrial sphere and its physical conditions, Eratosthenes proceeded to place on it the inhabited world by inscribing an equator, a meridian, a tropic and an "artic circle". The four-sided figure enclosed by the "artic circle", the tropic and the two halves of the meridian was to form the frame for his map; the map would overlap here and there, but in the main it would lie within this modern development of the old Ionian rectangle. It is not without significance that Strabo describes the new map as a "rectification" (διόρθωσις) of the old. The main point of Eratosthenes's work is that which Strabo considered irrelevant, the attempt to reconcile the flat map with the sphere. The inhabited world, he insists, lies on a figure (the temperate zone) rather "like a spinning-wheel"[7] or truncated cone, and we must always

3 Frr. 177,181.
4 Frr. 177,187,194.
5 Fr. 216.
6 Fr. 216, note.
7 Strabo. C. 113. Fr. 173.

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THESIS

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8 Frr. 188,19

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THESIS

remember this when attempting to depict it in the flat. It was, no doubt, this strong consciousness which induced him to use the curious term "seals" (σφραγῖδες)[8] for the main divisions of the inhabited world. One can imagine him, with the terrestrial globe in his mind's eye, drawing the "diaphragm" and the main meridian, then the boundary lines, beginning to pick off pieces by piece, from right to left, as though with some gigantic jig-saw puzzle. Seals, in the ordinary sense, have irregular surfaces and may be of any shape, but they are all roughly convex. Eratosthenes was vividly conscious both of the theoretical sphericity of the earth and of its practical irregularity.

8 Frr. 188,190 etc.

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C - The Contents and Arrangement of the Γεωγραφικά.

At first sight the reconstruction of the three books of the Γεωγραφικά, at least in outline, appears reasonably easy. The fact that each book is referred to as a separate ὑπόμνημα, or essay, suggests that the divisions were clear-cut and that the books were not published at the same time. Strabo even gives us the starting-points of the second and third books: the second book, he says[9], contains a general adjustment of geographical science on mathematical principles, whose only fault is that it goes into too much detail; the third a similar adjustment of the "old maps", based on a division of the inhabited world into northern and southern halves. There thus appears to be a simple prima facie case for a straightforward division into (1) history of geography down to the author's own time, accompanied by critical evaluation (2) "physical geography", in the modern sense, based on the spherical earth in the spherical universe and working down through the "zones" to ocean currents and winds and the position of the inhabited world (3) description of the inhabited world, based on the division into "Seals".

This simplification, tempting as it is, breaks down in practice, and a glance at the different reconstructions produced by different scholars is sufficient to show how very slender the evidence is for what Eratosthenes really wrote. For most of the fragments which can be attributed with any certainty or probability to the work we have only Strabo's evidence, and although he must have been writing with a copy before him it is important to remember that he very rarely gives an ungarbled extract from the first two books. As Strabo was a fervent Stoic, we have a disproportionate number of quotations from the criticism of Homer,

9 Fr. 164.
1 Fr. 187.

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2 Frr. 199,205
3 Fr. 136.

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THESIS

whom he felt bound to defend. Being not only a Stoic but personally averse from or unable to cope with mathematics, he omits all references but the slightest to such mathematical concepts as the size of the earth, the zones and the "winds". He defends Eratosthenes against the even more mathematically-minded Hipparchus, and subsequently attacks him himself on similar grounds[2]. A number of points come to us only in the form of a defence by Strabo against attacks by Hipparchus. Finally, after using Eratosthenes's "seals" for the south-eastern part of his descriptive geography he abandons him altogether except for occasional references. Even so, the quotations from the third book far outweigh those from the first two put together.

The few direct quotations we have from Eratosthenes show him to be a sufficiently succinct writer. If we assume that the three books were, if not of equal, at least of comparable length, and that what we have of the third book constituted at most a quarter of it, the gaps in our remains of the first two are enormous. It is scarcely necessary, indeed, for Strabo to keep on reminding us of his insistence on such points as the unreliability of Homer and sphericity of the earth for us to realize that not only masses of detail but whole slabs of material have been omitted because they did not square with Strabo's notions of what consititutes geography - a utilitarian science for the guidance of generals, statesmen and merchants[3], with a certain degree of entertainment and culture to make it palatable. It is not, then, possible to adduce Strabo's silence as positive evidence for the absence of any specific subject from the γεωγραφικά. His faint reference to the size of the earth as well as its shape gives good reason to suppose that Eratosthenes had a good deal more

2 Frr. 199,205 etc.
3 Fr. 136.

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4 Fr. 160.

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THESIS

to say about it, and the same applies to his apparently contradictory references, mentioned above, to the zones; but if Eratosthenes introduced a detailed exposition of his wind-rose Strabo may well have thought it so irrelevant as not to be worth mentioning at all.

The solution to the problem would be a good deal easier if we could be certain that Eratosthenes himself was uniformly methodical and orderly in his exposition, and that, for example, the sudden introduction of the shape of the earth into the middle of the history of geography was a digression on Strabo's own part, as he appears to admit[4]; but although, in a short quotation, Eratosthenes is lucid and concise, there seems sufficient reason to conclude that in a longer work he may not have been so. It has already been pointed out that his longer works were few, and these not continuous or homogeneous. The "Old Comedy" was a series of extracts and annotations, the "Chronography" a series of dates and events. Strabo's accusations of lack of order are too definite to be wholly without basis, and there can be little doubt that Eratosthenes did in fact turn from the immediate subject from time to time to ride a hobby-horse or insert an afterthought. It is essential to bear in mind that the three ways in which reference is made to the work, γεωγραφικά, γεωγραφούμενα, ὑπομνήματα, all imply a somewhat informal manner rather than an elaborately polished text-book; that the conditions of composition before the days of paged books were hardly conducive to rigidity of order; and that even so the general outline of the work, after allowing for the varying interpretations of modern scholars, does show a tolerably methodical development of the subject though there can be no final certainty about the detailed order of

4 Fr. 160.

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5 H. Ber
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many of the fragments. Further, the term ὑπόμνημα for each book suggests that they were published separately; and this alone would account for a good deal of repetition and recapitulation. In the absence of other evidence, it is reasonable to suppose that Strabo's criticisms follow the main lines of Eratosthenes.

At this point it will be helpful to consider the views of the three leading authorities of the past century side by side, bearing in mind that Berger assumes that the hypothesis of the spherical earth was still a major matter of dispute[5], and that Thalamas assigns everything connected with measurement of the globe (as opposed to the σταδιασμός of the inhabited world) to the separate work περὶ ἀναμετρήσεως.[6]

	Berger	Knaack[7]	Thalamas[8]
Book 1	Pre-history of geography - transition from disc to sphere - changes of surface - shape of earth - position and size - ocean - zones - criticisms of previous measurements.	Criticism of predecessors - Homer, Hesiod, Anaximander, Hecataeus etc. - followers of Alexander - sphericity (short) - changes in surface - ends with Deimachus and Megasthenes	Homer - first maps - advance of knowledge - early ignorance and spread by Alexander.
Book 2	Principles of new school on same points - new points on sphericity? - perhaps not measurement of earth, but, if not, reference to another work - zones and ocean, explaining inhabited world - no astronomy, else Strabo would protest.	Scientific foundations - shape and size of earth - zones - ocean - length and breadth of inhabited world - preliminaries to map-making - criticism of previous divisions of earth - Aristotle and Alexander, Greek and barbarian.	Rectification - shape of inhabited world - length and breadth - divisions.

5 H. Berger: Fragmente des E., pp.53-6.
6 V. sup. p.26.
7 Pauly-Wissowa, s.v. "Eratosthenes"
8 Etude bibliographique, pp.185-187.

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9 Frr. 164, 17
1 Frr. 152 -16

Book	Berger	Knaack	Thalamas
3	Projection Eratosthenico - Strabonian - Strabo's parallels and meridians a guide to those of E. - "winds" used in mapping.	Foundation of map - (1) India: sharp criticisms of Alexander's historians, especially Deimachus and Megasthenes....	Diaphragm - seals - three-quarters missing.

There are several points not satisfactorily covered by any of these summaries, though on general grounds Knaack's reconstruction seems the solution nearest to the truth. Apart from any other consideration, if Thalamas believed that our fragments represent only one quarter of the third book, it is difficult to imagine how he thought Eratosthenes filled up the second; or, in view of Strabo's slight but explicit references, how he could assume, even supposing the existence of the comprehensive περὶ ἀναμετρήσεως, that Eratosthenes would refrain in a geographical work from all reference to the size of the spherical earth, its surface and zones.

The chief point unexplained is the apparent major digression[1] in the first book on the sphericity, apart from its irregular surface, of the earth. At first sight this appears a simple anticipation of Book Two, as Strabo himself seems to imply; but if we bear in mind what has been already indicated as the chief contribution of Eratosthenes to geographic science, the bringing together the geography of the flat inhabited world with the sphere on which it is situated, it is an essential part of a historical survey. It is at least likely that Strabo did not appreciate the significance of the first appearance of this; and in the same way Berger was led to suppose that it was the spherical hypothesis itself which was at stake.

9 Frr. 164, 171 etc.
1 Frr. 152 -160.

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3 Fr. 158
4 Fr.160

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THESIS

If, however, we suppose Eratosthenes to hage started with his history of the geographers of the flat inhabited world, to have passed on to the history of theoretical sphericity, and thence to the practical implications and the researches which had taken place into the comparatively insignificant irregularities of the earth's surface, the whole book becomes intelligible if not, in its excessively fragmentary state, coherent. The measurements of mountains, the prevented cutting of the Isthmus by Demetrius[3] become relevant; and when Strabo brings himself up with a jerk: "I shall return to the order of argument from which I digressed[4]", it is Strabo who has digressed rather than Eratosthenes. Berger is misled into introducing at this point the zones: it is not impossible that they may have been mentioned here, but they do not become really relevant until the question of placing the inhabited world arises, and the general import of the passage in Strabo implies rather the general doctrine of sphericity than measurement and detail.

The other important points which it is necessary to discuss briefly here are (1) the measurement of the earth (2) the sun and moon (3) the winds. It has already been stated that each of these subjects may have been treated in a separate short work, possibly in the form of a letter or letters to Archimedes or Conon or some other physicist. There is no evidence whether this is true or untrue of any of them, though Thalamas concludes, with that "Gallica levitas" which Bernhardy attributes to Gossellin, that all these and more, including the zones and measurements of mountains, appeared in περὶ ἀναμετρήσεως and nowhere else. What, however, in the absence of evidence it is reasonable to suppose is that whether they had been published or not in another form it would be hardly possible for Eratosthenes to write a geographical work without some mention of them. Strabo repeatedly

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3 Fr. 158
4 Fr.160

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5 Fr. 164.
6 Fr. 167
7 Fragmente de
8 Uranlog. 158

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THESIS

complains of the amount of technical detail which Eratosthenes keeps inserting, not about his proper business, the inhabited world, but "that both the earth, including its liquid content, and the heavens are spherical".[5] There is, as has been pointed out above, plenty of room; and some of the undesirable detail may well have included, not merely a summary, such as is given by Cleomedes[6], of the geometrical proof of the earth's measurement, but a few remarks on the earth's position in the universe and its relation to the sun and moon. These fragments, included in the "Geography" by Bernhardy, have been ejected by subsequent editors: again, there is no evidence, but judged prely by relevance the balance of probability supports them.

In Section 3A the relevance of the "winds" to the geography of the inhabited world has already been made clear. The achievement of Eratosthenes was to detach the "wind-rose" from a particular point on the inhabited world and make it universal, and it is scarcely likely that in a book in which he was describing the relations of inhabited world to earth, he would omit some mention of the "winds". It has already been said that Berger,[7] who was not acquainted with the Galen passage, built up on the single statement of Achilles Tatius[8] an ingenious hypothesis that Eratosthenes, using Rhodes as his centre, adapted the wind-rose to the construction of his map, but this is now obviously untrue.

It is now possible, within a reasonable margin of probability to summarize the arrangement of the γεωγραφικά as follows, and it is on this plan that the fragments are placed in the text.

5 Fr. 164.
6 Fr. 167
7 Fragmente des E. pp.211,212.
8 Uranlog. 158B: ἐπραγματεύσατο δὲ περὶ ἀνέμων καὶ Ἐρατοσθένης.

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THESIS

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THESIS

Book One

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Warning against recent descriptive geographers and their inventions.

Book Two

The position of the earth, its shape, size and division into zones. The situation of the inhabited world in the temperate zone, and the possibility of sailing round the far side. Its shape, length and breadth. The winds. Unsuitability of division into continents and of men into Greek and foreigner.

Book Three

The Diaphragm and the Seals. Arrangement of Seals along the south side of the diaphragm from east to west, and also (?) of the north side, all measurements being in stades.

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9 Fr. 191
1 F.J.Gossell
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THESIS

D - The Map: Sources and Method.

That Eratosthenes was a man of encyclopaedic learning and catholic tastes is evident enough. As Librarian of Alexandria he had access to the most complete collection of records in existence[9]: among the half-million or so books in the two libraries there must have been a large assortment of the publications known as περίπλους and παράπλους (coasting voyage round bays and gulfs or along straight shores) γεωγραφία (descriptive geography), διαγραφὴ σταδίων (itinerary with nightly stages marked on royal roads), and ὑπομνήματα βασιλικά (Egyptian royal records on all kinds of government business) He had also at his disposal the works of previous philosophers and scientists, including Aristotle's own library which was transferred to Alexandria by Ptolemy Philadelphus. In these circumstances it would be almost reasonable to say that the sources used by Eratosthenes for his map comprised the whole of Greek literature and science up to his time. Indeed Gossellin[1] even improved upon this by asserting with apparent conviction that he had access to ancient maps based upon a correctly curved projection; that he misunderstood them and copied them as though they were drawn on a flat projection, and then destroyed the evidence. Who the mysterious people were who not only surveyed the whole inhabited world but had sufficient command of mathematics to project a curved surface on a flat map Gossellin leaves to the imagination, with the suggestion that they were Chaldeans or Babylonians.

What is more to the present purpose is to note, not the impressive list of Greek explorers and discoverers from Homer to the middle

9 Fr. 191
1 F.J.Gossellin: Géographie des Grecs analysée (Paris 1790) pp.36-51, and passim.

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2 See Bibliog
3 Fr. 211
4 Frr. 163, 1
5 Frr. 175,18
6 Plin. VI 6
7 Hip. ad

X 65.43
THESIS

of the third century, which can be studied in detail elsewhere,[2] but those who were clearly used or actually mentioned by Eratosthenes himself.

As has been mentioned above, the process of Greek exploration consisted of setting the boundaries of the unknown further and further back from Greece as the focal centre. From the middle of the fourth century an enormous increase of knowledge had followed the marches of Alexander's armies. He himself had not been content with purely military excursions but had deliberately organized exploration. Nearchus sailed a fleet from the Indus to the Persian Gulf. His records were used by Arrian, and were also available to Eratosthenes[3] as the only real authority for that coast. Callisthenes, Aristobulus and Onesicritus were also with Alexander, and left records. Other exploration was undertaken at the command of Alexander's successors, and helped to fill in the south-eastern part of the map. Megasthenes and Deimachus, whom Eratosthenes censures[4], were ambassadors respectively of Seleucus Nicator and Antiochus to Palimbothra, or Patna. For the Far East Eratosthenes himself preferred[5] the records of Ctesias and Patrocles, while Androsthenes of Thasos and others supplemented Nearchus on the Persian Gulf. Inland exploration as far as the river Jaxartes was provided by Deodamas, and accurate measurements of roads and stages by the well-known "Bematists", or "pacers" employed by Alexander, Diognetus and Baeton[6]. Exploration of the Red Sea was promoted by the Ptolemies, partly with the utilitarian purpose of elephant-hunting: Ariston was sent by Ptolemy I, Simmias by Ptolemy III, while Strabo quotes fourteen men mentioned by Artemidorus under Ptolemy II. Philo fixed ~~Rhm~~ by gnomon the latitudes of Meroe and Ptolemais Epitheras,[7] which were adopted by Eratosthenes.

2 See Bibliography
3 Fr. 211
4 Frr. 163, 194.
5 Frr. 175,187,225 (Patrocles): 211 (Androsthenes)
6 Plin. VI 61.
7 Hip. ap. Strab. c.77.

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8 Fr.200
9 Fr. R
1 Geog. I,15,2.
2 C.Müller: Geo
3 Fr. 270
4 Fr. 271.
5 Strab. C.115,
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6 Hipp. ad Arat
7 Fr. 223.

X 65-43
THESIS

Such was the wealth of information at hand for the south-eastern quarter of the inhabited world. Two centuries later Strabo "cannot say anything better"[8], and quotes Eratosthenes in extenso for all this district. For the Mediterranean coasts Eratosthenes followed the work "On Harbours", By Timosthenes, so closely indeed that he was accused of copying the whole book together with its preface[9]. This book was still quoted as authoritative by Ptolemy the mathematician and geographer nearly four centuries later[1]. There was also in existence a by Nymphodorus, of Syracuse. For the western districts Lycus of Rhegium and Timaeus the historian are also quoted by Agatharchides[2]. For the rest of the world Strabo was under the impression that he had better authorities, and abandoned Eratosthenes except for sporadic reference. It is, however, interesting to note that Julius Caesar took Eratosthenes with him as one of his chief guides for his campaigns in Gaul and Germany and, in a work published after personal travel in north-eastern Europe and Britain itself, quotes him as an authority without censure[3]. The main apparent reason for Strabo's abandonment of Eratosthenes and reversion to inferior authorities, especially for the coast-line of Spain, Portugal and France, is the degree of trust placed by Eratosthenes in Pytheas[4]. It is possible that Eratosthenes, the practical mathematician and astronomer, was so much impressed by the extraordinarily accurate reading (presumably one among others not recorded) taken by Pytheas of the gnomon's shadow at Massilia[5] and his discovery that the Pole Star was not in fact at the Pole[6] that he was led to suppose him a man of great personal reliability; or it may be that his wide reading and innate common sense bred in him an unusual discrimination between the true and the counterfeit. This is shown not only in such points as his preference of the more conservative Patrocles to Megasthenes in the east but in his acceptance of Cerne on the Atlantic coast of Africa[7] mentioned by Hanno but rejected as fabulous by Strabo.

8 Fr.200
9 Fr. R
1 Geog. I,15,2.
2 C.Müller: Geographi Graeci minores, vol I, p.156: Paris 1855
3 Fr. 270
4 Fr. 271.
5 Strab. C.115, 63; the ratio was 120: 41 4/5, and was accepted by Hipparchus himself.
6 Hipp. ad Arat., et Eud., Phaen. I,4 ἐπὶ γὰρ τοῦ πόλου οὐδὲ ἀστήρ κεῖται, ἀλλὰ κενός ἐστι τόπος ᾧ παράκεινται τρεῖς ἀστέρες.
7 Fr. 223.

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8 Gaston-E.Br
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THESIS

Whatever Pytheas did in fact do, he was the only first-hand authority for northern and western Europe, and for Britain until Julius Caesar, who did not penetrate beyond the S.E. corner of Britain in person. The information which had percolated at second hand by land was sufficiently inaccurate to make Strabo's account of these parts inferior, so far as can be determined, to that of Eratosthenes, who simply copied or adapted Pytheas for Spain and Britain and the north; no doubt to a great extent as Herodotus repeated what "the priests" told him, because it was all that was available.

Unfortunately there is no possibility of determining either what Pytheas did or what he said, such fragmentary references as we have to his works being elusively fascinating but so debatable as to be nearly useless. Broche, in the latest specialist publication on Pytheas[8], persuades himself with a wealth of intoxicating verbiage and exclamations, in the face of all probability, that Pytheas was a compound of business-man with an infallible scientist and a mystic in search of the midnight sun; that he possessed at least two triremes that kept up an unswerving average of 1000 stades a day (p.53) that he had anticipated the measurement of the earth's circumference by Eratosthenes (p.29,etc) and hence could navigate with accuracy (M.Broche does not explain how he found his longitudes); that he made the open sea voyage from Finisterre to Brittany or Ushant (ch.XI); he crossed from there to Cornwall, where he inspected the tin-mines[9], then along the south and east coasts of Britain by way of the Orkneys and Shetlands to Iceland. To the well-known objection that Thule could not be Iceland because there are no bees north of 61°[1], he replies that the climate may have changed, and that there are hornets there now (p.187). From Thule, he says, Pytheas, drunk with continuous daylight, sailed on to the Frozen Sea, then returned

8 Gaston-E.Broche: Pytheas le Massaliote: Paris 1936.
9 Fr. 278.
1 Cary "Ancient Explorers" p.36.

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2 Fr. 285
3 Frr. 175,2
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5 Agricola,
6 Fr. 284.

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THESIS

down the west coast, cataloguing the Hebrides but, curiously, not calling at Ireland (XXVI, XXIX); sailed along the north coast of Europe and right into the Baltic to Samland (Estonia)[2], which he named Queen (βασίλεια because of the quantity of amber found there (XXXII); onwards in search of the opening into the Caspian Sea, supposed to have been discovered by Patrodes[3], hoping to return by way of the River Don, which was supposed to have a mouth in the Caspian, and so home by way of the Black Sea and Mediterranean; but having sailed as far as, he "calculated", the meridian of the Don without success, returned instead by way of the north coast of Europe.[4]

It is not possible to deny that Pytheas might conceivably have done all this; but if M. Brocke had ever spent a few days cruising in a modern yacht with a modern rudder, and an auxiliary engine instead of oars, perhaps his time-table would be a little more elastic. If he had studied the tides and currents to the north of Britain, described by Tacitus[5] and by Scott at the beginning of "The Pirate" (where he unquestioningly, like Ptolemy, takes the Mainland of Shetland to be Thule), perhaps he would be less certain that Thule is Iceland. If he had read his texts with a little less romantic imagination and less of Gossellin's "Gallica Levitas", he would remember that Pytheas himself is described as stating that much of what he related was hearsay;[6] and, remarkable as his mathematical and astronomical achievements undoubtedly were, he would not seek to augment them by ascribing to him the discoveries and calculations of later discoverers.

It is very easy to go too far in the other direction, and follow Strabo in dismissing the whole affair as travellers' tales; but things which sounded as absurd as Mandeville or Munchausen than have proved to be no more than truth, sometimes curiously stated, and Cary and Warmington in England,

2 Fr. 285
3 Frr. 175,226.
4 καὶ διότι ἐπανελθὼν ἐνθένδε πᾶσαν ἐπέλθοι τὴν (Strab.C.104)
5 Agricola, 10. παραιωανῖτιν τῆς Εὐρώπης ἀπὸ Γαδείρων ἕως Τανάιδος
6 Fr. 284.

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7 "Ancient M
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8 Tr. 159.

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THESIS

followed by Hyde in America, take a moderate view which at present holds the field.[7] This credits Pytheas with coasting along Portugal and France to Ushant, crossing to Cornwall, circumnavigating Britain and possibly visiting Orkney. Somewhere in North Britain he heard about Thule, probably Norway, but was put off attempting to visit it by personal experience of "stuff like a sea-lung", probably dense fog. From Cornwall he sailed either back to Ushant or skent-wise to north France, and from there as far as the Elbe: Basileia, or Abalus, is Heligoland. He then returned to Marseilles, the remark of Polybius which has caused much discussion, that he sailed "all along Europe from Cadiz to the Don" being merely a sneering remark equivalent to "from Dan to Beersheba" or "from China to Peru".

There can be no final answer to these questions, and this is not the place for a full-length discussion of Pytheas's achievements. As, however, he is the only source Eratosthenes had for the northwest, the key-extracts concerning his purely geographical discoveries are quoted below in the text, and essential discussion of details is attempted in the notes on them.

Eratosthenes himself, so far as is known, did not travel for the sake of travel. During his residence in Athens he must have done a little travelling in Greece: he certainly claimed to have visited Helice in Achaea and seen the results of the famous earthquake and tidal wave of 273 B.C.

7 "Ancient Explorers", pp.33-40; "Ancient Greek Mariners", pp.124-134.

8 Fr. 159.

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9 Fr. 155
1 Frr. 156,1
2 H.Berger:
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3 Suidas, s.
8 Fr. 178.

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THESIS

It is impossible to say for certain how much travelling he did while resident at Alexandria, but it is fairly safe to assume that he himself visited Syene to confirm its position on the tropic. His remarks about the temple of Ammon and its oyster-shells[9] suggest a personal visit, but even upon this subject, in which he seems to have been much interested, he is content in the Alexandrian manner to accept most of his data at second hand from Strato of Lampsacus and Xanthus the Lydian[1]. It is possible to conclude that the contents of his map, which was after all more in the nature of a mathematical exercise, were the result of comparison of authorities rather than of personal observation.

For what would be of the greatest possible interest, the amount of indebtedness of Eratosthenes to Dicaearchus, there is almost no evidence. It is not even certain whether Dicaearchus was the author of the meridian measurement of @ 300,000 stades[2], or whether his map was one of the "old maps" which Eratosthenes set out to "rectify". Perhaps from the very fact that his work was overtaken and replaced by that of Eratosthenes, it has disappeared almost completely. His probable measurement of the earth, however, and his attempts at measuring the heights of mountains,[3] suggest that he may have anticipated the interest taken by Eratosthenes in the sphericity and irregularity of the earth. This is the more likely in that he was, like Strato, a Peripatetic, and evidently of similar tastes. It is at any rate certain that his "diaphragm", and division of the inhabited world into northern and southern halves, was, as has

9 Fr. 155
1 Frr. 156,157.
2 H.Berger: Gesch. der. Wiss. Erdkunde der Griechen: Leipzig, 1887. vol III, p.44.
3 Suidas, s.v. Δικαίαρχος.... καταμετρήσεις τῶν ἐν Πελοποννήσῳ ὀρῶν.

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6 Fr. 173.

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been shown above, based on an already well-established tradition and was accepted almost as it stood by Eratosthenes. The main meridian employed by Eratosthenes was also traditional, but Rhodes, where he makes it cross the diaphragm, is not given as one of the places through which Dicaearchus made his diaphragm pass. Diaearchus, however, did use the section of the meridian from Syene to Lysimachia[4] in his measurement of the earth. Nothing more is known about the methods used by Dicaearchus in the construction of his map, and in the absence of evidence it is perhaps permissible to attribute to Eratosthenes the method on which he based his own.

In his first two books, as we have seen, Eratosthenes emphasized the necessity of visualizing the inhabited world as part of a spherical surface; but when it came to the actual construction of a map desire could only outrun performance. With all respect to Gossellin and his race of perfect mathematicians,[5] there is no evidence that anyone before Ptolemy succeeded in evolving a method which could give the impression of a curved surface drawn on a plane. Thus, having compared the shape of the inhabited world with that of a "chlamys",[6] that is to say, a cape with the lower edge considerably longer than the upper, fitting round the "spinning-whorl" - shaped temperate zone like a real cape on the body of a human being, the arctic circle representing neck and shoulders, he tries to lay out the chlamys flat on the ground and copy it on to a plane map with straight axes. In this way he hoped to minimize the distortion which he knew very well he could not eliminate. Over a small area, indeed, his method is as good as any, but as in any flat map, whatever the method of projection, the distortion increases with the

4 Lysimachia, founded 309 B.C. in ἀκμή of Dicaearchus and destroyed 281

5 Disposed of by Ukert and Ideler. (See K.Müllenhoff: Deutsche Altertumskunde, I,p.260: Berlin 1870. Berger: Fragmente des E. p.100).

6 Fr. 173.

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7 Strabo C.
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size of the area and the consequent reduction in scale. This, no doubt, is why Strabo recommends a map not less than seven feet long if a globe is impracticable.[7]

The use by Strabo of the terms "meridian" and "parallel" has led to a great deal of confusion and misunderstanding. Between Eratosthenes and Strabo Hipparchus had adumbrated, though not put into effect for lack of sufficient data, a system of parallels calculated and cross-checked by three methods (1) gnomonic readings[8] (2) length of the longest day[9] (3) noon elevation of the sun on the shortest day.[1] The spaces between these lines were to be defined and described by their "celestial phenomena" and what are still called their "climatic" conditions,[2] and were called "climata", or ladder-steps. These in turn would be divided by meridians established by the observation of the comparative times of eclipses of the moon. The terrestrial globe would thus be reticulated by imaginary lines corresponding with those which could be much more easily drawn on the celestial, and places on the earth's surface could be placed with absolute certainty and exactitude by observing the points of the heavens under which they lay. This complete and theoretically perfect system could not even begin to be put into effective operation in the time of Hipparchus because of the absence of data, and particularly, in the case of the meridians, because of the impossibility of establishing relative times in different places with any approach to exactitude. He did, however, make a beginning by collecting such data as were available and calculating others, and his suggestions had a lasting effect. Ptolemy, in constructing his map on the new

7 Strabo C. 116.
8 Strabo C. 133,115,87; Hipp.ad.Arat.p.178D.
9 Strabo C. 133,134; Hipp.ad Arat. p.178D.
1 Strabo C. 75,135.
2 Strabo C. 132.

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7 Fig. 11
8 A. Thal

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projection, listed many hundreds of places, not by distances from each other, but by degrees, minutes and seconds of latitude and longitude, thus giving an entirely illusory effect of accuracy: his latitudes and longitudes were in fact worked out in exactly the same way as those of Eratosthenes, by calculation of distances from key places whose position was, or was thought to be, known. How wrongly some even of these could be calculated is illustrated by the fact t that Hipparchus himself placed Byzantium on the same parallel as Massilia[3]: it was the reading of Pytheas which was almost exactly right, while that of Hipparchus, or that he adopted, gave a result some two degrees out.

It is, then, in the light of these subsequent developments that the system of Eratosthenes must be considered. Berger was persuaded that Strabo followed Eratosthenes in his parallels and meridians and included them all among his fragments[4]. Müller, followed by Bunbury[5], reconstructed an elaborate map on twelve meridians and eight parallels[6]. The real, completely insuperable obstacle to a convincing reconstruction of even part of the map is that we know what it ought to look like; and all modern reconstructions suffer from this defect. Thalamas[7] wisely refrains from attempting a general reconstruction, confining himself to the features actually given in the fragments we have--the framework of the map and the eastern "seals"; but his assumption[8], on the ground that Eratosthenes considers an error of four hundred stades negligible, that the axes represent belts four hundred stades across instead of imaginary lines with a margin of error of four hundred stades, is quite indefensible.

The method which Eratosthenes really seems to have employed

3 Strabo, C. 115
4 Fragmente des Eratosthenes, pp. 169-170, 188-196.
5 E. H. Bunbury, Vol. 1, p. 660.
6 V. de St. Martin: Atlas dressé pour l'histoire de la géographie (plate 2): Paris, 1874.
7 Fig. 11
8 A. Thalamas: Géographie d'Eratosthène, p. 237-8.

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9 Frr. 188,
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2 V. sup. se
3 Fr. 184.

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is as follows. Taking his one meridian, diaphragm and a rectangle 3000 stades across representing the Mediterranean and Taurus, not with geometrical accuracy but roughly,[9] as Strabo insists is only proper in geography, he defines the southern and northern limits by the "parallels" of the Cinnamon Country and Thule. He then measures off the breadth of the inhabited world along the "meridian" as follows:

Actual Latitude in Degrees		Distance in Stades
12° - 17°	Cinnamon country to Meroe	3400
17° - 24°	Meroe to Syene	5000
24° - 32°	Syene to Alexandria	5000
32° - 40°	Alexandria to the Hellespont	8100
40° - 47°	Hellesport to mouth of River Borysthenes	5000
47° - 66°	Borysthenes to Thule.	11500
		38000 [1]

There are no theoretical limits to habitability beyond the ends of the inhabited world, but he measures from India to the Pillars of Heracles and then adds two thousand stades at either end to allow for the bulge of Spain and any possible capes and islands. There was, according to Strabo, the additional reason of making the length exceed twice the breadth, the possible reasons for which have already been discussed.[2]

"Length" of India	19000	
India to Caspian Gates	14000	stades
Caspian Gates to Euphrates	10000	
Euphrates to the Canobic mouth of the Nile	6300	
Canobic mouth to Carthage	13500	
Carthage to Pillars of Heracles, over	8000	
Beyond the Pillars	3000	
Allowance of 2000 each end	4000	
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9 Frr. 188, 189, 192 etc.
1 Fr. 177.
2 V. sup. section 3A.
3 Fr. 184.

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5 Fr. 180.
6 Fr. 187.

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It is noteworthy that most of these distances are in very round figures, those with most pretensions to accuracy being those with Alexandria as the centre; also that the distances westwards from the Euphrates are measured, not along the diaphragm itself but approximately along the "parallel" of Alexandria, converging with the diaphragm at the Pillars of Heracles.

Exactly which parallels mentioned by Strabo were used by Eratosthenes is not clear, but only two are attributed to him by name. One of these, approximating the "diaphragm" itself, passes through "Caria, Lycaonia, Cataonia, Media, Caspian Gates, and the parts of India next to the Caucasus";[4] another, through "Lysimachia, Mysia, Paphlagonia, the district round Sinope, Hyrcania and Bactra".[5] These lines, even if they did not appear in the finished map, he must have used at least in the preliminary stages of drawing. An interesting anticipation of Hipparchus is shown by his method of arriving at the latitude of the "capes of India".[6] More modest in his aims than Hipparchus, he made no attempt to utilize meridians in the same way, being no doubt fully aware of the insuperable difficulties in the way of establishing them even within the rough degree of approximation which satisfied him as a pioneer.

Having thus established his framework and the general lie of the countries, he proceeded to fill in from east to west boundaries, rivers and important towns with, presumably, a pair of compasses, measuring in straight lines from the diaphragm or places already fixed . What the finished product looked like can only be surmised, and any surmise is bound to be coloured by familiarity with the modern map. We can

4 Fr. 179 - continuing eastward the description in fr. 187 in more detail.
5 Fr. 180.
6 Fr. 187.

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7 Fr. 175
8 Fr. 266
9. Frr.2177
1 Fr. 279
2 Fr. 211
3 Frr.196, r

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hazard a guess at the first four Seals, we know that the Caspian Sea communicated with the Ocean,[7] that Rome was on the same meridian as Carthage,[8] that Africa stopped short just south of the Cinnamon Country,[9] that the shape and size of Britain,[1] the Persian Gulf[2] and Ceylon[3] were greatly distorted; but any honest attempt at reconstructing the map of Eratosthenes, in order to avoid an unconscious tracing of familiar outlines, must consist very largely of straight dotted lines and even more Terra Incognita than the original must have done.

7 Fr. 175
8 Fr. 266
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1 Fr. 279
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3 Frr.196, fin.; 198.

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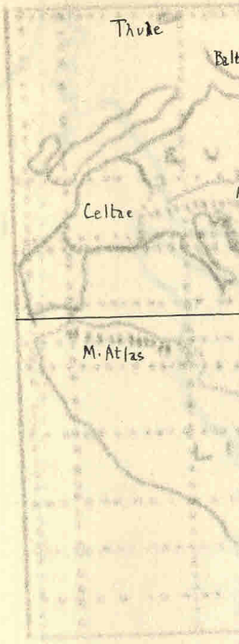

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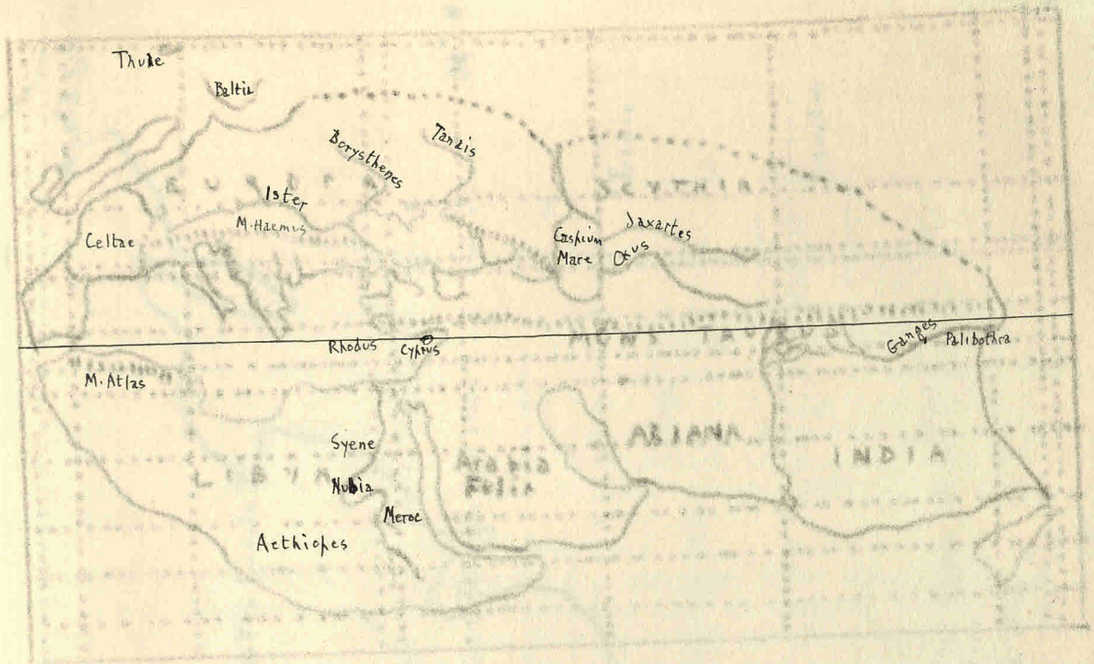

Figure 10

The traditional reconstruction of E.'s map
cf. Müller, Saint-Martin, Bunbury, etc.

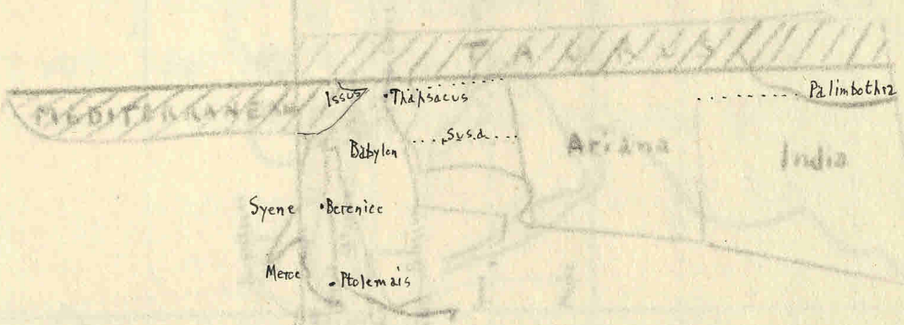

Figure 11

A Thalamas - "Les grandes lignes du tracé Eratosthénien"

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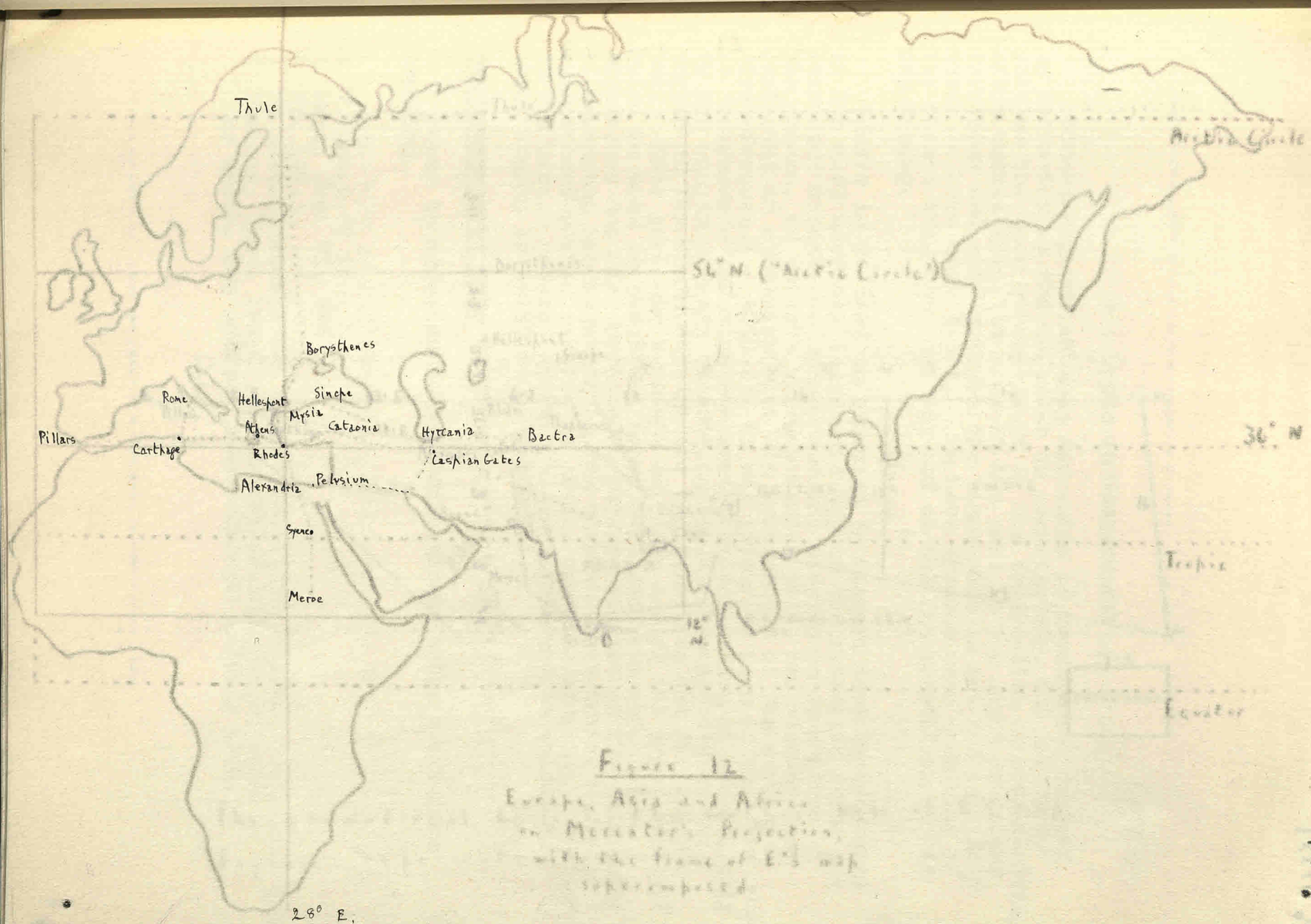

Figure 12

Europe, Asia and Africa
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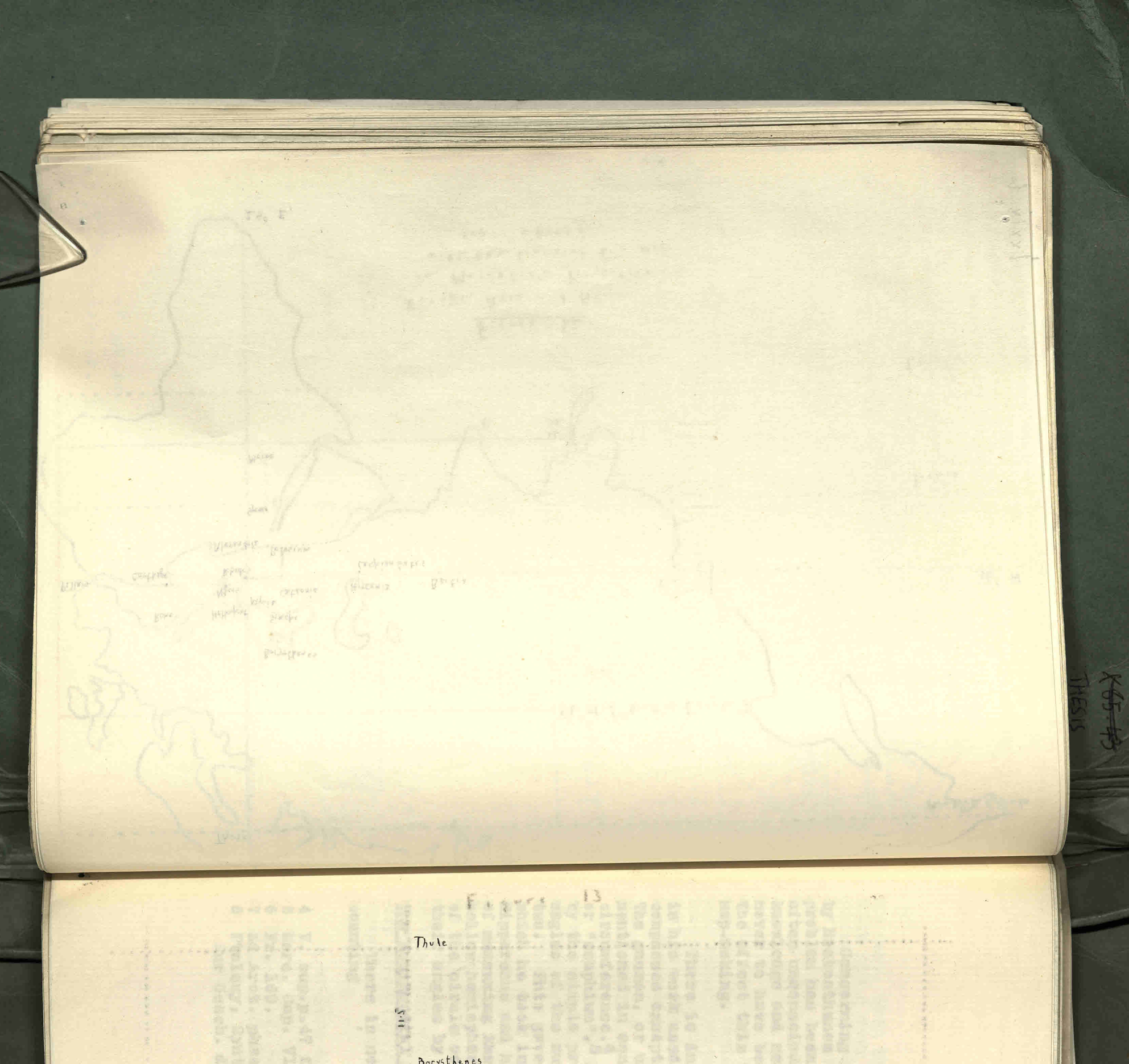
Figure 13
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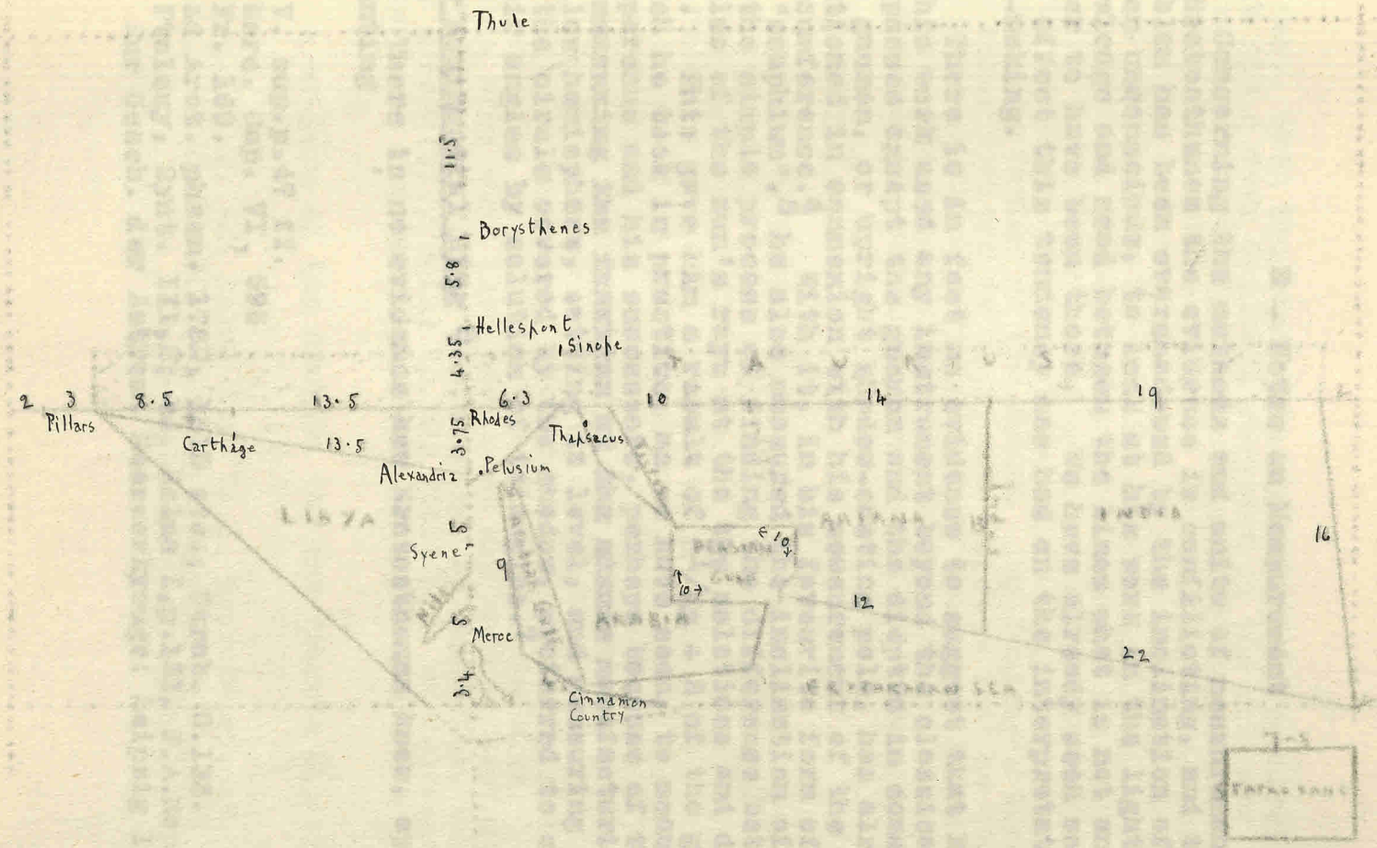
Figure 13



The geometrical basis of the northern half of Eratosthenes' map. Figures represent thousands of stades.

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4 V. sup.p.47 f
5 Mare. Cap. VI
6 Fr. 169.
7 ad Arot. phae
8 Ptolemy, Synt
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B - Notes on Measurement

Concerning the methods and units of measurement employed by Eratosthenes the evidence is conflicting, and the whole problem has been overshadowed by the inclination of commentators, often unconscious, to look at his work in the light of modern knowledge and read between the lines what is not and is likely never to have been there. We have already seen something of the effect this tendency has had on the interpretation of his map-making.

There is in fact no evidence to suggest that Eratosthenes in his work used any instrument beyond the classical ruler and compasses except the gnomon and the dioptra in some form. The gnomon, or upright shadow-casting pole, has already been mentioned in connexion with his measurement of the earth's circumference.[4] With it, in his favourite form of the πόλος, σκάφη or "scaphium",[5] he also measured the inclination of the ecliptic by the simple process of finding the difference between the angles of the sun's rays at the two solstices and dividing by two. This gave him a result of $^{11}/_{83} \div 2$ of the great circle,[6] which he took in practice, as we have seen, to mean $^{4}/_{60}$. Hipparchus and his successors, perhaps because of the difficulty of ~~measuring the fraction of the circle~~ manufacturing a perfect hollow hemisphere, setting it level, and measuring the fraction of the circle covered by the shadow, preferred to calculate their angles by solution of triangles.[7]

The Equinoctial Ring [8]

There is no evidence how Eratosthenes knew, apart from counting

4 V. sup.p.47 ff.
5 Marc. Cap. VI, 596
6 Fr. 169.
7 ad Arat. phaen. 178D, 181D etc.; Strab. C.133.
8 Ptolemy, Synt. III,2; ed. Halma I,p.153. J.A.Repsold: Zur Gesch. der Astrom. Messwerkzeuge: Leipzig 1908.

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The Dioptra [9]

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9 Ptol. Synt. ed
1 Ptol. Synt. V,

the days, when the equinoxes and solstices occurred, but as there was a very accurate revision of the calendar (238 B.C.) during his own residence at Alexandria the priests must have had methods of observation. The simplest, and perhaps the most likely to have been used by Eratosthenes, is that of a bronze ring set in lead on a stone pedestal so as to lie exactly in the plane of the sun's rays on the day of the solstice or equinox. The ring was square in section, and on the required day the shadow of the upper part exactly covered the inside of the lower. By Ptolemy's time there were other devices as well, and the fact that he complains that some of the old rings were no longer reliable suggests that they had been set up long enough for the change in inclination of the earth's axis to become perceptible.

The Dioptra [9]

In Ptolemy's time the διόπτρα, or simply ὄργανον, consisted of a rectangular base with two vertical rectangular plates standing upon it, all of wood. One of the vertical rectangles was fixed at one end, and had a slit throughit. The other could be moved to and fro along grooves, and was pierced by a hole or slit. A scale was marked on the base, whose width or height was to be measured at a distance, the object was sighted through the hole in the one plate, to which the eye was placed, and the slit in the other, the movable plate being slid on its grooves until the object exactly fitted the slit. Something of this kind must have been used not only by Eratosthenes but by Dicaearchus in his measurements of mountains, though not very sucessfully owing to the difficulty of estimating the distance to the base and hence of working out the similar triangles.

A by-form of the dioptra was the "regula Hipparchi", which

9 Ptol. Synt. ed. Halma I,1; II,1. Repsold op.cit.
1 Ptol. Synt. V,14: τὴν ὑποδεδειγμένην ὑπὸ τοῦ Ἱππάρχου διὰ τοῦ τετραπήχους κανόνος διόπτραν...

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2 Nyps. Anapl
3 Ivor Thoma
4 Strabo C.1
5 Gossellin:
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consisted of a ring fixed on the end of a rod, sighting with another ring sliding along a scale. This was used especially for measuring the apogee and perigee of the moon.

The Sexagesimal System

It is very unlikely that Eratosthenes divided the circumference of the earth further than the "sixtieths" to which reference has been made. The first recorded reference to a division of the zodiac into 360 parts appears in Hypsicles,[2] in the second half of the second century. The system, as applied to the zodiac, appears to have been adopted from the Chaldaeans, but Hipparchus is credited with its application to the circle in general.[3] When the further sub-division into minutes and seconds was introduced is not known, but it was in general use by Ptolemy's time. The attribution by Gossellin and others of the use of degrees to Eratosthenes is presumably based on a misunderstanding of Strabo.[4]

Measures of Length

During the past century and a half numerous theories have been put forward concerning the value of the stade. Gossellin[5] and other French scholars, with an extraordinary perversion of ingenuity, began from the curious assumption that the size of the earth must have been known, and worked out exact valuations on the basis of the various estimates of 400,000, 300,000, 250,000, 240,000 and 180,000 stades to the great circle. Assuming further that the various

2 Hyps. Anaph., ed. Manitius 5,25-31.
3 Ivor Thomas: Gr.Math.Works: Loeb ed. 1939. I,p.48; II,369-7.
4 Strabo C.132.
5 Gossellin: Recherches sur la géographie systématique et positive des anciens: Paris 1797-(passim)

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6 Tab. Jul. Asc
7 Pliny, XII, 53.
8 Anonym. Geog.
9 Plut. C. Grac
1 W.M.Leake: Or
London 1857.

Greek maps were merely perversions of a perfect pre-historic map on a curved projection, Gossellin, by employing any values of the stade that happened to fit, proved to his own satisfaction that the measurements in stades given by Eratosthenes and others were originally genuine but had been misinterpreted.

Even if we ignore these flights of imagination, upon which Gossellin based many pages of elaborate tables showing distance in yards, feet and inches and latitude and longitude in degrees, minutes and seconds, these remains the confusion of "Olympic", "Pythian" and "itinerary" stades. Further theories have been evolved from the facts that, whereas the normal ratio employed for conversion into Roman measurements was eight stades to the mile, in one reference it is stated that Eratosthenes and Strabo reckoned $8\frac{1}{3}$;[6] while Pliny says that "a schoenus, by Eratosthenes's reckoning, is clearly 40 stades, that is 5 miles, but some have assigned 32 stades to one schoemus".[7] In another place we have "....29,000 stades; that is to say, 3625 miles, or a little more than 900 schoeni of 30 stades each."[8] Plutarch gives: "The mile is a little less than eight stades,"[9] which seems to conflict with the $8\frac{1}{3}$ mentioned above.

One of the most interesting analyses of the whole question was published as long ago as 1839 by W.M.Leake. He reconciles the differences in conversion to Roman miles by assuming a conversion stade of 625 Roman feet, of which there were 5000 to the mile: the Roman foot is 11·652 English inches. If Strabo took this as 600 Roman feet, the figure of $8\frac{1}{3}$ would be accounted for. Leake pointed out that there is no evidence whatever in ancient writers that the stade varied in length, and that, in fact, as it was the basis of the foot-race, to which they attached great importance as an international sport, it is extremely unlikely that they

6 Tab. Jul. Ascal. Script. Metrol.Gr.,ed. Hultzsch, I.p.201.
7 Pliny,XII,53.
8 Anonym. Geog.exp.comp.2.: Geog.Gr.min.II,494.
9 Plut. C. Grac. 7.
1 W.M.Leake: On some disputed questions of ancient geography: London 1857.

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The account of Greek measures given by Herodotus is explicit and exact. "The stade of six plethra", he says, "consists of exactly one hundred fathoms (ὀργυιαί), the fathom measuring six feet or four cubits. The foot consists of four palms, the cubit of six."[3] The Attic foot, according to the standard in the Parthenon, was 12.1375 inches, giving a stade of 606·875 feet (English).[4] It is important to bear in mind that even nowadays for practical purposes we are content with a rough estimate for, say, conversion from dollars or francs to pounds, from kilometres to miles. In times when the relation of the diameter of a circle to its circumference was treated even by mathematicians as one-third,[5] it is unlikely that local variations of the stade within a few yards would matter very much. There can be little doubt that the stade to the Greek, and later to the eastern Mediterranean peoples, was just as uniform in its meaning as the mile to the average Englishman, and that any variations of foot and stade between Greek states would not be greater than, say, the differences of French, Swiss and Belgian francs before 1914. Under the Roman Empire, with its exact measurements and milestones, there may have been discrepancies, but in the time of Eratosthenes distances given in round figures of thousands or even hundreds of stades would be immediately intelligible to all Greek-speaking people.

Eratosthenes himself, as has been repeatedly pointed out, in the absence of exact data was content to approximate. Having taken all precautions he could, he knew his results were still not capable of exactitude: when he himself probably saw little difference between

2 H.Berger: Fragmente des E. pp.132-7.
3 Herodotus. II, 149.
4 W.M.Leake, op.cit.p.82.
5 e.g. Plin.II, 248, where the distance to the centre of the earth is given as 42,000 stades.

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6 A.Thalamas:
7 e.g. fr.200.
8 Herodotus, I
9 Strabo. C.12
1 Strabo. C.95

250,000 and 252,000 stades it is scarcely worth while to quibble over the decimal of an inch. The most recent discussion is that of Thalamas,[6] who concludes that the "itinerary" stade, as measured by the bematists, consisted of 240 paces of $2\frac{1}{2}$ feet theoretically; that each pace would not exceed 70 cm., giving a maximum stade of 168m. or 551 English feet. As we have no means of knowing how the bematists checked their measurements, this conclusion must be regarded with reserve.

In actual fact none of the measurements Eratosthenes gives was straight. The best authenticated is that from Syene to Alexandria, on which the measurement of the earth and his whole map were based; yet even this he took as a round figure, discounting something for the deviations of the river. In other cases also he discounted from itinerary measures in a quite arbitrary way to reach what he considered a just straight measurement.[7] As for distances by water, they were frankly guess-work, especially over the open sea. Herodotus,[8] for example, gives the length of the Black Sea as a voyage of 9 days and 8 nights, and takes the day's sail as 700 and the nights as 600 stades: clearly 350 and 250 would be much closer estimates. The distance from Rhodes to Alexandria was estimated at 4-5000 stades. Eratosthenes, on the basis of a gnomonic reading and incidentally of his estimate of the earth based in its turn on the distance (a land distance) from Syene to Alexandria, calculated it at 3750.[9] Oddly enough Posidonius based his measurement of the earth on this distance, and having made it in the first place 240,000 stades, afterwards in view of Eratosthenes's measurement reduced it to 180,000![1] The actual distance is somewhat under 400 miles, that from Syene to Alexandria rather over 500.

In ancient times ideas of time and distance inclined to be

6 A.Thalamas: La geographie d'E.,pp.155-9.
7 e.g. fr.200.
8 Herodotus, IV,86.
9 Strabo. C.126.
1 Strabo. C.95.

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2 Strabo C.80
3 Whitaker's
4 "The Times"

hazy. The Persian royal roads were measured in σταθμοί or stages, which naturally varied according to the nature of the ground, and it is likely that the parasang and the schoenus[2] also varied. The στάδιον , as its derivation suggests, was fixed. Its 600 feet cannot have differed more than a moderate number of feet from 200 English yards. Even the most practised of bematists must have shortened his step a little towards the end of the day or on hilly ground, and most of the distances given by Eratosthenes do not even pretend to be anything but the roughest of approximations. If we adopt the current English practice of taking ten stades as equivalent to one geographical or nautical mile, which itself varies from 6046 feet at the equator to 6108 feet at the poles,[3] we shall arrive at as accurate results as can be hoped for. On this basis the earth's circumference of 250,000 stades is equivalent to 25,000 mean geographical miles of 6080 feet,[3] or about 28,785 land miles; The actual circumference (at the equator, which to Eratosthenes was the same as along a meridian) is 24,902 miles.[3] The meridian measurement even now is so uncertain that the only standard work of reference which commits itself is Chambers's Encyclopaedia, which gives it as 24,856 miles.

At the meeting of the British Association held in August, 1947, Professor Eva G. R. Taylor, speaking on politics and geography, made the following remarks:[4] "We ourselves are perhaps startled to hear it suggested that the exact size and shape of the earth may be elevated to the rank of 'top secrets' - startled until we remember that success in mechanical warfare depended upon pin-pointing the target - a target

2 Strabo C.803; Pliny 6,30; Liddell and Scott.
3 Whitaker's Almanac, 1946.
4 "The Times", Aug.29,1947.

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"Only a mere fraction, "the "Times" report continues, "of the land surface had been covered by instrumental survey of the order of precision really necessary, and the tying together of such exact surveys had often been done only by calculation based on an assumed figure of the earth. If the map of Burma were much less than the 10 miles or 10 minutes of the arc out of the true that had been hinted....

"Since Eratosthenes over two millennia ago assumed the earth a perfect, static sphere, and hence deduced all its dimensions from a single measurement, the earth as a globe had proved progressively disappointing. To-day we could only say that the earth was 'earth-shaped' - and we still knew too little of its irregularities to be quite certain of destroying Hollywood from Timbuctoo."

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Est

Florvit

347 B.C. A
?400 B.C.

320 B.C. Dicaea

240 B.C. Erato
?100 A.D.
124 A.D.

130 A.D.

77 B.C.
500 A.D.

24 B.C.
?500 A.D.

100 B.C. Posi

Estimates of Earth's Circumference

Floruit		
347 B.C.	Aristotle: De Caelo 2.14.16.	400,000 stades
?400 B.C.	(Perhaps adopted from Archytas: Horace Odes I,28,1. cf. Aristophanes, Clouds 202)	
320 B.C.	Dicaearchus (?) (method: arc between Syene & Lysimachia, 20,000 stades = 1/15 meridian from observation of stars vertically overhead)	300,000 stades
240 B.C.	Eratosthenes	
?100 A.D.	Cleomedes cycl. theor. I,8,43 & passim	250,000 stades
124 A.D	Arrian ap. Io. Philopon. ad Arist. meteor.I.32.	250,000 stades
	Anon.geogr.expos.compend.fragm.A, in Geogr.Gr.min.II p.510	250,000 stades
	Anon.mens.tot.terr.habit. Geog. Gr.min.I.p.424.	250,000 stades
	Anon.geogr.expos.compend. Geogr - Gr.min.II.p.494.	250,000 stades
130 A.D.	Theon Smyrn.de astr.C.3.p.148.	252,000 stades
	do. p.156.	252,000 stades
77 B.C.	Gemin. Isag.C.13; Uranolog.p.50E	252,000 stades
500 A.D.	Achill.Tat.isag.Uranolog.p.154D	252,000 stades
	Macrob.in Somn.Scip.II,6,	252,000 stades
24 B.C.	Strabo passim	31,500 miles
?500 A.D.	Marc.Capell.VI,609	252,000 stades
	Marc. Heracleot. periph.mar.ext.I,4. (Geog.Gr.min.I.p.519)	259,200 stades
100 B.C.	Posidonius. (Strabo 2:2,2) (Method: difference in elevation of Canopus at Rhodes & Alexandria: based on Eratosthenes's own gnomonic measurement of distance R. to. A.)	180,000 stades

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TEXT

AND

TRANSLATION

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TEXT

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TRANSLATION

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LIFE AND WORKS: A - S

A: Suidas

Ἐρατοσθένης, Ἀγλαοῦ, οἱ δὲ Ἀμβροσίου, Κυρηναῖος, μαθητὴς φιλοσόφου Ἀρίστωνος 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 ρμς' Ὀλυμπιάδι, καὶ ἐτελεύτησεν κ' ἐτῶν γεγονώς, ἀποσχόμενος τροφῆς διὰ τὸ ἀμβλυώττειν , μαθητὴν ἐπίσημον καταλιπὼν Ἀριστοφάνην τὸν Βυζάντιον, οὗ πάλιν Ἀρίσταρχος μαθητής· μαθηταὶ δὲ αὐτοῦ Μνάσέας καὶ Μένανδρος καὶ Ἀριστις. ἔγραψε δὲ φιλόσοφα καὶ ποιήματα καὶ ἱστορίας, ἀστρονομίαν ἢ καταστερισμούς, περὶ τῶν κατὰ φιλοσοφίαν αἱρέσεων, περὶ ἀλυπίας, διαλόγους πολλοὺς καὶ γραμματικὰ συχνά.

B: Suidas

Ἀπολλώνιος Ἀλεξανδρεύς· ἐπῶν ποιητής, διατρίψας ἐν Ῥόδῳ, υἱὸς Σιλλέως, μαθητὴς Καλλιμάχου, σύγ-

LIFE AND WORKS: A - S

A.

Eratosthenes, son of Aglaus, or, according to some, of Ambrosius, of Cyrene; pupil of the philosopher Ariston of Chios, of the grammarian Lysanias of Cyrene, and of the poet Callimachus. He was summoned from Athens by Ptolemy III, and remained (at Alexandria) until Ptolemy V. Because he came second in every form of learning, though close to the first, he was called "Beta". Others called him "Plato the Second" or "the New Plato", and yet others "the All-Rounder". He was born in the 126th Olympiad, and died at the age of 80 by refraining from food because of the failure of his sight. He left behind a distinguished pupil, Aristophanes of Byzantium, whose pupil in turn was Aristarchus; his pupils were Mnaseas, Menander, and Aristis. Eratosthenes wrote philosophical works, poems, histories, astronomy or "promotions to the stars", works on philosophical sects and on freedom from pain, dialogues, and numerous works on "grammar".

B.

Apollonius of Alexandria. An epic poet; resident in Rhodes; son of Silleus; pupil of Callimachus;

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χρονος Ἐρατοσθένους καὶ Εὐφορίωνος καὶ Τιμάρχου, ἐπὶ Πτολεμαίου τοῦ Εὐεργέτου ἐπικληθέντος, καὶ διάδοχος Ἐρατοσθένους γενόμενος ἐν τῇ προστασίᾳ τῆς ἐν Ἀλεξανδρείᾳ βιβλιοθήκης.

C: Pap. Ox. X 1241 col. II

(Ἀπολλώ)νιος Σιλλέως Ἀλεξανδρεύς, ὁ καλούμενος Ῥόδιος, Καλλιμάχου γνώριμος· οὗτος ἐγένετο καὶ διδάσκαλος τοῦ πρώτου βασιλέως. τοῦτον διεδέξατο Ἐρατοσθένης· μεθ' ὃν Ἀριστοφάνης καὶ Ἀρίσταρχος· εἶτ' Ἀπολλώνιος ὁ Ἀλεξανδρεὺς ὁ (ε)ἰδογράφος καλούμενος· μεθ' ὃν Ἀρίσταρχος . . . . . οὗτος καὶ διδάσκαλος ἐγένετο τῶν τοῦ Φιλοπάτορος τέκνων . . . . . ἐπὶ δὲ τῷ ἑνάτῳ βασιλεῖ ἦκμασαν Ἀμμώνιος καὶ Ζηνο(δότος) καὶ Διοκλῆς καὶ Ἀπολλοδῶρος γραμματικοί . . . . .

D: (Ivor Thomas I p. 154)

Proclus in Euclidis Elementa II p. 20 init. de Euclide

νεώτερος μὲν οὖν ἐστὶ τῶν περὶ Πλάτωνα, πρεσβύτερος δὲ Ἐρατοσθένους καὶ Ἀρχιμήδους. οὗτοι γὰρ σύγχρονοι ἀλλήλοις, ὥσπερ καὶ φήσιν Ἐρατοσθένης.

E: Suidas

Φιλόχορος· . . . . . κατὰ δὲ τοὺς χρόνους γέγονεν ὁ Φιλόχορος Ἐρατοσθένους, ὡς ἐπιβαλεῖν πρεσβύτῃ νέον ὄντα Ἐρατοσθένει.

contemporary of Eratosthenes, Euphorion, and Timarchus, in the reign of Ptolemy surnamed Euergetes; succeeded Eratosthenes in the Directorship of the Library at Alexandria.

C.

Apollonius, son of Silleus, of Alexandria, surnamed Rhodius, pupil of Callimachus. He also became tutor to the first king. Eratosthenes succeeded him, and was followed by Aristophanes and Aristarchus. Next was Apollonius of Alexandria, called the portrait-painter, and after him Aristarchus. . . . . he also became tutor to the children of Philopator. . . . . In the reign of the ninth king flourished Ammonius, Zenodotus, Diocles, and Apollodorus the Grammarians. . . . .

D.

(Euclid) is junior to Plato's followers, but senior to Eratosthenes and Archimedes. These, as Eratosthenes himself says, were contemporaries.

. . . . .

E.

Philochorus: Philochorus lived about the period of Eratosthenes; as a young man, he encountered Eratosthenes in his old age.

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F: Censorinus C. 15 (de anno octogesimo primo)

Eratosthenes quoque, ille orbis terrarum mensor, et Xenocrates Platonicus, veteris Academiae princeps, ad eundem annum vixerunt.

G: Dion. Cyz. in Eratosth. epigramma. Brunck Analect. II, p. 255

Πρηύτερον γῆράς σε, καὶ οὐ κατὰ νοῦσος ἀμαυρὴ
ἔσβεσεν, εὐνήθης δ'ὕπνον ὀφειλόμενον,
ἄκρα μεριμνήσας, Ἐρατόσθενες· οὐδὲ Κυρήνη
ματά σ'ἐπ'ἀτρύτων ἐντὸς ἔδεκτο τάφων,
Ἀγλαοῦ υἱέ· φίλος δὲ καὶ εἰν ξείνῃ κεκάλυψαι
κὰρ τόδε Πρωτῆος κράσπεδον αἰγιαλοῦ.

H: Strabo, C. 15

Πρῶτον δ'ἐπισκεπτέον Ἐρατοσθένη, παρατιθέντας ἅμα καὶ τὴν Ἱππάρχου πρὸς αὐτὸν ἀντιλογίαν. ἔστι δ'ὁ Ἐρατοσθένης οὔθ'οὕτως εὐπατρόχαστος, ὥστε μηδ' Ἀθήνας αὐτὸν ἰδεῖν φάσκειν, ὅπερ Πολέμων ἐπιχειρεῖ δεικνύναι· οὔτ'ἐπὶ τοσοῦτον πίστος, ἐφ'ὅσον παρεδέξαντό τινες, καίπερ πλείστοις ἐντυχῶν, ὡς εἴρηκεν αὐτός, ἀγάθοις ἀνδράσιν . . . . .

δηλοῖ δὲ καὶ ἡ περὶ τῶν ἀγαθῶν ἐνδοθεῖσα ὑπ' αὐτοῦ πραγματεία καὶ μελέται καὶ εἴ τι ἄλλο τοιοῦτο τὴν ἀγωγὴν αὐτοῦ· διότι μέσος ἦν τοῦ τε βουλομένου φιλοσοφεῖν καὶ τοῦ μὴ θαροῦντος ἐγχειρίζειν ἑαυτὸν εἰς τὴν ὑπόσχεσιν

E.

Eratosthenes, too, the famous measurer of the world, and Xenocrates the Platonist, head of the Old Academy, lived to the same (81st) year.

G.

Gentle old age, not enfeebling illness, quenched thy flame, Eratosthenes. The slumber that thou sleepest is thy due after thy lofty cares. Cyrene thy foster-mother has not received thee in an everlasting tomb, son of Aglaus, yet, though in a foreign land, it is as a friend that thou liest hidden by this margin of the shore of Proteus.

H.

First let us consider Eratosthenes, laying aside for the moment Hipparchus' attack on him. Eratosthenes is not so easy to catch out that we can say, as Polemon tried to prove, that "he never even saw Athens". Nor is he so trustworthy as some people have taken him to be, although, as he says himself, he mixed with very many first class scholars. . . . .

His method is clearly shown in his published work "On the Good", his rhetorical exercises, and all his writings in this genre; he was half-way between wishing to be a genuine philosopher and bringing himself to come

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ταύτην, ἀλλὰ μόνον μέχρι τοῦ δοκεῖν προιόντος, ἢ καὶ παράβασίν τινα ταύτην ἀπὸ τῶν ἄλλων τῶν ἐγκυκλίων πεπορισμένου πρὸς διαγωγὴν ἢ καὶ παιδίαν· τρόπον δέ τινα καὶ ἐν τοῖς ἄλλοις ἔστι τοιοῦτος.

I: Clemens Alex. Strom. I p. 309 A

Ἀπολλόδωρος δὲ ὁ Κυμαῖος πρῶτος τοῦ Κριτικοῦ εἰσηγήσατο τοὔνομα, καὶ Γραμματικὸς προσηγορεύθη. ἔνιοι δὲ Ἐρατοσθένη τὸν Κυρηναῖόν φασιν, ἐπειδὴ ἐξέδωκεν οὗτος βιβλία δύο, Γραμματικὰ ἐπιγράψας.

J: Lucianus Macrob. 27

Γραμματικῶν δὲ Ἐρατοσθένης μὲν ὁ Ἀγλαοῦ Κυρηναῖος, ὃν οὐ μόνον γραμματικόν, ἀλλὰ καὶ ποιητὴν ἄντις ὀνομάσειε, καὶ φιλόσοφον, καὶ γεωμέτρην.

K: Steph. Byz.

Κυρήνη· ἐντεῦθεν ἦν Ἐρατοσθένης Ἀγακλέους παῖς, ὁ ἱστορικός.

L: Archimedes, ed. Heiberg, vol. II p. 428 seq.

πρόβλημα, ὅπερ Ἀρχιμήδης ἐν ἐπιγράμμασιν εὑρὼν τοῖς ἐν Ἀλεξανδρείᾳ περὶ ταῦτα πραγματευομένοις ζητεῖν ἀπέστειλεν, ἐν τῇ πρὸς Ἐρατοσθένην τὸν Κυρηναῖον ἐπιστολῇ.

to grips with this profession, so that he only reached the stage of appearing to be one--providing himself with philosophy as an interlude to the daily round, for a pastime or even an amusement. To some extent he gives the same impression in his other works too.

I.

Apollodorus of Cyzico was the first to introduce the title of "critic", and to be called "grammarian". Some, however, say that Eratosthenes of Cyrene was the first, because he published two books with the title "Grammar".

J.

Among grammarians is Eratosthenes, son of Aglaus, of Cyrene. He may be called not only a grammarian, but also a poet, philosopher, and geometer.

K.

Cyrene: Eratosthenes, son of Agacles, the historian, came from here.

L.

The problem which Archimedes solved in epigrams and wrote in his letter to Eratosthenes of Cyrene for those who concerned themselves with the study of these subjects at Alexandria.

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M: Syncellus p. 91 C. (Chronog. fr. XXIII):

ὧν τὴν γνῶσιν, φησίν, ὁ Ἐρατοσθένης λαβὼν Αἰγυπτιακοῖς ὑπομνήμασιν καὶ ὀνόμασιν κατὰ πρόσταξιν βασιλικὴν τῇ Ἑλλάδι φωνῇ παρέφρασεν.

M: "Geminus" Ch. Orb. descr. v. 109:

Ἤδη δ'ἐπ'ἀρχὴν εἶμι τῆς συντάξεως
τοὺς συγγραφεῖς ἐνθέμενος, οἷς δὴ χρώμενος
τὸν ἱστορικὸν εἰς πίστιν ἀνακέμπω λόγον·
τῷ τὴν γεωγραφίαν γὰρ ἐπιμελέστατα
γεγραφότι, τοῖς τε κλίμασι καὶ τοῖς σχήμασιν,
Ἐρατοσθένει μάλιστα συμπεπεισμένος-

Q: Cicero ad Att. II. 6:

A scribendo prorsus abhorret animus. Etenim geographica, quae constitueram, magnum opus est. Ita valde Eratosthenes, quem mihi proposueram, a Scorpione et Ab Hipparcho reprehenditur.

P: Arrian Hist. Ind. 3. 1:

Ἐμοὶ δὲ Ἐρατοσθένης ὁ Κυρηναῖος πιστότερος ἄλλου ἔστω, ὅτι τῆς περιόδου περὶ ἔμελεν Ἐρατοσθένει.

Q: Strabo C. 104:

Πολύβιος δὲ τὴν Εὐρώπην χωρογραφῶν τοὺς μὲν

M.

According to him, Eratosthenes learned these things in the Egyptian records and language, and translated them into Greek by royal command.

N.

I shall now proceed to set out and collate those historians by following whom I can make my history trustworthy. In matters of "climate" and conformation of places I put most confidence in Eratosthenes, who completed his geographical writings with the utmost care.

O.

I feel very much averse from writing. Not only is the geographical work which I had in mind a great undertaking, but Eratosthenes, whom I had taken as my model, is an object of keen censure to Serapio and Hipparchus.

P.

I myself shall take Eratosthenes of Cyrene to be more trustworthy than anyone else, because he took into consideration descriptive geography.

Q.

Polybius, in his descriptive geography of

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ἀρχαίους ἔθν φησι, τοὺς δ'ἐκείνους ἐλέγχοντας ἐξετάζειν Δικαίαρχόν τε καὶ Ἐρατοσθένη, τὸν τελευταῖον πραγματευσάμενον περὶ γεωγραφίας. . . . .

Ri Marc. Hermol. a - a. O. 3 p. 566:

Ἐρατοσθένης δὲ ὁ Κυρηναῖος, οὐκ οἶδα τί πασθών, τὸ Τιμοσθένους μετέγραψε βιβλίον, βραχέα τινὰ προσθεὶς ὡς μηδὲ τοῦ προοιμίου τοῦ μνημονευθέντος ἀποσχέσθαι, ἀλλ'αὐταῖς λέξεσι πάνυ τοῦ οἰκείου προθεῖναι συγγράμματος.

Si Etymolog. M. p. 198, 20:

Βιβλιαίγισθος, Ἀνδρέας ὁ ἰατρὸς ἐπεκλήθη ὑπὸ Ἐρατοσθένους, ὅτι λάθρα αὐτοῦ τὰ βιβλία μετέγραψε.

Europe, says that he passes over the ancients but carefully examines those who refute them, Dicaearchus and Eratosthenes, the most recent scholar to concern himself with geography.

E.

Eratosthenes of Cyrene for some unknown reason copied the book of Timosthenes with a few slight additions. He did not even keep his hands off the well-known preface, but put it in front of his own work, difficulties and all.

S.

Andreas the physician was nicknamed by Eratosthenes "bibliaogisthus" (Book-adulterer), because he furtively copied his writings.

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POEMS:

Hermes: 1-13:

1.

ὀρθοῦ· ναὶ γὰρ μᾶλλον ἐπωδίνουσι μέριμναι. . . . .

2.

Λάδωνος περὶ χεῦμα. . . . .

3.

αἱ δὲ πέρην Ἀρύαντος ἐπὶ προχοαῖς ποταμοῖο. . . . .

4.

φωριαμὸν δ'ὀνόμηναν, ὃ μιν κύθε φῶριον ἄγρην·
ἐκ τοῦ φωριαμὸς νικλήσεται ἀνθρώποισι. . . . .

5.

. . . . . βαθὺς διαφύεται αὐλών . . . . .

6.

πέλμα ποτιρράπτεσκεν ἐλαφροῦ φαιπασίοιο. . . . .

7.

χρειὼ πάντ'ἐδίδαξε· τί δ'οὐ χρειὼ κεν ἀνεύροι; . . . . .

8.

ἡ χερνῆτις ἔριθος ἐφ'ὑψηλοῦ πυλεῶνος
δενδαλίδας τεύχουσα καλοὺς ἤειδεν ἰούλους . . . . .

POEMS:

Hermes: 1-13:

1.

Be steadfast: for troubles are bringing even worse pangs.

2.

Around the stream of Ladon. . . . .

3.

They beyond, at the mouth of the river Aryas. . . . .

4.

They named that which concealed his stolen booty a chest.
This is the origin of its being called φωριαμὸς by men.

5.

. . . . .a deep hollow lies between. . . . .

6.

He sewed on the sole of a light slipper. . . . .

7.

Necessity teaches all. What would necessity not teach?

8.

When the hired reaper, making barley-cakes in the lofty gate-house, was singing sweet harvest-songs. . . . .

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9.

κρήνης Γαργαφίης . . . . .

10.

ἄγρης μοῖραν ἔλειπον, ἔτι ζώοντας ἰούλους
ἠὲ γενειῆτιν τρίγλην ἢ κερκάδα πίχλην
ἢ δρομίην χρύσειον ἐπ'ὀφρύσιν ἱερὸν ἰχθύν . . . . .

11.

ὀκτὼ δὴ τάδε πάντα συν ἁρμονίῃσιν ἀρήρει,
ὀκτὼ δ'ἐν σφαίρῃσι κυλίνδετο κύκλῳ ἰόντα
ταὐτ'ἐνάτην περὶ γαῖαν . . . . .

12.

αὐτὴν μέν μιν ἔτετμε μεσήρεα παντὸς Ὀλύμπου
κέντρου ἔπι σφαίρης· διὰ δ'ἄξονος ἠρήρειστο.

13.

πέντε δέ οἱ ζῶναι περιειλάδες ἐσκείρηντο,
αἱ δύο μὲν γλαυκοῖο μελαινότεραι κυάνοιο,
ἡ δὲ μία ψαφαρή τε καὶ ἐκ πυρὸς οἷον ἐρυθρή.
ἡ μὲν ἔην μεσάτη, ἐκέκαυτο δὲ πᾶσα περὶ κρὸ
τυπτομένη φλογμοῖσιν, ἐπεὶ ῥᾳ ἑ ματρὸς ὑπ'αὐτὴν
κεκλιμένην ἀκτῖνες ἀειθερέες πυρόωσιν·
αἱ δὲ δύω ἑκάτερθε πόλοις περικεκτηῖαι
αἰεὶ φρικαλέαι, αἰεὶ δ'ὕδατι μογέουσαι·

9.

Of the Gargaphian spring. . . . .

10.

They were leaving part of their catch, still living
red-fish, bearded mullet, thrush-coloured perch, or
the sacred racing fish with gold on its brows. . . . .

11.

All these eight fitted in with the notes of the scale,
these revolving on their eight spheres were rolling
about the earth, which was the ninth. . . ..

12.

He came upon it in the midst of all Olympus at the centre
of the sphere; it was fixed through the pole.

13.

Five encircling zones were twined about it:
two darker than blue-green Cyanus,
one both dusty and red as it were with fire.
This zone was in the middle, and was burnt all round
as the flames beat upon it,
for the heavenly rays blaze upon it
as it lies right under the Dog Star.
The two on either side, spread about the poles,
are ever stiff with cold, ever overdone with water;

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οὐ μὲν ὕδωρ, ἀλλ' αὐτὸς ἀπ' οὐρανόθεν κρύσταλλος
πεῖ γαῖαν κρύπτεσκε· περίψυκτος δὲ τέτυκται.
ἀλλὰ τὰ μὲν χερσαῖα τ' ἀνέμβατά τ' ἀνθρώποισι·
δοιαὶ δ' ἄλλαι ἔασιν ἐναντίαι ἀλλήλῃσι,
μεσσηγὺς θέρεός τε καὶ ὑετίου κρυστάλλου
ἄμφω εὔκρητοί τε καὶ ὄμπνιον ἀλδήσκουσαι
καρπὸν Ἐλευσινίης Δημήτερος· ἐν δὲ μιν ἄνδρες
ἀντίποδες ναίουσι . . . . .

Antorinya (or Hesiod): 14-16:

14.

. . . . . ἔκ τέ οἱ ὅσσε
κανθῶν καμφαίνεσκε Μοσυχλαίῃ φλογὶ ἶσον . . . . .

15.

. . . . . αἱ δὲ πελιδναὶ
κυθεδόνες γάστρην ἀν' ὑπέτρεφον οὐλοὸν ἕλκος . . . . .

16.

ἰυγῆς δ' ὡς καῦρον ἐπέκλυον . . . . .

Ericone: 17-23:

17.

Ἰκαριοῖ, τόθι πρῶτα περὶ τράγον ὠρχήσαντο . . . . .

yet it is no
concealed th
These, then,
but there ar
in between t
both tempera
Demeter. In

from their

the wound a

They heard

Then the Ic

yet it is not water, but sheer ice from heaven
concealed the earth there, and it is frozen all round.
These, then, are barren and impassable to human beings;
but there are two more opposite to each other,
in between the heat and the raining ice,
both temperate and growing the rich crop of Eleusinian
Demeter. In them live men on opposite sides of the earth.

Anterinys (or Hesiod): 14-16:

14.

. . . . . His eyes gleamed forth . . . . . .
from their sockets like fire of Hesychius. . . . .

15.

. . . . . dark pustules were spreading
the wound all over the belly. . . . .

16.

. . . . .
They heard a shriek lasting only a little while. . . . .

Erigone: 17-23:

17.

Then the Icarians first danced round a goat. . . . .

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18.

ἄστυ τε δὴ Θορικοῦ καλὸν ἴκανεν ἔδος . . . . .

19.

. . . . . μέσον δ'ἐξαύσατο βαυνόν . . . . .

20.

καὶ βαθὺν ἀκρήτῳ πνεύμονα τεγγόμενος . . . . .

21.

μόσχους καὶ χλωρὰς πλήματος ἐκφυάδας . . . . .

22.

. . . . . περιπλέγδην ἠρεμόνεσσι

23.

οἶνός τοι πυρὶ ἶσον ἔχει μένος, εὖτ'ἂν ἐς ἄνδρας
ἔλθῃ· κυμαίνει δ'οἷα Λίβυσσαν ἅλα
βορέης ἠὲ νότος· τὰ δὲ καὶ κεκρυμμένα φαίνει
βυσσόθεν· ἐκ δ'ἀνδρῶν πάντ'ἐτίναξε νοον . . . . .

Epithalamium: 24:

. . . . . αὐροσχάδα βότρυν
Ἰκαριωνείης . . . . .

18.

Until he came to the fair seat of Thoricus. . . . .

19.

He lighted up a stove in the middle. . . . .

20.

. . . . .and drenching the depths of his lungs with unmixed wine. . . . . .

21.

. . . . .scions and green sprouts from a shoot. . . . .

22.

. . . . .closely entwined with tendrils.

23.

Wine indeed has a power like fire when it enters into men; it lashes them to fury as the north wind the Libyan Sea. It reveals what is hidden from the very foundations, and scatters abroad all the wits of men.

Epithalamium: 24:

. . . . .the golden shoot, the cluster of Icarioneia. . .

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Epigram: 25:

Εἰ κύβον ἐξόλίγου διπλήσιον, ὠγαθέ, τεύχειν
φράζεαι, τὴν στερεὴν πᾶσαν ἐς ἄλλο φύσιν
εὖ μεταμορφῶσαι, τόδε τοι πάρα, κἂν σύγε μάνδρην,
ἢ σιρόν, ἢ κοίλου φρείατος εὐρὺ κύτος,
τῇδ'ἀναμετρήσαιο, μέσας δ'τε τέρμασιν ἄκροις
συνδρομάδας δισσῶν ἐντὸς ἕλῃς κανόνων.
μηδὲ σύγ''Αρχύτεω δυσμήχανα ἔργα κυλίνδρων,
μηδὲ Μεναιχμείους κωνοτομεῖν τριάδας
δίζηαι, μηδ'εἴ τι θεουδέος Εὐδόξοιο
καμπύλον ἐν γραμμαῖς εἶδος ἀναγράφεται.
τοῖσδε δέ γ'ἐν πινάκεσσι μεσόγραφα μυρία τεύχοις,
βετά κεν ἐκ παύρου κυθμένος ἀρχόμενος.
Εὐαιών, Πτολεμαῖε, πατήρ, ὅτι παιδὶ σὺν ἥβῃ
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''Ερατοσθένεος.

Uncertain: 26-29:

26.

ὀπταλέα κρέα
ἐκ τέφρης ἐπάσαντο τά τ'ἀγρῶσσοντες ἕλοντο . . . . .

Epigram: 25:

. . . . . If you wish, my dear sir, to find a cube double the size of a small one, or to change any solid figure correctly into another, this you can do whether it is a stable, a pit, or the broad shaft of a hollow well that you want to alter. Thus can you measure it, when you find between the two rulers the means converging at their extreme ends. Have nothing to do with the clumsy cylinders of Archytas, or with cutting the cone as in the triads of Menaechmus, or with any curved shape described in the figures of the god-fearing Eudoxus. On these plates you can find any number of mean lines, though you start from a slender basis.

A blessed father you are, Ptolemy, in that, being in the prime of life with your son, you have yourself given him everything dear to Muses and to kings too. In the future, heavenly Zeus, may he also receive the sceptre from your own hand.

May this come true: and may anyone who looks upon this monument of Eratosthenes of Cyrene say so too.

Uncertain: 26-29:

26.

They tasted baked meats from the ashes, and selected them as they picked them out.

27.

When men have purified themselves thrice, the gods give

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27.

τρίς δ'ἀναμαξαμένοισι θεοὶ διδόασιν ἄμεινον . . . . .

28: Plin. Nat. Hist. XXII, #86:

scolymum quoque in cibos recepit oriens et alio nomine limoniam appellavit. frutex est numquam cubitali altior cristis foliorum ac radice nigra, sed dulci, Eratostheni quoque laudata in pauperi cena.

29: Schol. B V Il. T 233:

ἔστι δὲ ἡ λέξις (ὀτρυντύς) Ἀντιμάχειος. χαίρει δὲ καὶ Ἐρατοσθένης ταῖς τοιαύταις ἐκφοραῖς, ὡς τὸ πολλὴ ἀντιμαχητύς.

them better fortune.

28.

The east has also admitted the artichoke among the foods, and given it another name, "limonia". It is a bush, never more than a cubit high, with tufts of leaves and a dark but sweet root. Eratosthenes also praises it as a poor man's supper.

29.

The expression (ὀτρυντύς, exhortation) is Antimachean. Eratosthenes too is partial to such locutions, e. g. πολλὴ ἀντιμαχητύς (much conflict).

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PROSE WORKS:

Platonicus: 30-38:

30: Theo. Smyrnaeus p. 2:

Ἐρατοσθένης μὲν γὰρ ἐν τῷ ἐπιγραφομένῳ Πλατωνικῷ φησιν, ὅτι Δηλίοις τοῦ θεοῦ χρήσαντος ἐπὶ ἀλλαγῇ λοιμοῦ βωμὸν τοῦ ὄντος διπλασίονα κατασκευάσαι, πολλὴν ἀρχιτέκτοσιν ἐμπεσεῖν ἀπορίαν, ζητοῦσιν ὅπως χρὴ στερεὸν στερεοῦ γενέσθαι διπλάσιον. ἀφικέσθαι τε πευσομένους περὶ τούτου Πλάτωνος· τὸν δὲ φάναι αὐτοῖς, ὡς ἄρα οὐ διπλασίου βωμοῦ ὁ θεὸς δεόμενος τοῦτο Δηλίοις ἐμαντεύσατο, προφέρων δέ, καὶ ὀνειδίζων τοῖς Ἕλλησιν, ἀμελοῦσι μαθημάτων, καὶ γεωμετρίας ὠλιγωρηκόσιν.

31: Eutocius: ad Archimedis sphaeram et cylindrum (Archim. ed. Heib. III, 88)

Βασιλεῖ Πτολεμαίῳ Ἐρατοσθένης χαίρειν. Τῶν ἀρχαίων τινὰ τῶν τραγωδοποιῶν φασιν εἰσαγαγεῖν τὸν Μίνω τῷ Γλαύκῳ κατασκευάζοντα τάφον· κυθόμενον δέ, ὅτι πανταχοῦ ἑκατόμπεδος εἴη, εἰπεῖν·

Μικρόν γ' ἔλεξας βασιλικοῦ σηκὸν τάφου·
διπλάσιος ἔστω, τοῦ καλοῦ δὲ μὴ σφαλείς
δίπλαζ' ἕκαστον κῶλον ἐν τάχει τάφου.

PROSE WORKS:

Platonicus: 30-38:

30.

In his work entitled "Platonicus", Eratosthenes says that when the god gave an oracle to the people of Delos bidding them, for the relaxation of a plague, to construct an altar double the size of the existing one, great perplexity came upon the engineers when they tried to find a way to make a solid body double the size of another solid. They also went to ask Plato about it. He told them that it was not because he wanted a double-sized altar that the god had given this oracle to the Delians, but to call attention to and to reproach the neglect of mathematics and contempt of geometry among the Greeks.

31.

Eratosthenes to King Ptolemy, greeting.

It is said that one of the old tragedians introduced Minos preparing a tomb for Glaucus; and that, when he learnt that it measured a hundred feet in every direction, he said:"The shrine you speak of is small for a royal tomb. Let it be doubled in size, but let it not fall short of beauty. Double straightway each side of the tomb."

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ἐδόκει διημαρτηκέναι· τῶν γὰρ πλευρῶν διπλασιασθεισῶν, τὸ μὲν ἐπίπεδον γίνεται τετραπλάσιον, τὸ δὲ στερεὸν ὀκταπλάσιον. ἐζητεῖτο δὲ καὶ παρὰ τοῖς γεωμέτραις, τίνα ἄν τις τρόπον τὸ δοθὲν στερεὸν διαμένον ἐν τῷ αὐτῷ σχήματι διπλασιάσειαν· καὶ ἐπαλεῖτο τὸ τοιοῦτον πρόβλημα, κύβου διπλασιασμός, ὑποθέμενοι γὰρ κύβον, ἐζήτουν τοῦτον διπλασιάσαι. πάντων δὲ διαπορούντων ἐπὶ πολὺν χρόνον, πρῶτον Ἱπποκράτης ὁ Χῖος ἐπενόησεν, ὅτι ἐὰν εὑρεθῇ δύο εὐθειῶν γραμμῶν, ὧν ἡ μείζων τῆς ἐλάσσονός ἐστι διπλασία, δύο μέσας ἀνάλογον λαβεῖν ἐν συνεχεῖ ἀναλογίᾳ, διπλασιασθήσεται ὁ κύβος, ὥστε τὸ ἀπόρημα αὐτοῦ εἰς ἕτερον οὐκ ἔλασσον ἀπόρημα κατέστρεφεν. μετὰ χρόνον δέ τινά φασιν Δηλίους, ἐπιβαλομένης νόσου, κατὰ χρησμὸν διπλασιάσαι τινὰ τῶν βωμῶν ἐπιταχθέντας, ἐμπεσεῖν εἰς τὸ αὐτὸ ἄπόρημα. διαπεμψαμενους δέ, τοὺς παρὰ τῷ Πλάτωνι ἐν Ἀκαδημίᾳ γεωμέτρας, ἀξιοῦν αὐτοῖς εὑρεῖν τὸ ζητούμενον. τῶν δὲ φιλοπόνως ἐπιδιδόντων ἑαυτοῖς, καὶ ζητούντων, δύο δοθεισῶν δύο μέσας λαβεῖν, Ἀρχύτας μὲν ὁ Ταραντῖνος λέγεται διὰ τῶν ἡμικυλίνδρων εὑρηκέναι, Εὔδοξος δὲ διὰ τῶν καλουμένων καμπύλων γραμμῶν. συμβέβηκε δὲ πᾶσιν αὐτοῖς ἀποδεικτικῶς γεγραφέναι· χειρουργῆσαι δὲ καὶ εἰς χρείαν κεσεῖν μὴ δύνασθαι, πλὴν ἐπὶ βραχύ τι τοῦ Μεναίχμου, καὶ ταῦτα δυσχερῶς. ἐπινενόηται δέ τις ὑφ' ἡμῶν ὀργανικὴ βαδία, δι' ἧς εὑρήσομεν, δύο τῶν δοθεισῶν, οὐμόναν δύο μέσας,

Evidently he was mistaken, for when the sides are doubled a plane surface is quadrupled, while a solid is multiplied by eight.

Inquiry was made too among geometricians for a method by which a given solid, while keeping its shape, could be doubled in size. This problem was known as "Doubling the Cube", for they assumed a cube and sought for a way to double it. Everyone was perplexed for a long time, and Hippocrates of Chios first realized that if a way could be discovered to find two means in continued proportion between two straight lines, of which the greater was twice the length of the shorter, the cube would be doubled; thus the first perplexity was resolved into another just as great.

Some time later it is said that the people of Delos, attacked by a plague, were ordered by an oracle to double one of their altars and fell into the same perplexity. They sent to the geometricians of Plato's Academy and thought that they should discover what was being sought. They devoted themselves energetically to the matter and tried to discover a way to find two means between two given lines, and Archytas of Tarentum is said to have found a way by means of half-cylinders, while Eudoxus achieved it by what are called "curved lines". All of them succeeded in demonstrating it by pure construction; but they have not been able to apply their solutions to practical use, except to a small extent Menaechmus, and his solution is awkward.

ἀλλ'ὅσας ἄν τις ἐπιτάξῃ. τούτου δὲ εὑρισκομένου δυνησόμεθα καθόλου τὸ δοθὲν στερεὸν παραλληλογράμμοις περιεχόμενον εἰς κύβον καθιστάναι, ἢ ἐξ ἑτέρου εἰς ἕτερον σχηματίζειν, καὶ ὅμοιον ποιεῖν, καὶ ἐπαύξειν διατηροῦντας τὴν ὁμοιότητα, ὥστε καὶ βωμοὺς καὶ ναούς, δυνησόμεθα δὲ καὶ τὰ τῶν ὑγρῶν μέτρα καὶ ξηρῶν, λέγω δὲ οἷον μετρητὴν μεδίμνων, εἰς κύβον καθιστάναι, καὶ διὰ τούτου πλευρᾶς ἀναμετρεῖν τὰ τούτων δεκτικὰ ἄγγεῖα, πόσον χωρεῖ. χρήσιμον δὲ ἔσται τὸ ἐπινόημα καὶ τοῖς βουλομένοις ἐπαύξειν καταπελτικὰ καὶ λιθοβόλα ὄργανα. δεῖ γὰρ ἀνάλογον ἅπαντα αὐξηθῆναι, καὶ τὰ πάχη, καὶ τὰ μεγέθη, καὶ τὰς κατατρήσεις, καὶ τὰς χοινικίδας, καὶ τὰ ἐμβαλλόμενα νεῦρα, εἰ μένει καὶ ἡ βουλὴ ἀνάλογον ἐπαυξηθῆναι. ταῦτα δὲ οὐ δυνατὰ γενέσθαι ἄνευ τῆς τῶν μέσων εὑρέσεως. τὴν δὲ ἀπόδειξιν καὶ τὴν κατασκευὴν τοῦ λεχθέντος ὀργάνου ὑπογέγραφά σοι.

Δεδόσθωσαν δύο ἄνισοι εὐθεῖαι, ὧν δεῖ δύο μέσας ἀνάλογον εὑρεῖν ἐν συνεχεῖ ἀναλογίᾳ, αἱ αε. δθ. καὶ κείσθω ἐπί τινος εὐθείας τῆς εθ. πρὸς ὀρθὰς ἡ αε. καὶ ἐπὶ τῆς εθ. τρία συνεστάτω παραλληλόγραμμα ἐφεξῆς, τὰ αζ. ζι. ιθ. καὶ ἤχθωσαν διάμετροι ἐν αὐτοῖς αἱ αζ. λη. ιθ. ἔσονται δὲ αὗται παράλληλοι, μένοντος δὲ τοῦ μέσου παραλληλογράμμου

I myself have invented a simple instrumental method by means of which I can find, if two lines are given, not merely two means but as many as are required. By this discovery I can transform absolutely any given solid bounded by parallelograms into a cube, or from one shape into another, and the like; I can multiply solids, keeping the same shape; I can transform measures of liquid and dry capacity, such as a measure of medimni, into a cube, and by calculating its side measure how many vesselfuls it contains. The invention will be useful also for those who wish to enlarge catapults and stone-throwing engines; for everything has to be enlarged in proportion, thickness, length, and breadth, holes, washers, and cords attached, if it is really intended to enlarge in proportion. It is not possible to do this without finding "means". The proof and arrangement of the said instruments I have appended here for your information.

Given two unequal straight lines, αε and δθ, to which it is required to find two means in continued proportion.

Let αε lie at right angles to a straight line εθ. Upon εθ construct three (equal) rectangles αζ, ζι, ιθ, and draw their diagonals αζ, λη, ιθ. These diagonals will be parallel to one another. Now letting the middle rectangle ζι remain stationary, slide the rectangle αζ

τοῦ ζι΄., συνωθήτω τὸ μὲν αζ΄. ἐπάνω τοῦ μέσου, τὸ δὲ ιθ΄. ὑποπάτω, καθάπερ ἐπὶ τοῦ δευτέρου σχήματος, ἕως οὗ γένηται τὰ αβγδ΄. κατ᾽εὐθεῖαν. καὶ συμπιπτέτω τῇ εθ΄. ἐκβληθείσῃ κατὰ τὸ κ΄. ἔσται δὲ ὡς ἡ ακ΄. πρὸς κβ΄. ἐν μὲν ταῖς αε΄. ζβ΄. παραλλήλοις ἡ εκ΄. πρὸς κζ΄. ἐν δὲ ταῖς αζ΄. βη΄. παραλλήλοις ἡ ζκ΄. πρὸς κη΄. ὡς ἄρα ἡ ακ΄. πρὸς κβ΄. ἡ εκ΄. πρὸς κζ΄. καὶ ἡ κζ΄. πρὸς κη΄. πάλιν ἐπεὶ ἔστιν, ὡς ἡ βκ΄. πρὸς κγ΄. ἐν μὲν ταῖς βζ΄. γη΄. παραλλήλοις ἡ ζκ΄. πρὸς κη΄. ἐν δὲ ταῖς βη΄. γθ΄. παραλλήλοις ἡ ζκ΄. πρὸς κη΄. ἐν δὲ ταῖς βη΄. γθ΄. παραλλήλοις ἡ ηκ΄. πρὸς κθ΄. ὡς ἄρα ἡ βκ΄. πρὸς κγ΄. ἡ ζκ΄. πρὸ κη΄. καὶ ἡ ηκ΄. πρὸς κθ΄. ἀλλ᾽ὡς ἡ ζκ΄. πρὸς κη΄. ἡ ἐκ΄. πρὸς κζ΄. καὶ ὡς ἄρα ἡ εκ΄. πρὸς κζ΄. ἡ κζ΄. πρὸς κη΄. καὶ ἡ ηκ΄. πρὸς κθ΄. ἀλλ᾽ὡς ἡ εκ΄. πρὸς κζ΄. ἡ αε΄. πρὸς βζ΄. ὡς δὲ ἡ ζκ΄. πρὸς κη΄. ἡ βζ΄. πρὸς γη΄. ὡς δὲ ἡ ηκ΄. πρὸς κθ΄. ἡ γη΄. πρὸς δθ΄. καὶ ὡς ἄρα ἡ αε΄. πρὸς βζ΄. ἡ βζ΄. πρὸς γη΄. καὶ ἡ γη΄. πρὸς δθ΄. ηὕρηνται ἄρα τῶν αε΄. δθ΄. δύο μέσαι, ἥ τε βζ΄. καὶ ἡ γη΄.

Ταῦτα οὖν ἐπὶ τῶν γεωμετρουμένων ἐπιφανειῶν ἀποδέδεικται. ἵνα δὲ καὶ ὀργανικῶς δυνώμεθα τὰς δύο μέσας λαμβάνειν, διαπήγνυται κλινθίον ξύλινον ἢ ἐλεφάντινον ἢ χαλκοῦν, ἔχον τρεῖς κινακίσκους ἴσους ὡς

over it and the rectangle $\iota\theta$ below it, as in the second figure, until $\alpha\beta\gamma\delta$ fall in the same straight line. Let this straight line meet $\varepsilon\theta$ produced at κ.

Now since $\alpha\varepsilon \parallel \zeta\beta$,

$\alpha\kappa : \kappa\beta :: \varepsilon\kappa : \kappa\zeta$,

and since $\alpha\zeta \parallel \beta\eta$,

$\alpha\kappa : \kappa\beta :: \zeta\kappa : \kappa\eta$

$\therefore \alpha\kappa : \kappa\beta :: \varepsilon\kappa : \kappa\zeta :: \kappa\zeta : \kappa\eta$,

Again since $\beta\zeta \parallel \gamma\eta$,

$\beta\kappa : \kappa\gamma :: \zeta\kappa : \kappa\eta$,

since $\beta\eta \parallel \gamma\theta$,

$\zeta\kappa : \kappa\eta :: \eta\kappa : \kappa\theta$,

$\therefore \beta\kappa : \kappa\gamma :: \zeta\kappa : \kappa\eta :: \eta\kappa : \kappa\theta$,

But $\zeta\kappa : \kappa\eta :: \varepsilon\kappa : \kappa\zeta$,

and $\varepsilon\kappa : \kappa\zeta :: \zeta\kappa : \kappa\eta :: \eta\kappa : \kappa\theta$,

Similarly $\varepsilon\kappa : \kappa\eta :: \alpha\varepsilon : \beta\zeta$, and $\zeta\kappa : \kappa\eta :: \beta\zeta : \gamma\eta$.

Also $\eta\kappa : \kappa\theta :: \gamma\eta : \delta\theta$.

Thus, since $\alpha\varepsilon : \beta\zeta :: \beta\zeta : \gamma\eta :: \gamma\eta : \delta\theta$,

$\beta\zeta$ and $\gamma\eta$ are the required means to $\alpha\varepsilon$ and $\delta\theta$.

Such is the proof by geometrical plane surfaces. To enable us to find the two means by instrument, a block of wood, ivory, or bronze is pierced through, carrying three equal plates of extreme fineness. The middle plate is fixed, while the others can be slid along in grooves; their sizes and proportions are determined by the indivi-

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λεπτοτάτους· ὧν ὁ μὲν μέσος ἐνήρμοσται, οἱ δὲ δύο ἑκάστοι εἰσιν ἐν χολέβραις, τοῖς δὲ μεγέθεσι καὶ ταῖς συμμετρίαις ὡς ἕκαστοι ἑαυτοὺς πείθουσι. τὰ μὲν γὰρ τῆς ἀποδείξεως ὡσαύτως συντελεῖται. πρὸς δὲ τὸ ἀκριβέστερον λαμβάνεσθαι τὰς γραμμάς, φιλοτεχνητέον, ἵνα ἐν τῷ συνάγεσθαι τοὺς κινακίσκους παράλληλα διαμένῃ πάντα καὶ ἄσχαστα, καὶ ὁμαλῶς συναπτόμενα ἀλλήλοις. ἐν δὲ τῷ ἀναθήματι τὸ μὲν ὀργανικὸν χαλκοῦν ἐστι, καὶ καθήρμοσται ὑπ'αὐτὴν τὴν στεφάνην τῆς στήλης προσεμολυβδοχοημένον, ὑπ'αὐτοῦ δὲ ἡ ἀπόδειξις συντομώτερον φραζομένη καὶ τὸ σχῆμα, μετὰ τοῦ δὲ ἐπίγραμμα. ὑπογεγράφθω οὖν σοι καὶ ταῦτα, ἵνα ἔχῃς καὶ ὡς ἐν τῷ ἀναθήματι. τῶν δὲ δύο σχημάτων τὸ δεύτερον γέγραπται ἐν τῇ στήλῃ.

Δύο τῶν δοθεισῶν εὐθειῶν, δύο μέσας ἀνάλογον εὑρεῖν ἐν συνεχεῖ ἀναλογίᾳ. δεδόσθωσαν αἱ αε΄. δθ΄. συνάγω δὲ τοὺς ἐν τῷ ὀργάνῳ κίνακας, ἕως ἂν κατ'εὐθεῖαν γένηται τὰ α΄. β΄. γ΄. δ΄. σημεῖα. νοείσθω δὴ ὡς ἔχει (vulgo ἔχῃ) ἐπὶ τοῦ δευτέρου σχήματος. ἔστιν ἄρα, ὡς ἡ ακ΄. πρὸς κβ΄. ἐν μὲν ταῖς αε΄. βζ΄. παραλλήλοις ἡ εκ΄. πρὸς κζ΄. ἡ κζ΄. πρὸς κη΄. ὡς δὲ αὗται πρὸς ἀλλήλας, ἤ τε αε΄. πρὸς βζ΄. καὶ ἡ βζ΄. πρὸς γη΄. ὡσαὐτως δὲ δείξομεν, ὅτι καὶ ὡς ἡ ζβ΄. πρὸς γη΄. ἡ γη΄. πρὸς δθ΄. ἀνάλογον ἄρα αἱ αε΄, βζ΄. γη΄. δθ΄. εὕρηνται ἄρα, δύο τῶν δοθεισῶν, δύο μέσαι. ἐὰν δὲ

dual users, for the details of the proof are completed in the same way. In order to find the lines with greater accuracy, care must be taken in the manufacture that in bringing together the plates the whole apparatus remains straight and unbroken and evenly fitting together. The instrument on the monument is of bronze, and is fastened on by means of soldering right under the crown of the pillar. Below it is an abridged exposition of the proof, and the figure, and after that an epigram. This too must be appended here for your benefit, so that you may have it just as on the monument. It is the record of the two figures which is inscribed on the pillar.

"Given two straight lines, to find two means in continued proportion.

Let the straight lines be αε and δθ

I bring together the plates on the instrument, until the points α, β, γ, and δ are in the same straight line. Observe how it is in the second figure.

Now since αε || βζ, αη:ηβ :: εη:ηζ :: ηζ:ηδ.

Similarly αε:βζ :: βζ:γδ.

In the same way we can show that ζβ:γδ :: γδ:δθ

Thus αε, βζ, γδ, and δθ are in continued proportion. Thus the two means have been found for the

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αἱ δοθεῖσαι μὴ ἴσαι ὧσι ταῖς αε΄. δθ΄. ποιήσαντες αὐταῖς ἀνάλογον τὰς αε΄. δθ΄. τούτων ληψόμεθα τὰς μέσας, καὶ ἐπανοίσομεν ἐπ' ἐκείνας, καὶ ἐσόμεθα ποιηκότες τὸ ἐπιταχθέν. ἐὰν δὲ κλείους μέσας ἐπιταχθῇ εὑρεῖν, ἔτι κλείους πιναξίσους καταστησόμεθα ἐν τῷ ὀργάνῳ τῶν ληφθησομένων μέσων, ἡ δὲ ἀπόδειξις ἡ αὐτή.

32: Theo. Smyrnaeus p. 127:

Ἐρατοσθένης δὲ ἐν τῷ Πλατωνικῷ φησι, μὴ ταὐτὸν εἶναι διάστημα καὶ λόγον. ἐπειδὴ λόγος μέν ἐστι δύο μεγεθῶν ἡ πρὸς ἄλληλα ποιὰ σχέσις, γίνεται δὲ αὐτὴ καὶ ἐν διαφόροις (καὶ ἐν ἀδιαφόροις) οἷον ἐν ᾧ λόγῳ ἐστὶ τὸ αἰσθητὸν πρὸς τὸ νοητόν, ἐν τούτῳ δόξα πρὸς ἐπιστήμην, καὶ διαφέρει καὶ τὸ νοητὸν ἐπιστητοῦ, ᾧ καὶ ἡ δόξα τοῦ αἰσθητοῦ. διάστημα δὲ ἐν διαφέρουσι μόνον, ἢ κατὰ τὸ μέγεθος, ἢ κατὰ ποιότητα, ἢ κατὰ θέσιν, ἢ ἄλλως ὁπωσοῦν. δῆλον δὲ καὶ ἐντεῦθεν, ὅτι λόγος διαστήματος ἕτερον· τὸ γὰρ ἥμιου πρὸς τὸ διπλάσιον (καὶ τὸ διπλάσιον πρὸς τὸ ἥμιου) λόγον μὲν οὐ τὸν αὐτὸν ἔχει, διάστημα δὲ τὸ αὐτό.

two given straight lines.

If the given straight lines are not equal to αε and δθ, we make αε and δθ proportionate to the given lines, take the means, and then relate them to the given lines; in this way we shall have done what is required. If it is required to find more means, we must put on the instrument (one) more plate than the number of means to be found. The proof is the same."

32.

In the "Platonicus" Eratosthenes says that "difference" and "proportion" are not the same; since proportion is some qualitative relationship between two magnitudes, and this relationship exists both in things of different and things of the same categories. For example, the "proportion" of opinion to knowledge is the same as that of the thing perceived to the thing apprehended, while the thing apprehended itself differs from the knower in just the same way as the opinion from the perceiver. "Difference" is found only in things which differ in size, quality, position, or any attribute at all. From this it is clear that proportion is not the same as difference; for there is not the same proportion between half and double, double and half, though the difference is the same.

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33: Theo. Smyrn. p. 129:

ὁ δὲ Ἐρατοσθένης φησίν, ὅτι τῆς ἀναλογίας φύσις καὶ ἀρχὴ λόγος ἐστὶ καὶ πρώτη (ἀρχὴ καὶ) τῆς γενέσεως αἰτία πᾶσι τοῖς μὴ ἀτάκτως γενομένοις. ἀναλογία μὲν γὰρ πᾶσα ἐκ λόγων, λόγου δὲ ἀρχὴ τὸ ἴσον. δῆλον δὲ οὕτως. ἐν ἑκάστῳ τῶν γενῶν ἴδιόν ἐστί τι στοιχεῖον, εἰς ὃ τὰ ἄλλα ἀναλύεται, αὐτὸ δὲ εἰς μηδὲν ἐκείνων· ἀνάγκη δὲ τοῦτο ἀδιαίρετον εἶναι καὶ ἄτομον· τὸ γὰρ διαίρεσιν καὶ τομὴν ἐπιδεχόμενον συλλαβὴ λέγεται καὶ οὐ στοιχεῖον. τὰ μὲν οὖν τῆς οὐσίας στοιχεῖα κατὰ οὐσίαν ἀδιαίρετά ἐστι, τὰ δὲ τοῦ ποίου κατὰ τὸ ποιόν, τὰ δὲ τοῦ ποσοῦ κατὰ τὸ ποσόν. ὅλως δὲ ἕκαστον κατὰ τοῦτο ἄτομον καὶ ἕν, καθ' ὃ στοιχεῖόν ἐστι συνθέτου τινὸς ἢ μικτοῦ. τοῦ μὲν οὖν ποσοῦ στοιχεῖον ἡ μονάς, τοῦ δὲ πηλίκου στιγμή, λόγου δὲ καὶ ἀναλογίας ἰσότης. οὔτε γὰρ μονάδα ἔτι διελεῖν ἔστιν εἰς τὸ ποσόν, οὔτε στιγμὴν εἰς τὸ πηλίκον, οὔτε ἰσότητα εἰς πλείους λόγους. γίνεται δὲ ἀριθμὸς μὲν ἐκ μονάδος, γραμμὴ δὲ ἐκ στιγμῆς, λόγος δὲ καὶ ἀναλογία ἐξ ἰσότητος, τρόπον δὲ οὐ τὸν αὐτὸν ἕκαστον τούτων. ἀλλὰ μονὰς μὲν πολλαπλασιαζομένη ὑφ' ἑαυτῆς οὐδὲν γεννᾷ ὡς οἱ ἄλλοι ἀριθμοί, τὸ γὰρ ἅπαξ ἓν ἕν· κατὰ σύν-

33.

Eratosthenes says that proportion is the nature and origin of progression and the first cause of all orderly arrangements: for every progression consists of proportions, and the basis of proportion is equality. The proof of this is as follows.

Every class of thing has some element into which it can be broken up, while the element itself cannot: it must be indivisible and unsplittable, for anything susceptible of division or splitting is a compound, not an element. Now natural elements are indivisible according to nature, while those of quality are indivisible with regard to quality and those of quantity with regard to quantity. Generally, each element is unsplittable and single in respect of the composition or mixture of which it is an element. Now the element of quantity is the unit, that of size the point, that of proportion and progression inequality. Neither is it possible, with reference to quantity, to divide the unit, nor with reference to size the point, nor can equality be split into a number of proportions. Number originates from the unit, the line from the point, proportion and progression from equality, though all these do not happen in the same way. Unity multiplied by itself does not generate anything like other numbers, for once

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θεσιν δὲ αὔξεται μέχρις εἰς ἄπειρον· στιγμή τε οὔτε κατὰ πολλαπλασιασμὸν οὔτε κατὰ σύνθεσιν. ἀλλὰ κατὰ συνέχειαν ῥυεῖσά τε καὶ ἐνεχθεῖσα γραμμὴν ἀποτελεῖ, γραμμὴ δὲ ἐπιφάνειαν, ἐπιφάνεια δὲ σῶμα. καὶ μὴν ὁ τῶν ἴσων λόγος οὐκ αὔξεται συντιθέμενος· πλειόνων γὰρ ἴσων ἐξῆς τιθεμένων ὁ τῆς περιοχῆς λόγος ἐν ἰσότητι διαμένει. διὸ καὶ συμβαίνει, τὴν στιγμὴν μὴ εἶναι μέρος γραμμῆς μηδὲ τὴν ἰσότητα λόγου, τὴν μέντοι μονάδα ἀριθμοῦ· μόνη γὰρ αὐτὴ συντιθεμένη λαμβάνει τινὰ αὔξησιν. αἴτιον δὲ τοῦ λεχθέντος, ὅτι διαστήματος ἄμοιρος ἰσότης, καθάπερ καὶ ἡ στιγμὴ μεγέθους.

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34: Theo. p. 168:

ὁ δὲ Ἐρατοσθένης φησὶν, ὅτι πᾶς μὲν λόγος ἢ κατὰ διάστημα, ἢ κατὰ τοὺς ὅρους αὔξεται, τῇ δὲ ἰσότητι συμβέβηκε διαστήματος μὴ μετέχειν. εὔδηλον δὲ ὅτι κατὰ τοὺς ὅρους μόνους αὐξηθήσεται. λαβόντες δὴ τρία μεγέθη, καὶ τὴν ἐν τούτοις ἀναλογίαν, κινήσομεν τοὺς ὅρους, καὶ δείξομεν, ὅτι πάντα τὰ ἐν τοῖς μαθήμασιν ἐξ ἀναλογίας ποσῶν τινων σύγκειται, καὶ ἔστιν αὐτῶν ἀρχὴ καὶ στοιχεῖον ἡ τῆς ἀναλογίας φύσις, τὰς δὲ ἀποδείξεις ὁ μὲν Ἐρατοσθένης φησὶ παραλείψειν.

one is one: but by addition it can be increased right up to infinity; while a point cannot be increased by either multiplication or addition. Instead, by flowing and being moved along it makes a line, the line a plane surface and the plane a solid. Similarly the proportion of equal quantities is not increased by being added together, for when a number of equals are added together the proportion of the sum remains at equality. Thus too it comes about that the point is not part of a line, nor yet equality of proportion, though the unit is part of a number. It alone increases by addition. The reason for this is that equality does not partake of difference, in the same way that the point does not partake of size.

34.

Eratosthenes says that every progression increases either by a (common) difference or by its terms; but equality does not partake of difference, and can obviously be increased only by its terms. Thus, if we take three magnitudes and the relationship between them, and manipulate the terms, we shall show that all branches of mathematics consist of relationships of some magnitudes or other, and of these the basis and element is the nature of relationship. Eratosthenes says he will omit the proofs.

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35: Nicomachi enchiridii harmon. I p. 79 ed. Meursii:

καὶ προσεκθησόμεθα τὴν τοῦ Πυθαγορικοῦ λεγομένου κανόνος κατατομὴν ἀκριβῶς κατὰ τὸ βούλημα τοῦδε τοῦ διδασκάλου συντετελεσμένην, οὐχ ὡς Ἐρατοσθένης παρήκουσεν.

36: Ptolemaei Harmon. II, 14 (Westphal, p. 89):

τὸ μὲν οὖν πρῶτον κανόνιον περιέχει τὰ ἐναρμόνια γένη· ἐπὶ μὲν τοῦ πρώτου σελίδίου, τὸ κατὰ Ἀρχύταν . . . . . ἐπὶ δὲ τοῦ δευτέρου, τὸ κατὰ Ἀριστόξενον . . . . . ἐπὶ δὲ τοῦ τρίτου, τὸ κατὰ Ἐρατοσθένην, ἐν λόγοις τῷ τῶν ιε΄ πρὸς ιθ΄ καὶ ἐπι τριακοστογδόῳ, καὶ ἐπι τριακοστεννάτῳ. (lacuna)

p. 419 Κανόνιον α΄ Ἐρατοσθένους ἁρμονικά	p. 423 Κανόνιον β΄ Ἐρατοσθένους χρωματικά	p. 433 Κανόνιον γ΄ Ἐρατοσθένους διατονικά
α | ξ	α | ξ	α | ξ
β | οϛ	β | οβ	β | ξξ
γ | οη	γ | οϛ	γ | οε
δ | π	δ | π	δ | π
ε | ϛ	ε | ϛ	ε | ϛ
ϛ | ριδ	ϛ | ρη	ϛ | ρα
ζ | ριζ	ζ | ριδ	ζ | ριγ
η | ρκ	η | ρκ	η | ρκ

37: Placita Philosophorum (Plutarch ?) p. 884 B:

περὶ χρόνου. Ἐρατοσθένης (τὸν χρόνον φησὶ) τὴν τοῦ ἡλίου πορείαν.

35.

I shall set out also the summary of what is called the Pythagorean canon, accurately completed according to the wish of this master, and not as Eratosthenes misunderstood it.

36.

The first Canon contains the types of scales: on the first page that according to Archytas. . . . . on the second, that according to Aristoxenus. . . . . on the third, that according to Eratosthenes, in the proportions 15 to 19, thirty-eighth and thirty-ninth,

p. 419 Canon 1		p. 423 Canon 2		p. 433 Canon 3	
Eratosthenes' Harmonics		Eratosthenes' Chromatics		Eratosthenes' Diatonics	
1	60	1	60	1	60
2	74	2	72	2	67
3	78	3	76	3	75
4	80	4	80	4	80
5	90	5	90	5	90
6	114	6	108	6	101
7	117	7	114	7	113
8	120	8	120	8	120

37.

According to Eratosthenes, time consists of the sun's journey.

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38: Iambl. ap. Stob. Ecl. I p. 904:

ἄλλη τοίνυν αἵρεσις τῶν Πλατωνικῶν οὐ κατὰ τοὺς δημιουργικοὺς κλήρους οὐδὲ κατὰ τὰς διαιρέσεις τῶν κρειττόνων γενῶν, οἷον θεῶν ἀγγέλων δαιμόνων ἡρώων, οὐδὲ κατὰ τὰς νομὰς τοῦ παντὸς διακρίνει τὰς ἀπὸ τῶν διαφερόντων τόπων καταβάσεις τῶν ψυχῶν· τιθεμένη δὲ τὴν ψυχὴν ἀεὶ εἶναι ἐν σώματι, ὥσπερ ἡ Ἐρατοσθένους καὶ Πτολεμαίου τοῦ Πλατωνικοῦ καὶ ἄλλων, ἀπὸ σωμάτων αὐτὴν λεπτοτέρων εἰς τὰ ὀστρεώδη πάλιν εἰσοικίζει σώματα· διατρίβειν μὲν γὰρ αὐτὴν εἰς μοῖράν τινα τοῦ αἰσθητοῦ, καθήκειν γεμὴν εἰς τὸ στερεὸν σῶμα ἄλλοτε ἀπ' ἄλλων τοῦ παντὸς τόπων.

39: The Sieve:

Nicomachus Arithmet. I, 13, 2-4:

ἡ δὲ τούτων γένεσις ὑπὸ Ἐρατοσθένους καλεῖται Κόσκινον, ἐπειδὴ ἀναπεφυρμένους τοὺς περισσοὺς λαβόντες καὶ ἀδιακρίτους, ἐξ αὐτῶν τῇ τῆς γενέσεως μεθόδῳ ταύτῃ διαχωρίζομεν, ὡς δι' ὀργάνου ἢ κοσκίνου τινός· καὶ ἰδίᾳ μὲν τοὺς πρώτους καὶ ἀσυνθέτους, ἰδίᾳ δὲ τοὺς δευτέρους καὶ συνθέτους, χωρὶς δὲ τοὺς μικτοὺς εὑρίσκομεν. ἔστι δὲ ὁ τρόπος τοῦ κοσκίνου τοιοῦτος· ἐνθέμενος τοὺς ἀπὸ τριάδος πάντας ἐφεξῆς περισσοὺς ὡς δυνατὸν μάλιστα ἐπὶ μήκιστον στίχον, ἀρξάμενος ἀπὸ τοῦ πρώτου ἐπισκοπῶ, τίνας οἷός τε ἐστι μετρεῖν, καὶ εὑρίσκω δύνατὸν ὄντα τοὺς

38.

There is another sect of Platonists which distinguishes the descents of souls from better places not by dispensations of a Creator nor yet according to divisions into superior races such as gods, angels, spirits, and heroes, nor by districts of the universe; but lays it down that the soul is always in a body, like the sect of Eratosthenes, Ptolemy the Platonist, and others, and removes it in turn from more subtle bodies into shell-like bodies. Its manner of life, they say, partakes to a certain extent of the sensible; at least, it comes into its solid body at different times from different parts of the universe.

39: The Sieve:

The formation of these is called by Eratosthenes the "Sieve"; for taking the odd numbers as they are, mixed up and undistinguished, by this method of (finding their) formation we separate them out as though by means of an instrument or sieve. Thus we find separately the prime and simple numbers, the secondary and compound, and in another classification those of mixed character. The method of the Sieve is as follows:

I set out all the odd numbers in succession, beginning with three, in the longest row possible. Beginning with the first, I then examine which it is able to divide

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δύο μέσους παραλείποντας μετρεῖν, μέχρις οὗ ἂν προχωρεῖν ἐθέλωμεν, οὐχ ὡς ἔτυχε δὲ καὶ εἰκῇ μετροῦντα, ἀλλὰ τὸν μὲν πρῶτως κείμενον, τουτέστι τὸν δύο μέσους ὑπερβαίνοντα κατὰ τὴν τοῦ πρωτίστου ἐν τῷ στίχῳ κειμένου ποσότητα μετρήσει, τουτέστι κατὰ τὴν ἑαυτοῦ· τρὶς γὰρ· τὸν δ'ἀπ'ἐκείνου δύο διαλείποντα κατὰ τὴν τοῦ δευτέρου τεταγμένου· πεντάκις γάρ· τὸν δὲ περαιτέρω πάλιν δύο διαλείποντα κατὰ τὴν τοῦ τρίτου τεταγμένου· ἑπτάκις γάρ. τὸν δὲ ἔτι περαιτέρω ὑπὲρ δύο κείμενον κατὰ τὴν τοῦ τετάρτου τεταγμένου· ἐνάκις γάρ· καὶ ἐπ'ἄπειρον τῷ αὐτῷ τρόπῳ. εἶτα μετὰ τοῦτον ἀπ'ἄλλης ἀρχῆς ἐπὶ τὸν δεύτερον ἐλθὼν σκοπῶ, τίνας οἷός τέ ἐστι μετρεῖν, καὶ εὑρίσκω πάντας τοὺς τετράδα διαλείποντας, ἀλλὰ τὸν μὲν πρῶτον κατὰ τὴν τοῦ ἐν τῷ στίχῳ πρώτου τεταγμένου ποσότητα· τρὶς γάρ· τὸν δὲ δεύτερον κατὰ τὴν τοῦ δευτέρου· πεντάκις γάρ· τὸν δὲ τρίτον κατὰ τὴν τοῦ τρίτου· ἑπτάκις γάρ· καὶ τοῦτο ἐφεξῆς ἀεί.

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Cotaeteris: 40-41:

40: Geminus apud Petavium p. 34 C:

ὅθεν τὰ Ἴσια πρότερον μὲν ἤγετο κατὰ τὰς χειμερινὰς τροπάς, ὡς καὶ Ἐρατοσθένης ἐν τῷ περὶ τῆς ὀκταετηρίδος ὑπομνήματι μνημονεύει.

The
held about th
Eratosthenes

evenly. I find that it can divide into those which pass over two intervening numbers, as far as we are willing to go on, not dividing at random and haphazard; and it will divide that which lies first--that is, the one that passes over two in between--according to the magnitude of the number lying first in the row, that is, its own magnitude, or three times. The number which passes by two from that it will measure according to the magnitude of that in the second position, or five times, and that two further on according to that of the third in order, or seven times; that two more further on by the magnitude of the fourth in order, or nine times; and so on indefinitely. Next after this, starting again, I pass to the second number and look into which it can divide, and find it will divide into all those that pass over a set of four, the first by the magnitude of the number first in order in the row, or three times; the second, according to that of the second, or five times; the third according to that of the third; and so on in order for ever.

The Eight-Year Cycle: 40-41:

40.

Therefore the festival of Isis was formerly held about the time of the winter solstice, according to Eratosthenes in his essay on the "Eight Years".

41: Ach. Tat. in Arati Phaen. p. 139:

λέγεται δὲ ἐνιαυτὸς ἡ ἀπὸ τοῦ ζῳδίου εἰς τὸ αὐτὸ ἀποκατάστασις αὐτοῦ ἐν ἡμέραις τξε΄καὶ ἐλαχίστῳ μορίῳ. ἀπὸ δὲ σημείου εἰς σημεῖον ἀποκαθίσταται ἐν ὀκτὼ καὶ δεκαετηρίδι, εἴ γε γνήσιόν ἐστι τὸ σύγγραμμα Ἐρατοσθένους. οὗτος γὰρ ἀνέγραψεν δεινύς, ὡς οὐκ εἴη Εὐδόξου.

Ariston: 42-43:

42: Strabo 2. 15:

. . . . . καίπερ πλείστοις ἐντυχὼν ὡς εἴρηκεν αὐτὸς ἀγαθοῖς ἀνδράσιν. Ἐγένοντο γάρ, φησὶν ὁ Ἐρατοσθένης, ὡς οὐδέποτε, κατὰ τοῦτον τὸν καιρὸν ὑφ' ἕνα περίβολον καὶ μίαν πόλιν οἱ κατ'Ἀρίστωνα καὶ Ἀρκεσίλαον ἀνθήσαντες φιλόσοφοι. οὐκ ἰκανὸν δ'οἶμαι τοῦτο ἀλλὰ τὸ κρίνειν καλῶς, οἷς μᾶλλον προσιτέον. ὁ δὲ Ἀρκεσίλαον καὶ Ἀρίστωνα τῶν καθ'ἑαυτὸν ἀνθησάντων κορυφαίους τίθησιν· Ἀπελλῆς τε αὐτῷ πολὺς 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 ἐμ-

41.

A year is the name given to its return to the same part of the zodiac, lasting 365 days and a small part of a day. The return from one sign to the next occupies a period of eighteen years, if the record of Eratosthenes is genuine. It was he who wrote about it showing that it was not introduced (the Athenian calendar) by Eudoxus.

Ariston: 42-43.

42.

. . . . . although, as he himself says, he fell in with very many able men. "At this period" says Eratosthenes, "there were more philosophers than at any other in history in the compass of one city, namely those who flourished in the time of Ariston and Arcesilaus."

I myself do not think this mere contact with genius is enough: we must rather distinguish those whom we should follow. Eratosthenes puts Arcesilaus and Ariston at the head of those who flourished in his own time. He also makes much of Apelles and of Bion, who, he says, was the first to adorn philosophy with embroidery: yet he adds that people would often say of him: ". . . . . (a thigh) such as Bion showed from his rags." Indeed, in these very remarks he shows a considerable weakness

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φαίνει τῆς ἑαυτοῦ γνώμης, ὃς τοῦ Ζήνωνος τοῦ Κιτιέως γνώριμος γενόμενος Ἀθήνησι, τῶν μὲν ἐκείνου διαδεξαμένων οὐδενὸς μέμνηται, τοὺς δ'ἐκείνῳ διενεχθέντας, καὶ ἂν διαδοχὴ οὐδεμία σώζεται, τούτους ἀνθῆσαί φησι κατὰ τὸν καιρὸν ἐκεῖνον.

43: Athenaeus VII p. 281 C:

Καὶ τῶν Στωικῶν δὲ τινες συνεφήψαντο ταύτης τῆς ἡδονῆς· Ἐρατοσθένης γοῦν ὁ Κυρηναῖος, μαθητὴς γενόμενος Ἀρίστωνος τοῦ Χίου, ὃς ἦν εἷς τῶν ἀπὸ τῆς Στωᾶς, ἐν τῷ ἐπιγραφομένῳ Ἀρίστωνι παρεμφαίνει τὸν διδάσκαλον ὡς ὕστερον ὁρμήσαντα ἐπὶ τρυφήν, λέγων ὧδε· Ἤδη δέποτε καὶ τοῦτον πεφώρακα τὸν τῆς ἡδόνης καὶ ἀρέτης μεσότοιχον διορύττοντα, καὶ ἀναφαινόμενον παρὰ τῇ ἡδονῇ.

Good and Evil: 44-47:

44: Stobaei Serm. CXV p. 592, 32. (Gesn. a. 1559):

Ἐρατοσθένης τῆς ἡλικίας ἔφη τὸ μὲν ἀκμάζον ἔαρ εἶναι, τὸ δὲ μετὰ τὴν ἀκμὴν θέρος καὶ μετόπωρον, χειμῶνα δὲ τὸ γῆρας.

45: Harpocratio p. 28:

Ἁρμοσταί, οἱ ὑπὸ Λακεδαιμονίων εἰς τὰς ὑπηκόους πόλεις ἄρχοντες ἐκπεμπόμενοι, ὡς Ἐρατοσθένης ἐν τοῖς περὶ ἀγαθῶν καὶ κακῶν φησι.

of his own intelligence: after being acquainted with Zeno the Citian at Athens, he mentions none of his successors, but speaks of those who differed from him and who had no successors as flourishing at that time.

43.

Some even of the Stoics joined in grasping at this "pleasure". At least Eratosthenes of Cyrene, who was a pupil of Ariston of Chios, one of the Stoic school, reveals in his work entitled "Ariston" his master in later life eagerly devoting himself to luxury. These are his words: "I have sometimes detected even him undermining the party-wall between pleasure and virtue, and making his appearance in the home of pleasure."

Good and Evil: 44-47.

44.

Eratosthenes said that the adolescent part of life is spring, the part that follows adolescence is summer and autumn, while old age is winter.

45.

Harmosts: Governors sent out to subject states by the Spartans, according to Eratosthenes in his "Good and Evil".

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46: Clem. Alex. Strom. IV p. 496 C:

Ἐκεῖ οὐ μόνον Αἰσώπιοι καὶ Μακεδόνες καὶ Λάκωνες στρεβλούμενοι ἐκφέρουν, ὡς φησιν Ἐρατοσθένης ἐν τοῖς περὶ ἀγαθῶν καὶ κακῶν, ἀλλὰ καὶ Ζήνων ὁ Ἐλεάτης, ἀναγκαζόμενος κατεῖπεῖν τι τῶν ἀπορρήτων, ἀντέσχεν πρὸς τοὺς βασάνους, οὐδὲν ἐξομολογούμενος· ὅς γε καὶ τελευτῶν τὴν γλῶτταν ἐκτρώγων, προσέπτυσε τῷ τυράννῳ, ὃν οἱ μὲν Νέαρχον, οἱ δὲ Δημύλον προσαγορεύουσιν.

47: Diog. Laert. VI. 93:

Ἐρατοσθένης δέ φησιν, ἐξ Ἱππαρχίας περὶ ἧς λέξομεν, γενομένου παιδὸς αὐτῷ (Cratoti Cynico), ὄνομα Πασικλέους, ὅτ'ἐξ ἐφήβων ἐγένετο, ἀγαγεῖν αὐτὸν ἐπ'οἴκημα παιδίσκης, καὶ φάναι τοῦτον αὐτῷ πατρῷον εἶναι τὸν γάμον.

Wealth and Poverty: 48-49:

48: Diog. Laert. IX. 66 (de Pyrrhone):

εὐσεβῶς δὲ καὶ τῇ ἀδελφῇ συνεβίω μαίᾳ οὔσῃ, καθά φησιν Ἐρατοσθένης ἐν τῷ περὶ πλούτου καὶ πενίας, ὅτι καὶ οὗτος φέρων εἰς τὴν ἀγορὰν ἐπίπρασκεν ὀρνίθια, εἰ τύχοι, καὶ χοιρίδια· καὶ τὰ ἐπὶ τῆς οἰκίας καθάροι ἀδιαφόρως.

46.

It was not only Aesopians, Macedonians, and Spartans, according to Eratosthenes in his "Good and Evil", who bore torture stoutly. Zeno of Elea, too, when he was being forced to give away some secret, held out against the torments and admitted nothing. He even finished by biting off his tongue and spitting it at the tyrant, whom some name as Nearchus and others as Demylus.

47.

Eratosthenes says that a son named Pasicles was born to him (Crates the Cynic) by Hipparchia, of whom I shall have something to say; and when he reached manhood Crates took him to a harlot's house and told him that this was his father's marriage.

Wealth and Poverty: 48-49:

48.

(Pyrrho) lived respectably with his sister, who was a nurse, according to Eratosthenes in his "Wealth and Poverty": he himself used to take birds and piglings to market on occasion and sell them. He even used to do the household cleaning without making any distinctions.

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49: Plutarch, Themistocles p. 125, E:

ὁ δὲ Ἐρατοσθένης ἐν τοῖς περὶ πλούτου προσιστόρησε, διὰ γυναικὸς Ἐρετριακῆς ἦν ὁ χιλίαρχος εἶχε τῷ Θεμιστοκλεῖ τὴν πρὸς αὐτὸν (regem) ἔντευξιν γενέσθαι καὶ σύστασιν.

Letters: 50-51:

50: Athenaeus X p. 418, A:

Ἐκ τούτων εἰκὸς ἐστι καὶ Ἐρατοσθένη ἐν ταῖς Ἐπιστολαῖς, Ἡμπελον, φῆσαι, ἐρωτηθέντα, τί αὐτῷ δοκοῦσιν εἶναι Βοιωτοί, εἰπεῖν· τί γὰρ ἄλλο ἢ τοιαῦτα ἐλάλουν, οἷα ἂν καὶ τὰ ἀγγεῖα φωνὴν λαβόντα, πόσον ἕκαστος χωρεῖ.

51: Athenaeus XI p. 482, A:

Ἐρατοσθένης δ'ἐν τῇ πρὸς Ἀγήτορα τὸν Λάκωνα ἐπιστολῇ ὡς κυαθῶδες ἀγγεῖον τὸ κυμβίον παραδίδωσι, γράφων οὕτως· Θαυμάζουσι δὲ οἱ αὐτοί, καὶ πῶς κύαθον μὴ κεκτημένος, ἀλλὰ κυμβίον μόνον, φιάλην προσεικάζετο. δοκεῖ δή μοι τὸ μὲν τῆς τῶν ἀνθρώπων χρείας (ἕνεκα), τὸ δὲ τῆς τῶν θεῶν τιμῆς εἰς τὴν κρῆσιν παρειληφέναι. κυάθῳ μὲν οὖν οὐδὲν ἐχρῶντο τότε, οὐδὲ κοτύλῃ· κρατῆρα γὰρ ἵστασαν τοῖς θεοῖς, οὐκ ἀργυροῦν, οὐδὲ λιθοκόλλητον, ἀλλὰ τῆς Κωλιάδος γῆς. τοῦτον δ'ὀσάκις ἐπιπλη-

49.

Eratosthenes further relates in his work on "Wealth" that it was through an Eretrian woman in the possession of the chiliarch that Themistocles first came into contact with the king and became on friendly terms with him.

Letters: 50-51:

50.

It is probably for these reasons that Eratosthenes said in his letters that Pempelus, when asked what he thought of the Boeotians, answered: "They just talk nonsense about vessels that receive the power of speech and argue about their respective capacities."

51.

In his letter to Agetor the Spartan Eratosthenes gives the "cymbium" as a cup-like vessel. This is what he writes: "The same people wonder how it is that, when he possessed no cup, but only a cymbium, he possessed a bowl as well. Now I think that he obtained the one for human use, the other for use in honour of the gods. They used at that time not to use a cup at all, or a goblet. They used to offer to the gods a mixing-bowl, not of silver, nor yet inlaid, but of Colian clay. As often as they

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ρώσαιεν, ἀποσπείσαντες τοῖς θεοῖς ἐκ τῆς φιάλης ὠνοχόουν ἐφεξῆς, τὸ νεοπρᾶτα βάπτοντες τῷ κυμβίῳ, καθὰ καὶ νῦν παρ' ὑμῖν ποιοῦσιν ἐν τοῖς φιδιτίοις. εἰ δέ ποτε πλεῖον πιεῖν βουληθεῖεν, προσπαρετίθεσαν τοὺς καλουμένους κοτύλους, πάλλιστα καὶ εὐποτώτατα ἐκπωμάτων. ἦσαν δὲ καὶ οὗτοι τῆς αὐτῆς περαμείας.

filled this up they first poured libations to the gods and then poured wine in turn from the bowl, dipping the new mixture with the cymbium, as is done even now at our public dinners. If at any time they wished to drink in larger quantities, they placed also in position what are called "cotyli", the most beautiful of drinking-vessels and the pleasantest to drink from. These too were of the same clay".

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OLD COMEDY: 52-91:

Scenographicus: 52-56:

52: Pollux I. 145:

τὸ δὲ κωλύον ἐκπίπτειν τὸν προχὸν ἐμπηγνύμενον τῷ ἄξονι, παραξόνιον, ... ἢ ὡς Ἐρατοσθένης ἔμβολος.

53: Pollux X. 1:

ἐνέτυχόν ποτε βιβλίῳ τῷ τῶν Ξενοφῶντος Ἱππικῶν ἐξηγεῖσθαι λέγοντι. εὑρὼν δὲ . . . . . τοῦτο Ἐρατοσθένην ἐν τῷ Σκευογραφικῷ λέγειν, ἐπῆλθέ μοι ζητεῖν τὸ τοῦ Ἐρατοσθένους βιβλίον διὰ τὸ παραγωγὸν τῆς χρήσεως· ὡς δὲ εὗρον μόλις, οὐδὲν εἶχεν ὧν ἤλπισα.

54: Pollux X. 60 (de ἀναλογείῳ):

παρὰ μέντοι Ἐρατοσθένει ἐν τοῖς περὶ κωμῳδίας, ὡς ἔχοιμέν τινα τοῦ ὀνόματος τοῦδε ἀποστροφήν, εὑροις ἂν τοὔνομα ἐπὶ τοῦ σκεύους τοῦ τοῖς βιβλίοις χρησίμου.

55: Erotiani gloss. Hippocr. p. 394:

Χεῖαι. Ἐπικλῆς φησι, ψυχαί· οὐκ ὀρθῶς· χεῖαι γάρ εἰσιν ὑποδήματος γυναικείου εἶδος, καθά φησιν Ἐρατοσθένης καὶ Καλλίστρατος ἐν δ' Συμμίκτων.

OLD COMEDY: 52-91:

Scenographicus: 52-56:

52.

The part which is fixed on the axle and prevents the wheel from coming off is called "linch-pin" . . . . . or, according to Eratosthenes, "peg".

53.

I once came upon a book of Xenophon's, "Horsemanship", that claimed to explain it. When I found that Eratosthenes mentioned it in his "Treatise on Furniture", it occurred to me to look for Eratosthenes' book, because of the perversion of the usage. When I found it with difficulty, it contained none of what I hoped for.

54.

In the work of Eratosthenes on "Comedy", so that we may have some explanation of this word, you may find the word standing for an article of furniture used for books.

55.

Cheiae: According to Epicles, spirits. This is incorrect. According to Eratosthenes and to Callistratus in Book 6 of his "Miscellany", Cheiae are a kind of footwear for women.

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56: Hesychius:

Βασιλίδες. ὑπόδημα γυναικεῖον καὶ αὐλητικόν, ὡς Ἐρατοσθένης, ἀπὸ τοῦ βασιλέως κληθέντος.

Architectonicus: 57-58:

57: Schol. Ap. Rhod. I, 567:

ἱστέον, ὅτι Ἐρατοσθένης ἐν τῷ Ἀρχιτεκτονικῷ μέρη ταῦτά φησιν ἱστοῦ, Πτέρνη, Θωράκιον, Ἠλακάτη, Καρχήσιον, Κεραία, Ἰκρίον.

58: Schol. Ap. Rhod. III, 232:

τὴν δὲ κατασκευὴν τῶν ἀρότρων Ἐρατοσθένης ἐν τῷ Ἀρχιτεκτονικῷ καταγράφει.

59: Plut. Moralia p. 785 B:

Πῶλον δὲ τὸν τραγῳδὸν Ἐρατοσθένης καὶ Φιλόχορος ἱστοροῦσιν ἑβδομήκοντα ἔτη γεγενημένον, ὥστε τραγῳδίας ἐν τέτταρσιν ἡμέραις διαγωνίσασθαι μικρὸν ἔμπροσθεν τῆς τελευτῆς.

Aristophanes: 60-78:

60: Schol. Eq. 96 3:

μολγόν. Ἐρατοσθένης μολγὸν καὶ ἀμολγὸν τὸν αὐτόν (τὸ αὐτό). ἀμολγοὺς δὲ παρὰ τούτοις φησὶ λέγεσθαι τοὺς ἀμελγόντας τὰ κοινά. Ἡσίοδος δὲ μᾶζά τ' ἀμολγαίη.

56.

Basilides: A woman flute-player's footwear, according to Eratosthenes, derived from "basileus" (king).

Architectonicus: 57-58:

57.

It is worthy of note that Eratosthenes, in his "Engineering", gives the parts of the mast as follows: heel, crow's-nest, top-mast, mast-head, yard-arm, step.

58.

Eratosthenes describes the furniture of the plough in his "Engineering".

59.

Eratosthenes and Philochorus relate that Polus the tragic actor, when seventy years old, acted eight whole tragedies in four days shortly before his death.

Aristophanes: 60-78:

60.

Molgos (hide, skin): Eratosthenes says that "molgos" and "amolgos" are the same. He says that among these people those who "milk the commonwealth" are called "amolgi". Hesiod, however, uses it of "shepherd's loaf".

61: Schol. Nub. 448:

Κύρβις οὖν ἡ περιέχουσα τὰς ἱερὰς γραφὰς στήλη· ἢ ὡς Ἐρατοσθένης φησὶν ἄξων Ἀθήνησιν οὕτω καλούμενος, ἐν ᾧ οἱ νόμοι περιέχονται.

62: Schol. Nub. 549:

δῆλον δέ, ὅτι πρότερος ὁ Μαρικᾶς ἐδιδάχθη τῶν δευτέρων Νεφελῶν. Ἐρατοσθένης δέ φησι, Καλλίμαχον ἐγκαλεῖν ταῖς διδασκαλίαις, ὅτι φέρουσιν ὕστερον τρίτῳ ἔτει τὸν Μαρικᾶν τῶν Νεφελῶν, σαφῶς ἐνταῦθα εἰρημένου, ὅτι πρότερον καθεῖται. λανθάνει δ'αὐτόν, φησιν, ὅτι ἐν μὲν ταῖς διδαχθείσαις εἰ λέγεται οὐδὲν ἄτοπον. αἱ δὲ διδασκαλίαι δὲ δῆλον ὅτι τὰς διδαχθείσας φέρουσι. πῶς δ'οὐ συνεῖδεν, ὅτι καὶ ἐν τῷ Μαρικᾷ προτετελεύτηκε Κλέων, ἐν δὲ ταῖς Νεφέλαις λέγεται· [Εἶτα τὸν θεοῖσιν ἐχθρὸν βυρσοδέψην . . . . .

63: Schol. Nub. 967:

οὕτως Ἐρατοσθένης. Φρύνιχος αὐτοῦ τούτου τοῦ ἄσματος μέμνηται, ὡς Λαμπρονλέους ὄντος, τοῦ Μίδωνος υἱοῦ ἢ μαθητοῦ. ἔχει δὲ οὕτως·

Παλλάδα περσέπολιν, δεινὰν θεόν, ἐγρεκύδοιμον, - ποτινλήζω, πολεμαδόκον - ἀγνάν, παῖδα Διὸς μεγάλου δαμασίππον.

61.

A "cyrbis", then, is a column with sacred writings round it; or, according to Eratosthenes, what is at Athens called an "axle", round which the laws are inscribed.

62.

It is obvious that the "Maricas" was produced before the second edition of the "Clouds". Eratosthenes says that Callimachus reproaches the Catalogue of Stage Productions for containing the "Maricas" two years later than the "Clouds", though it is clearly stated there that it was put on first. "He does not realize," he says, "that if it is mentioned among the productions there is nothing strange about it. Obviously the Catalogue of Productions contains (all) that are produced. Surely he must have been conscious that in the 'Maricas' Cleon is already dead, while in the 'Clouds' are the words: 'Then the tanner, hateful to the gods. . . . .'."

63.

This is what Eratosthenes says: "Phrynichus mentions this same song as one of Lamprocles, son or pupil of Midon. It goes like this:

'Thee I call, Pallas, destroyer of cities, dread goddess, rouser of the deep, warlike, holy, horse-taming daughter of great Zeus. . . . .'"

Καὶ κατὰ Λαμπροκλέα ὑποτίθησι κατὰ λέξιν. τὸ δὲ τηλέπορον βόαμα Κυδίδου τοῦ Ἑρμιονέως πιθαρῳδοῦ.

64: Schol. Vesp. 239:

τοῦ κορκόρου. πρὸς τὸν Λυκοφρόνα, κόρκορον λέγοντα ἰχθύδιόν τι. ἠπάτηται δέ, ὡς φησιν Ἐρατοσθένης. ἔστι γὰρ λάχανόν τι ἄγριον καὶ εὐτελὲς ἐν Πελοποννήσῳ· ὡς καὶ ἡ παροιμία· καὶ κόρκορος ἐν λαχάνοισι.

65: Harpocratio, p. 44:

Δεκάζων. Ἐρατοσθένης δὲ ἐν τοῖς περὶ τῆς ἀρχαίας κωμῳδίας, πόθεν τὸ πρᾶγμα εἴρηται, δηλοῖ οὕτω λέγων. Λύκος ἐστὶν ἥρως πρὸς τοῖς ἐν Ἀθήναις δικαστηρίοις τοῦ Θηρίου μορφὴν ἔχων, πρὸς ὃν οἱ δωροδοκοῦντες κατὰ δέκα γιγνόμενοι συνεστρέφοντο.

66: Schol. Vesp. 704:

ἐπισίζῃ. Λυκόφρων καὶ οἱ περὶ Ἐρατοσθένη τὸ ἐπαφιέναι τοὺς κύνας, ἐπισίζειν.

67: Schol. Vesp. 1032:

Κύννης. πόρνης. καὶ Κύνναν καὶ Σαλαβάκχω. Ἐρατοσθένην δὲ ἀγνοήσαντα τὴν Κύνναν, ὅτι πόρνη, οἱ μέν τινες προφέρεσθαί φασι κυνός, ὡς Ἐπιμενίδης οἱ δὲ πυρός· οὐκ εὖ.

68: Argumentum Pacis:

φέρεται ἐν ταῖς διδασκαλίαις, ὅτι καὶ ἑτέραν

He puts it also under the heading of Lampocles. "The far-reaching cry" is from Cydides, the bard of Hermione.

64.

Lycophron says that "corcorus" is a kind of small fish. According to Eratosthenes, he is wrong; it is a kind of wild herb, cheap in the Peloponnese. The proverb bears this out: "Corcorus also among the herbs....."

65.

Decazon: In his work on "Ancient Comedy" Eratosthenes explains the origin of the term in the following words: "Lycus is a hero, in the shape of a beast, standing near the law-courts at Athens. Near his statue the receivers of bribes used to gather in tens."

66.

"Hisses on": Lycophon and the followers of Eratosthenes say that "episizein" means "to set the dogs at".

67.

Of Cynna: A harlot. "Cynna and Salabaccho" (Knights 765). Some, like Epimenides, say that Eratosthenes, not knowing that Cynna was a harlot, explained it as "of a dog"; others, "of five". This is incorrect.

68.

It is related in the Catalog of Stage Productions

δεδίδαχεν δμοίως Ἀριστοφάνης. Εἰρήνην. ἄδηλον οὖν φησιν Ἐρατοσθένης, πότερον τὴν αὐτὴν ἀνεδίδαξεν, ἢ ἑτέραν παθῆσεν, ἥτις οὐ σώζεται. Κράτης μέντοι δύο εἶπε δράματα, γράφων οὕτως· . . . . . καὶ σποράδην δέ τινα ποιήματα παρατίθεται, ἅπερ ἐν τῇ νῦν φερομένῃ οὐκ ἔστιν.

69: Schol. Arist. Peace 48:

τὴν σπατίλην ἐσθέει· . . . . . πῶς δὲ ἤσθιεν ὁ Κλέων ἤδη τεθνηκώς; Ἐρατοσθένης γὰρ ἐπὶ Θράκης τὸν θάνατον Βρασίδου καὶ Κλέωνος ὀκτὼ μησὶ προγεγονέναι φησί.

70: Schol. Pac. 702:

ὠρακιάσας. οἷον, ὠρακιάσας, ἢ λειποψυχήσας, ἢ ἀθυμήσας. ὡς φιλοκότην δὲ πάλιν διαβάλλει τὸν Κρατῖνον, μετὰ ἐκλύσεως ἐσκοτωμένον. ᾧ ἴσως ἀκολουθεῖ καὶ τὸ ὠρακιάσας· τοιοῦτοι δὲ οἱ λειποψυχοῦντες· τρέπεται γὰρ αὐτῶν ἡ χροιά. Λυκόφρων δὲ τὸ ὠρακιᾶν ἀντὶ τοῦ ὠχριᾶν. Ἐρατοσθένης δέ, τὸ ὑπὸ ἐκλύσεως ἐσκοτῶσθαι. ὅτι δὲ φίλοινος ὁ Κρατῖνος, καὶ αὐτὸ ἐν τῇ Πυτίνῃ λέγει σαφῶς.

71: Schol. Av. 122:

σισύραν. Ἐρατοσθένης δέ φησιν, ὅτι καθάπερ

that Aristophanes also produced another "Peace". Eratosthenes says it is not certain whether he produced the same play again or put on another which is not preserved. Crates, however, says that there were two plays, and writes: ". . . . .some scattered lyrics were inserted, which are not in the one which is still extant."

69.

He is eating leather-parings: . . .. . But how could Cleon be eating when he was already dead? Eratosthenes says that the death of Brasidas and Cleon had taken place eight months previously in Thrace.

70.

ὠρακιάσας: That is, "turning pale" or "losing one's senses", or "being down-hearted". He again accuses Cratinus of being fond of drinking, blind with helplessness. Probably "turning pale" results from this: people losing their senses are like this, for their colour changes. Lycophron says that ὠρακιᾶν is instead of ᾠχριᾶν, but Eratosthenes prefers "blind with helplessness". That Cratinus was fond of wine, he himself clearly states in the "Flask".

71.

σισύρα (goat-skin): Eratosthenes says that,

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τὸ δένδρον τὸ αὐτὸ καὶ ἄνδραχνον καὶ ἀνδράχνην καλοῦμεν, οὕτως ὤοντο σισύραν καὶ σίσυν ἐπὶ τοῦ αὐτοῦ μετέχεσθαι. καὶ τρίτην προσλαμβάνουσι σισύραν οἱ κατὰ Λιβύην, τὸ ἐκ τῶν κωδίων τὸ ἀμπεχόνιον καλούμενον.

72: Schol. Platonis p. 35 (Ruhnk):

ἅττα. Ἐρατοσθένης δὲ χρονικῶς αὐτό φησι παρὰλαμβάνεσθαι· . . . . . Ὀκηνικ' ἄτθ' ὑμεῖς ὀρχούμενοι κοκιᾶτε.

73: Hesychius:

κατειλυσκωμένην. ὁ μὲν Λυκόφρων, καταρτωμένην· Ἐρατοσθένης δέ, συγκεῖσθαι τὴν λέξιν ἐκ τοῦ εἱλεῖν καὶ σκᾶσθαι.

74: Harpocrat. p. 117 (Schol. Ran. 798):

μεῖον καὶ μειαγωγός. Ἐρατοσθένης δ' ἐν τοῖς περὶ κωμῳδίας φησὶν οὕτως· Νόμου ὄντος μὴ μεῖον εἰσάγειν ὡρισμένου τινός, ἐπισκώπτοντες μετὰ παιδίας πάντα τὸν εἰσάγοντα Μεῖον ἔφασαν εἰσάγειν, ὅθεν τὰ μὲν ἱερεῖα Μεῖον προσηγορεύθη· Μειαγωγὸς δὲ ὁ εἰσάγων.

75: Schol. Ran. 1026:

δοκοῦσι δὲ οὗτοι οἱ Πέρσαι ὑπὸ τοῦ Αἰσχύλου

just as we call the same strawberry-tree both ἄνδραχνος and ἀνδράχνη, so too they thought that the forms σισύρα and σίσυς shared the same meaning. People in Libya add a third form, too, σισύρνα, meaning a cloak made of fleeces.

72.

ἅττα: Eratosthenes says that it is taken in a temporal sense: . . . . ."Whenever you are weary with dancing."

73.

κατειλυσκωμένην: Lycophron says it means "hanging down". According to Eratosthenes, the expression is compounded from "εἱλεῖν", to roll, and "σκᾶσθαι", to be drawn or pulled.(Lysistrata, 722)

74.

μεῖον and μειαγωγός: Eratosthenes explains as follows in his "Comedy": "As it was the rule not to bring an offering smaller than a prescribed weight, people used to mock in play at everyone as he brought his offering, saying 'Μεῖον', 'Too small!' Hence the sacrifices received the name of 'Μεῖον', and he who brought an offering 'Μειαγωγός'."

75.

This play "The Persians" seems to have been pro-

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δεδιδάχθαι ἐν Συρακούσαις, σκυδάσαντος Ἱέρωνος, ὡς φησιν Ἐρατοσθένης ἐν γ' τῶν κωμῳδιῶν.

76: Schol. Ran. 1263:

τῶν φήφων λαβῶν. Ἐρατοσθένης δέ, τῶν ψευδαττικῶν τινας γράφειν, τῶν ψήφων λαβών, ἵνα καὶ τὰ κεκλασμένα δράματα, ἐν οἷς τοκαράκαν τοῦτο ἠγνόηται, δοκῇ μὴ σεσολοικίσθαι.

77: Schol. Plut. 797:

οὐ φὰρ κρεκῶδες. ἔμφασις τοῦ Ἀριστοφανείου κροσώκου· ὁ δὲ λόγος κρὸς τοὺς ἀντιτέχνους κρὸς διασυρμόν, οἳ διὰ τὸν αὐτῶν ὄβολὸν ἐκειρῶντο τὸν δῆμον κρὸς ἑαυτοὺς ἑκάγειν. Καὶ ἐν τοῖς Ὄφηξὶ δὲ ἐσεμνύνετο, ὅτι οὐκ εἰσι καρ'αὐτῷ κάρυα ἐκ φορμίδος. φαίνεται μέντοι τὸ τοιοῦτον οὐ διὰ τῶν χορηγῶν γενέσθαι, ἀλλὰ δι'αὐτῶν τῶν διδασκάλων, ὡς καὶ Ἐρατοσθένης ἐκισημαίνεται.

78: Schol. Plut. 1194:

ἀλλ'ἐκδότω τις δεῦρο. ὅτι ὁ Λυκόφρων, ὡς ὁ Ἐρατοσθένης φησίν, ᾠήθη κρῶτον τοῦτον ὀφδας ᾐτηκέναι. κεκοίηκε δὲ καὶ ἐν Ἐκκλησιαζούσαις αὐτό. ἀλλὰ γὰρ Στράττις κρὸ ἀμφοτέρων τούτων τοὺς Ποταμίους διδάσκων εἰς Φιλύλλιον ἀναφέρει τὸ κρᾶγμα·

duced by Aeschylus at Syracuse on the request of Hiero, according to Eratosthenes in "Comedy", Book 3.

76.

τῶν ψήφων λαβών: Eratosthenes says that some of the fake Atticists write "taking some votes", so that even the spurious plays, in which this is really quite unknown, may not appear to be incorrect.

77.

"It is not seemly": The saying is that of an Aristophanic character, but the argument is a satirical one against his rival playwrights, who tried to attract the people to themselves by petty bribery. In "The Wasps", too, he solemnly declared that in his plays there were no nuts from a basket. It appears that this kind of thing was done, not by the stage managers, but by the authors themselves, according to the implication of Eratosthenes.

78.

"Let someone bring (torches ready kindled)". According to Eratosthenes, Lycophron thought that Aristophanes was the first to 'call for torches': he does it also in the "Assembly of Women". Actually, Strattis, who produced the "River People" before both these plays, refers the practice to Philyllius:

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Ὑμεῖς τε πάντες ἔξιτ'ἐπὶ τὸ Πύθιον,
ὅσοι περ'ἐστε, μὴ λαβόντες λαμπάδας
μηδ'ἄλλο μηδὲν ἐχομένον Φιλυλλίου.

Cratinus:

79: Athenaeus XI p. 501 D:

Κρατίνου δ'εἰπόντος ἐν Δραπέτισιν· Δέχεσθε φιάλας τάσδε βαλανειομφάλους· Ἐρατοσθένης ἐν τῷ ἐνδεκάτῳ περὶ κωμῳδίας τὴν λέξιν ἀγνοεῖν φησι Λυκόφρονα· τῶν γὰρ φιαλῶν οἱ ὀμφαλοὶ καὶ τῶν βαλανείων οἱ θόλοι παρόμοιοι· εἰς δὲ τὸ εἶδος οὐκ ἀρρύθμως παίζονται.

Pherecrates: 80-81:

80: Harpocrat. p. 119:

Μεταλλεῖς, Λυσίας ἐν τῷ πρὸς Διοχάρη εἰ γνήσιος. οἱ μέταλλα ἐργαζόμενοι μεταλλεῖς ὀνομάζονται. ἔστι δὲ καὶ δρᾶμα Φερεκράτους Μεταλλεῖς, ὅπερ Νικομαχόν φησι πεποιηκέναι Ἐρατοσθένης ἐν ἑβδόμῳ περὶ τῆς ἀρχαίας κωμῳδίας.

81: Photius:

εὐθὺ Λύκειον, τὸ εἰς Λύκειον, ὅθεν Ἐρατοσθένης καὶ διὰ τοῦτο ὑποπτεύει τοὺς Μεταλλεῖς.

"Go out, all of you, to the Pythian temple, taking neither torches nor anything else connected with Philyllius."

Cratinus:

79.

Cratinus in his "Refugee Women", says: "Take these shields with bosses like bath-houses." In the eleventh book of his "Comedy" Eratosthenes says that Lycophron does not know the word. The bosses of "bowl-shields" and the domes of bath-houses are similar, and the play on their shape fits the metre well.

Pherecrates: 80-81:

80.

Μεταλλεῖς: Lysias uses the word in his speech against Diochares, if it is genuine. Those who work in mines (μέταλλα) are called miners (μεταλλεῖς). There is also a play of Pherecrates entitled "The Miners", which Eratosthenes, in the seventh book of his "Ancient Comedy", says was written by Nicomachus.

81.

"Straight to the Lyceum", i. e. "to the Lyceum". This (the use of εὐθύ with an accusative) is an additional reason why Eratosthenes suspects "The Miners".

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Unidentified Writers: 82-91:

82: Diog. Laert. VII 5:

Καὶ πρότερόν γε Στωικοὶ ἐκαλοῦντο οἱ διατρίβοντες ἐν αὐτῇ (τῇ ποικίλῃ στοᾷ) ποιηταί, καθά φησι καὶ Ἐρατοσθένης ἐν ὀγδόῃ περὶ τῆς ἀρχαίας κωμῳδίας.

83: Hesychius:

ἄλκαζον. ὅπλον ἢ ἀλεξιφάρμακον φυτόν. Ἐρατοσθένης δέ, ὄνομα εἶναί τινος ἀνθρώπου κωμῳδουμένου.

84: Hesychius:

Παρ'αἰγείρου θέα. Ἐρατοσθένης φησί, ὅτι πλησίον αἰγείρου τινὸς θέα (αἴγειρος δέ ἐστι φυτοῦ εἶδος) ἐγγὺς τῶν ἱερίων. ἕως οὖν τούτου τοῦ φυτοῦ ἐξετείνετο καὶ κατεσκευάζετο τὰ ἱερία, ἃ ἐστιν ὀρθὰ ξύλα, ἔχοντα σανίδας προσδεδεμένας οἷον βαθμούς, ἐφ' οἷς ἐκαθέζοντο, πρὸ τοῦ κατασκευασθῆναι τὸ θέατρον.

85: Photius:

εὔκλεια, καὶ τὰ ὅμοια, μακρὰ ἡ τελευταία. καὶ παροξύνεται, ὥσπερ καὶ Ἐρατοσθένης ἐν ιβ' περὶ . . . .

86: Athen. IV p. 140 A:

τῆς δὲ κοπίδος μνημονεύει καὶ Ἀριστοφάνης

Unidentified Writers: 82-91:

82.

In earlier times too the poets who spent their time there (in the Stoa Poecile) were called Stoics, according to Eratosthenes in the eighth book of his "Ancient Comedy".

83.

Alcaeus: A weapon, or a plant giving protection against poison. According to Eratosthenes, the name of a comic writer.

84.

"The view from the black poplar": Eratosthenes says this means "view near a certain black poplar" (the poplar is a kind of tree), "near the benches". The benches were ranged and erected up to this tree, and consisted of upright timbers with planks fastened on like steps. On these people used to sit before the theatre was erected.

85.

εὐθύλεια and similar words have the last syllable long and are accented paroxytone, according to Eratosthenes in his twelfth book on . . . . .

86.

The word κοπίς (long knife) is mentioned by

ἢ Φιλύλλιος ἐν ταῖς Πόλεσιν, Ἐπιλυκός τε ἐν Κωραλίσκῳ, λέγων οὕτως· κότ'ἄν κοπίδ'οἰώσωμ'αἰὲν Ἀμυκλαῖον, παραγγέλλωσι βάρανες πολλοὶ πάρτοι καὶ ζωμὸς μάλα ἀδύς. διαρρήδην λέγων, μάζας ἐν ταῖς κοπίσι παρατίθεσθαι· τοῦτο γὰρ οἱ βάρανες δηλοῦσιν· οὐχὶ τολύπας, ὡς φησι Λυκόφρων, ἢ τὰ προφυράματα τῶν μαζῶν, ὡς Ἐρατοσθένης.

87: Eustath. ad Od. β' p. 1445, 41 = 96, 3:

ἦια κυρίως κατὰ Ἐρατοσθένην ὀσπρίων καλάμαι. καὶ διυλλάβως ἐν συναιρέσει ᾶ, ὡς καὶ Φερεκράτης· τὴν γαστέρ' ᾶων πάχύρων σεσαγμένους.

88: Etymolog. M. p. 682, 52:

Ποῖ κῆχος. ζήτει καὶ τοῦτο, ποῖ κῆχος; εἰς τὸν οὐρανόν. καὶ Ἀριστοφάνης. Ποῖ κῆχος; εὐθὺς Σικελίας. καὶ παρὰ Φερεκράτει, Ποῖ κῆχος; καὶ εἰ μὲν παρεζευγμένον εὑρήσεις τὸ ποῖ τῷ κήχει· Ἐρατοσθένης δὲ λαμβάνει ἐκ ταύτης τῆς συντάξεως, ποῦ ἐγγὺς, καὶ εἰς τίνα τόπον; ποῦ ἄγχος· ποῦ κῆχος, τὸ πῆ, κῆ· πῆ ἐγγύς, πῆ ἄγχος· ὅπερ ἐστὶν ἐν τῷ ἔναγχος· κῆχος. ἔλλειψις ἄρα τοῦ γ, κῆχος, ἄγχος· ἔχει αὐτὸ ἐν τῷ ἔναγχος.

Aristophanes or Philyllius in the "Cities", and by Epilycus in the "Boy", when he says: "When I carry a long Amyclaean knife, let many cakes and loaves announce it, and first rate soup", clearly implying that cakes are served on knives. βάραξ and μᾶζα both mean "cake", not "dough-nut" as Lycophron says, or "dough kneaded ready for making cakes", as Eratosthenes.

87.

According to Eratosthenes the exact meaning of ἤια is bean-stalks. He gives the pronunciation as ἦα run into two syllables, as in Pherecrates: "Their bellies stuffed with bean-stalks and chaff."

88.

ποῖ κῆχος: Consider this too: "Whither away?" "Into the sky." Also Aristophanes: "Whither away? Straight towards Sicily." Also in Pherecrates: "Whither away?" You will always find ποῖ attached to the κῆχος. Eratosthenes gets from this combination: "Whither, near at hand?" and "To what place?"

ποῦ ἄγχος to ποῦ κῆχος suggests πῆ to κῆ. • πῆ ἐγγύς to πῆ ἄγχος is the same as ἔναγχος to κῆχος • Omission of the Υ from ἄγχος gives κῆχος. In ἔναγχος the Υ is retained.

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89: Photius:

σάμαια, Ἐρατοσθένης ἀπέδωκε, τὸν φορμόν.

90: Athenaeus II p. 41, D:

Ἀθηναῖοι δὲ μετάκερας καλοῦσι τὸ χλιαρόν· ὡς Ἐρατοσθένης φησίν, ὕδαρῆ φησι, καὶ μετάκερας.

91: Athenaeus XI p. 499 E:

. . . . . λάγυνος. . . . . Ἐρατοσθένης δέ φησι, λέγεσθαι τὴν πέτασον καὶ τὴν στάμνον ὑπό τινων.

Grammar: 92-100:

92: Schol. in Dion. Thrac. p. 725:

ὅθεν οὖν ἀπὸ σκοποῦ καὶ Ἐρατοσθένης ἔφη, ὅτι γραμματική ἐστιν ἕξις παντελὴς ἐν γράμμασι, γράμματα καλῶν τὰ συγγράμματα.

93: Quint. Inst. Or. I, 1, 16:

Quidam litteris instituendos, qui minores septem annis essent, non putaverunt, quod illa primum aetas et intellectum disciplinarum capere et laborempati posset. . . . Sed alii quoque auctores, inter quos Eratosthenes, idem praeceperunt.

94: Etymolog. M. p. 529, 39:

Καὶ κατὰ κῦρβις, λέγεται τὸ τὴν σιαγόνα κλῆ-

89.

σάμαξ: Eratosthenes explains as the same as φορμός, matting.

90.

The Athenians call χλιαρόν (lukewarm) μετάκερας (mixed); as Eratosthenes says, "washy" and "lukewarm".

91.

λάγυνος (flagon): Eratosthenes says it is called by some πέτασος (hat) and στάμνος (jar).

Grammar: 92-100:

92.

Thus Eratosthenes did not miss the mark when he said that "grammar" is a universal system in letters; by "letters" meaning "composition".

93.

Some have thought that children under seven years should not be instructed in reading and writing, because that was the earliest age capable of understanding the necessary studies and of standing the work. . . . Other authorities as well, among them Eratosthenes, have given the same advice.

94.

καὶ κατὰ κόρρης (and on the temple) means "to

ξαι. ὁ δὲ Ἐρατοσθένης ἅπασαν τὴν τῆς κεφαλῆς πληγήν. κόρρην γὰρ τὴν κεφαλὴν λέγεσθαί φησι, μεταβεβλῆσθαι δὲ τὸ σ εἰς τὸ ρ Ἀττικῶς, ὡς ἐπὶ τῆς μυρρίνης καὶ τοῦ ταρροῦ· ἔστι γὰρ μυρσίνη καὶ ταρσός.

25: Anecdota Bekk. p. 215:

ἐκκοπήρυκτος ὁ ἐπὶ ἁμαρτήμασιν ἐκπεσὼν τῆς πατρῴας οἰκίας· ἐκποίητος δὲ ὁ ἑτέρῳ δοθεὶς εἰσποιήσασθαι. οὕτως Ἐρατοσθένης.

26: Hesychius:

ἡδυντῆρες· οἱ ἅλες. Ἐρατοσθένης.

27: Hesychius:

ἀγρηνόν· δικτυοειδές, ὃ περιτίθενται οἱ βακχεύοντες Διονύσῳ· Ἐρατοσθένης δὲ αὐτὸ καλεῖ γρῆνυν ἢ γρῆνον.

28: Athenaeus 1 p. 16 D:

ἀκολαστικὸς δέ ἐστι παρ' αὐτῷ καὶ ὁ τῶν Φαιάκων βίος· Αἰεὶ γὰρ ἡμῖν δαίς τε φίλη κίθαρίς τε, καὶ τὰ ἑξῆς, ἃ ἔφη Ἐρατοσθένης οὕτω δεῖς γεγράφθαι φησίν·

Οὐ γὰρ ἔγωγέ τί φημι τέλος χαριέστερον εἶναι,
ἢ ὅταν εὐφροσύνη μὲν ἔχῃ, κατὰ δῆμον ἀκούσῃς,
δαιτυμόνες δ' ἀνὰ δώματ' ἀκουάζωνται ἀοιδοῦ.

strike on the jaw", or, according to Eratosthenes, any blow on the head. He says that "πύρση" means "head", and the σ changes to ρ in Attic; for example μυρσίνη and ταρσός become μυρρίνη and ταρρός.

25.

ἀποκήρυκτος (publicly disowned) means a man who has been banished for his misdoings from his father's house.

ἐκποίητος (alienated) means one who has been given to someone else to adopt. These are the explanations of Eratosthenes.

26.

~~ἡδυσμῆρες~~ (seasonings): salt. Eratosthenes.

27.

~~ἀγρηνόν~~: a net-like garment which Bacchanals drape round them. Eratosthenes calls it γρῆνυς or γρῆνος.

28.

In Homer too the life of the Phaeacians is given up to enjoyment: "Always dear to us is the banquet, and the harp", and so on: these verses Eratosthenes says ought to read:

"I for my part say that no aim is more pleasant,
than when happiness prevails and evil is absent,
when the banqueters along the hall listen to the singer."

κακότητος ἀκούσης, φάσκων, τῆς ἀφροσύνης. ἀδύνατον γὰρ μὴ φρονίμους εἶναι Φαίακας, οἷ μάλα φίλοι εἰσὶ θεοῖσιν, ὡς ἡ Ναυσικάα φησίν.

99: Schol. Venet. Il. ω'282:

ἡ διπλῆ, ὅτι εἰ μὴ προσέθηκε τὸν στίχον, οἱ θέλοντες συγχεῖσθαι τὰ δυικὰ παρ' Ὁμήρῳ, Ἐρατοσθένης καὶ Κράτης, ἔλεγον ἂν ἐπὶ τῶν ἐννέα Πριαμιδῶν τετάχθαι, τὼ μὲν ζευγνύσθην.

100: Schol. Ap. Rhod. I 482:

Ἀλωιάδας. τὴν περὶ τούτων ἱστορίαν καὶ Ὅμηρος οἶδεν. Ἐρατοσθένης δὲ γηγενεῖς αὐτοὺς φησι· διὰ δὲ τὸ ἀνατετράφθαι ὑπὸ τῆς Ἀλωέως γυναικὸς μυθευθῆναι, ὡς Ἀλωέως εἰσὶν υἱοί.

Baton: 101:

101: Diog. Laert. VIII 89 (de Eudoxo):

φησὶ δ'αὐτὸν Ἐρατοσθένης ἐν τοῖς πρὸς Βάτωνα, καὶ κυνῶν διαλόγους συνθεῖναι.

Arsinoe: 102:

102: Athenaeus VII p. 276 A:

ὁ Πλουτάρχος, κατὰ τὸ ὅμοιον, ἔφη, καὶ ἐν Ἀλεξανδρείᾳ τῇ ἐμῇ Λαγυνοφόρια ἑορτή τις ἦγετο, περὶ

"'Evil being absent,'" he says, "means 'intemperance'; for it would be impossible for the Phaeacians, who were, according to Nausicaa, 'very dear to the gods', not to be temperate."

99.

Dual: if he had not appended the line, those who would have it that the dual number is confused in Homer, Eratosthenes and Crates, would say that "τω μὲν ξευγνύσθην" applied to the nine sons of Priam.

100.

Aloiadae: Even Homer knew the story about them. Eratosthenes says that they were earth-born, but that because they were brought up by the wife of Alŭeus the legend grew up that they were his sons.

Baton: 101:

101.

According to Eratosthenes in his work "Against Baton", he also composed dialogues of dogs.

Arsinoe: 102:

102:

"In the same way," said Plutarch, "in my city of Alexandria too a festival used to be held called the

ἧς ἱστορεῖ Ἐρατοσθένης ἐν τῷ ἐπιγραφομένῳ συγγράμματι Ἀρσινοῇ· λέγει δὲ οὕτως· Τοῦ Πτολεμαίου κτίζοντος ἑορτὴν καὶ θυσιῶν παντοδαπῶν γένη, καὶ μάλιστα περὶ τὸν Διόνυσον, ἠρώτησεν Ἀρσινόη τὸν φέροντα τοὺς θαλλούς, τίνα νῶν ἡμέραν ἄγει, καὶ τίς ἐστιν ἑορτή· τοῦ δ' εἰπόντος, καλεῖται μὲν Λαγυνοφόρια, καὶ τὰ νομισθέντα αὐτοῖς δειπνοῦσιν κατακλιθέντες ἐπὶ στιβάδων, καὶ ἐξ ἰδίας ἕκαστος λαγύνου παρ' αὐτῶν φέροντες πίνουσιν· ὡς δ' οὗτος ἀπεχώρησεν, ἐμβλέψασα πρὸς ἡμᾶς, Συνοίκιά γ', ἔφη, ταῦτα βυπαρά· ἀνάγκη γὰρ τὴν σύνοδον γενέσθαι 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 λουσίν· εὐωχοῦνται μὲν γὰρ κατ' ἰδίαν, παρέχει δὲ ταῦτα ὁ καλέσας ἐπὶ τὴν ἑστίασιν.

Chronography: 103-123:

103: Clem. Alex. Strom. I p. 336 B:

Ἐρατοσθένης δὲ τοὺς χρόνους ὧδε ἀναγράφει· Ἀπὸ μὲν Τροίας ἁλώσεως ἐπὶ Ἡρακλειδῶν πάθοδον, ἔτη δγδοήκοντα· ἐντεῦθεν δὲ ἐπὶ τὴν Ἰωνίας κτίσιν, ἔτη ἑξήκοντα· τὰ δὲ τούτοις ἑξῆς, ἐπὶ μὲν τὴν ἐπιτροπίαν

Flagon-bearing. Eratosthenes relates the following story about it in his essay entitled 'Arsinoe':

"'As Ptolemy was founding a festival and all sorts of sacrifices, especially to do with Dionysus, Arsinoe asked the man carrying the olive-branches what day he was celebrating, and what festival it was. He replied that it was called the Flagon-bearing, and that the people, reclining on straw mattresses, dined on what was provided for them while each drank separately out of a flagon he had brought with him. After he had gone away, she looked towards me and said: "These filthy conditions are natural. The assembly must consist of a mixed crowd, when they set before them a stale and wholly unattractive feast." If she had approved of that kind of festival, the queen would scarcely have worked so hard when making just the same preparations, as in the Pitchers. There the people feast separately, but the person who invites them to the banquet provides the food.'"

Chronography: 103-123:

103.

Eratosthenes records the periods of history as follows: from the fall of Troy to the return of the Heraclidae, eighty years; from then to the colonizing of Ionia, sixty years; following this to the guardianship

τὴν Λυκούργου, ἔτη ἑκατὸν πεντήκοντα ἐννέα· ἐπὶ δὲ προηγούμενον ἔτος τῶν πρώτων Ὀλυμπίων, ἔτη ἑκατὸν ὀκτώ· ἀφ' ἧς Ὀλυμπιάδος ἐπὶ τὴν Ξέρξου διάβασιν, ἔτη διακόσια ἐννενήκοντα ἑπτά· ἀφ' ἧς ἐπὶ τὴν ἀρχὴν τοῦ Πελοποννησιακοῦ πολέμου, ἔτη τεσσαράκοντα ὀκτώ· καὶ ἐπὶ τὴν κατάλυσιν καὶ Ἀθηναίων ἦτταν, ἔτη εἴκοσι ἑπτά· καὶ ἐπὶ τὴν ἐν Λεύκτροις μάχην, ἔτη τριάκοντα τέσσαρα· μεθ' ἣν ἐπὶ τὴν Φιλίππου τελευτὴν ἔτη τριάκοντα πέντε· μετὰ δὲ ταῦτα ἐπὶ τὴν Ἀλεξάνδρου μεταλλαγήν, ἔτη δώδεκα.

104: Clem. Alex. p. 337 A:

ἀπὸ τούτου (Ἡρακλειδῶν καθόδου) ἐπὶ Εὐαίνετον ἄρχοντα, ἐφ' οὗ φάσιν Ἀλέξανδρον εἰς τὴν Ἀσίαν διαβῆναι . . . . . ὡς φὲ Ἐρατοσθένης, ἑπτακόσια ἑβδομήκοντα τέσσαρα (ἔτη).

105: Clem. Alex. p. 327 B:

Ἐρατοσθένης δὲ μετὰ τὸ ἑκατοστὸν ἔτος τῆς Ἰλίου ἁλώσεως τὴν Ὁμήρου ἡλικίαν φέρει.

106: Dion. Hal. A. R. I, 74. (de anno urbis conditae):

Κάτων δὲ Πόρκιος Ἑλληνικὸν μὲν οὐχ ὁρίζει χρόνον· ἐπιμελὴς δὲ γενόμενος, εἴ καί τις ἄλλος, περὶ τὴν συναγωγὴν τῆς ἀρχαιολογουμένης ἱστορίας, ἔτεσιν ἀποφαίνει δυσὶ καὶ τριάκοντα καὶ τετρακοσίοις ὑστεροῦσαν τῶν Ἰλιακῶν. ὁ δὲ χρόνος οὗτος ἀναμετρηθεὶς ταῖς Ἐρα-

of Lycurgus, a hundred and fifty-nine years; to the Leading Year, that of the first Olympic games, a hundred and eight years; from this Olympiad to the invasion of Xerxes, two hundred and ninety-seven years; from this to the beginning of the Peloponnesian War, forty-eight years; until the end and the defeat of Athens, twenty-seven years; until the battle of Leuctra, thirty-four years; after this to the death of Philip, thirty-five years; and after this to the dissolution of Alexander, twelve years.

104.

From this time (the return of the Heracleidae) to the Archonship of Euaenetus, in whose time it is said that Alexander crossed to Asia. . . . .is, according to Eratosthenes, seven hundred and seventy-four(years).

105.

Eratosthenes says that Homer flourished over a hundred years after the taking of Ilium.

106.

Porcius Cato does not give the date by Greek reckoning, but showing as much care as anyone in ~~the~~ collecting the material of ancient history, he shows that it (the foundation of Rome) was four hundred and thirty-two years after the Trojan War. This date, if measured by

τοσθένους χρονογραφίαις κατὰ τὸ πρῶτον ἔτος πίπτει τῆς ἑβδόμης Ὀλυμπιάδος. ὅτι δέ εἰσιν οἱ κανόνες ὑγιεῖς οἷς Ἐρατοσθένης κέχρηται, καὶ πᾶς ἄν τις ἀπευθύνοι τοὺς Ῥωμαίων χρόνους πρὸς τοὺς Ἑλληνικούς, ἐν ἑτέρῳ δεδήλω-
10 ται μοι λόγῳ.

107: Serv. Dan. Verg. A I 273:

Eratosthenes Ascanii, Aeneae filii, (filium) Romulum parentem urbis refert (Romae).

108: Schol. Arist. Vesp. 500:

δοκεῖ δὲ ἡ τυραννὶς (Πεισιστρατιδῶν) καταστῆναι, ὡς φησιν Ἐρατοσθένης, ἐπὶ ἔτη ν', τοῦ ἀκριβοῦς διαμαρτάνων.

109: Diog. Laert. I, 119:

Ἄνδρων δὲ ὁ Ἐφέσιος δύο φήσὶ γεγονέναι Φερεκύδας, Σύριους, τὸν μὲν ἀστρολόγον, τὸν δὲ θεολόγον . . . . . Ἐρατοσθένης δ'ἕνα μόνον, καὶ ἕτερον Ἀθηναῖον γενεαλόγον.

110: Quint. Inst. Or. XI, 2, 14:

Est autem magna inter auctores dissensio, Glaucone Carystio an Leocrati an Agatharco ah Scopae scriptum sit id carmen: et Pharsali fuerit haec domus,

the chronology of Eratosthenes, falls in the first year of the seventh Olympiad. I have shown in another work that the criteria used by Eratosthenes were sound, and have explained the method of checking Roman dates against Greek.

107.

Eratosthenes relates that Romulus, the father of the city (of Rome), was the (descendant) of Ascanius, son of Aeneas.

108.

The (Pisistratid) tyranny appears to have lasted, according to Eratosthenes, for 50 years, but this is not accurate.

109.

Andron the Ephesian says there were two men called Pherecydes, Syrians, the one an astronomer, the other a theologian. . . . . Eratosthenes says there was only one Syrian and a second an Athenian writer of genealogy.

110.

There is much disagreement among the authorities whether this poem was written by Glaucon of Carystus, Leocrates, Agatharchus, or Scopas, and whether this house was at Pharsalus, as Simonides himself appears to indicate

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ut ipse quodam loco significare Simonides videtur atque Apollodorus et Eratosthenes. . . . .tradiderunt.

111: Schol. Av. 557:

ἱερὸν πόλεμον . . . . . ἱστορεῖ περὶ αὐτοῦ καὶ Θουκυδίδης, καὶ Ἐρατοσθένης ἐν τῷ ἐννάτῳ, καὶ Θεόπομπος ἐν τῷ με΄.

112: Hesychius : also Suidas:

Ῥοίκου πριθοπομπία. Ἐρατοσθένης ἐν τῷ ἐννάτῳ, τῶν Ἀμαθουσίων βασιλέα· τοῦτον αἰχμάλωτον γενόμενον εἶτα ὑποστρέψαντα πρὸς ἑαυτόν, τῇ πόλει Ἀθηναίων πριθὰς ἐκπέμψαι φησίν.

113: Cicero ad Atticum VI 1:

Quis enim non dixit, Εὔπολιν τὸν τῆς ἀρχαίας ab Alcibiade navigante in Siciliam delectum esse in mare? Redarguit Eratosthenes; affert enim, quas ille post id tempus fabulas docuerit; num idcirco Duris Samius, homo in historia diligens, quod cum multis erravit, irridetur?

114: Vita Eurip. post Bacchas Elmsleii:

ἐτελεύτησε δέ, ὡς φησι Φιλόχορος, ὑπὲρ τὰ ἑβδομήκοντα ἔτη γεγονώς· ὡς δὲ Ἐρατοσθένης, οε΄.

115: Sorani vita Hippocratis ap. Fabric. Bibl. Gr. XII p. 673:

Ἱπποκράτης τῷ γένει μὴν ἦν Κῶος, υἱὸς Ἡρακλείδα

somewhere, and also Apollodorus and Eratosthenes have related.

111.

The Sacred War: Thucydides also mentions it. So does Eratosthenes in his ninth book and Theopompus in book 25.

112.

Rhoecus' sending of barley: According to Eratosthenes in the ninth book, king of the "Amathusians"; he was taken prisoner, and afterwards when he returned home sent barley to the city of Athens.

113.

Who has never said that "Eupolis of the Old Comedy" was thrown down into the sea by Alcibiades when he was sailing to Sicily? Eratosthenes has refuted this story, adducing the plays which he produced after that date. Surely, though, Duris of Samos, a careful historian, is not to be laughed at over a point on which he made the same mistake as many others.

114.

He (Euripides) died, according to Philochorus, aged more than seventy; according to Eratosthenes, 75.

115.

Hippocrates was a Coan by birth, the son of

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καὶ Φαιναρέτης εἰς Ἡρακλέα καὶ Ἀσκληπιόν τὸ γένος ἀναφέρων, ἀφ' οὗ μὲν εἰκοστός, ἀφ' οὗ δὲ ἐννέα καὶ δέκατος. μνημονεύει δὲ τῆς γενεαλογίας αὐτοῦ Ἐρατοσθένης, καὶ Φερεκύδης, καὶ Ἀπολλόδωρος καὶ Ἄρειος ὁ Ταρσεύς.

116: Harpocratio p. 77:

Εὔηνος, Ὑπερίδης ἐν τῷ κατ' Αὐτοκλέους. δύο ἀναγράφουσιν Εὐήνους ἐλεγείων ποιητάς, ὁμωνύμους ἀλλήλοις, καθάπερ Ἐρατοσθένης ἐν τῷ περὶ Χρονογραφιῶν ἀμφοτέρους λέγων Παρίους· εἶναι γνωρίζεσθαι δέ φησιν τὸν νεώτερον μόνον. μέμνηται δὲ θατέρου αὐτῶν καὶ Πλάτων.

117: Plut. Dem. p. 850 B:

ἐπεὶ τόλμαν γε καὶ θάρσος οἱ λεχθέντες ὑπ' αὐτοῦ (Δημ.) λόγοι τῶν γραφέντων μᾶλλον εἶχον, εἴ τι δεῖ πιστεύειν Ἐρατοσθένει καὶ Δημητρίῳ τῷ Φαληρεῖ καὶ τοῖς Κωμικοῖς, ὧν Ἐρατοσθένης μὲν φησιν αὐτὸν ἐν τοῖς λόγοις κολλάχου γεγονέναι παράβακχον.

118: Plut. Dem. p. 860 B:

Ἐρατοσθένης δὲ καὶ αὐτὸς ἐν πρίνῳ φησὶ κοίλῳ τὸ φάρμακον φυλάσσειν, τὸν δὲ πρίνον εἶναι τοῦτον αὐτῷ φόρημα περιβραχιόνιον.

119: Plut. Alex. p. 665, E:

ἡ δὲ Ὀλυμπίας, ὡς Ἐρατοσθένης φησί, προπέμπουσα

Heracleides and Phaenarete. He traced his descent from Heracles and Asclepius, being twentieth and nineteenth in line from them respectively. His lineage is mentioned by Eratosthenes, Pherecydes, Apollodorus, and Areus of Tarsus.

116.

Evenus: Mentioned by Hyperides in his speech against Autocles. Two poets called Evenus are recorded, writers of elegiacs, according to Eratosthenes in his "Chronography", where he says that they are both Parians. He adds that only the later one is well known. The other is mentioned by Plato also.

117.

His (Demosthenes) spoken words were bolder and more confident than his written, if we must at all believe Eratosthenes, Demetrius of Phalerus, and the Comic writers. Of these, Eratosthenes says that when speaking he often became like one possessed.

118.

Eratosthenes himself also says that he kept the poison in a hollow ring, and that this ring was made for wearing on the arm.

119.

Olympias, according to Eratosthenes, as she was

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τὸν Ἀλέξάνδρον ἐπὶ τὴν στρατείαν, καὶ φράσασα μόνῳ τὸ περὶ τὴν τέκνωσιν ἀπόρρητον, ἐκέλευεν ἄξια φρονεῖν τῆς γενέσεως.

120: Plut. Alex. P. 682:

Ἀλέξανδρος δὲ τὴν ἐντὸς τοῦ Εὐφράτου πᾶσαν ὑφ' ἑαυτῷ ποιησάμενος ἤλαυνεν ἐπὶ Δαρεῖον, ἑκατὸν μυριάσιν στρατοῦ καταβαίνοντα. καί τις αὐτῷ φράζει τῶν ἑταίρων, ὡς δὲ γέλωτος ἄξιον πρᾶγμα, τοὺς ἀκολούθους παίζοντας, εἰς δύο μέρη διῃρημένους σφᾶς αὐτούς, ὧν ἑκατέρου στρατηγὸν εἶναι καὶ ἡγεμόνα, τὸν μὲν Ἀλέξανδρον τὸν δὲ Δαρεῖον ὑπ' αὐτῶν προσαγορευόμενον, ἄρξαμένους δὲ βώλοις ἀκροβολίζεσθαι πρὸς ἀλλήλους, εἶτα πυγμαῖς, τέλος ἐκκεκαῦσθαι τῇ φιλονεικίᾳ, καὶ μέχρι λίθων καὶ ξύλων πολλοὺς (πολεμίους) δυσκατακαύστους γεγονότας. ταῦτα ἀκούσας ἐκέλευσεν αὐτοὺς μονομαχῆσαι τοὺς ἡγεμόνας, καὶ τὸν μὲν Ἀλέξανδρον αὐτὸς ὥπλισεν, τὸν δὲ Δαρεῖον Φιλώτας. ἐθεᾶτο δὲ ὁ στρατὸς ἐν οἰωνῷ τινι τοῦ μέλλοντος τιθέμενος τὸ γιγνόμενον, ἰσχύρας δὲ τῆς μάχης γενομένης, ἐνίκησεν ὁ καλούμενος Ἀλέξανδρος, καὶ δωρεὰν ἔλαβεν δώδεκα κώμας, καὶ στολῇ Περσικῇ χρῆσθαι. ταῦτα μὲν οὖν Ἐρατοσθένης ἱστόρηκεν.

121: Plut. Moralia p. 329:

Ἀλέξανδρος οὐ τὴν ἐσθῆτα προσήκατο τὴν Μηδικήν,

seeing Alexander off on his campaign, told him privately the secret of his birth, and bade him have thoughts worthy of his parentage.

120.

After gaining control of all the territory inside the Euphrates, Alexander was proceeding against Darius, who was marching down with a force of a million men. One of his companions told, as something to laugh at, that his followers had divided themselves in play into two parties, each of which had its general and leader; the one being addressed by them as Alexander, the other as Darius. Beginning by throwing at each other with clods, they had gone on to fisticuffs, and finally, inflamed with their rivalry, to stones and clubs, and many had been difficult to calm down. When he heard this he ordered the leaders to meet in single combat. He himself armed "Alexander", and Philotas armed "Darius". The army looked on, taking what was happening as a kind of omen of future events. The battle became intense, and the man called "Alexander" won. He received as his reward twelve villages and the right to wear a Persian robe.

Such is the account of Eratosthenes.

121.

Alexander adopted not the Medic garb, but the

ἀλλὰ τὴν Περσικήν, εὐτελεστέραν οὖσαν· τὰ γὰρ ἔξαλλα καὶ τραγικὰ τοῦ βαρβαρικοῦ νόσμου παραιτησάμενος, οἷον τιάραν καὶ κάνδυν καὶ ἀναξυρίδας, ἐκ τοῦ Μακεδονικοῦ καὶ Περσικοῦ τρόπου μεμιγμένην τινα στολὴν ἐφόρει καθάπερ Ἐρατοσθένης ἱστόρηκεν.

(Uncertain)

122: Schol. Plat., Ruhnk p. 61:

Σιβύλλαι. τετάρτη, Ἰταλική, ἡ ἐν ἐρημίᾳ τῆς Ἰταλίας τὴν διατριβὴν λαχοῦσα, ἧς υἱὸς ἐγένετο Εὔανδρος, ὁ τὸ ἐν Ῥώμῃ τοῦ Πανὸς ἱερόν, τὸ καλούμενον Λούπερκον, κτίσας· περὶ ἧς ἔγραψεν Ἐρατοσθένης.

123: Lactanius I. 6, p. 25:

Sextam (Sibyllam) Samiam, de qua scribit Eratosthenes in antiquis annalibus Samiorum repperisse se scriptum.

Olympic Victors: 124-132:

124: Schol. Theoc. II 121 a:

λεύκαν Ἡρακλέος. (Ἐρατοσθένης ἐν) Ὀλυμπιονίκαις φησὶ τὸν Ἡρακλέα κατελθόντα εἰς Ἅιδου εὑρεῖν παρὰ τῷ Ἀχέροντι φυομένην τὴν λεύκην καὶ αὐτῇ ἀναστέψασθαι ἣν Ὅμηρος (Il.N. 389, Π 482) ἀχερωΐδα καλεῖ.

Persian, which was less extravagant. He deprecated the odd and theatrical parts of the foreign dress, such as the crown, the robe, and the trousers, and according to Eratosthenes wore a kind of robe combining the Macedonian and Persian fashions.

(Uncertain)

122.

Sibylla: A fourth, of Italy; she spent her allotted span in an Italian wilderness. She bore a son, Evander, who founded in Rome the temple of Pan known as the Lupercal. Eratosthenes wrote about her.

123.

A sixth, of Samos, of whom Eratosthenes says that he found mention in the ancient records of the Samians.

Olympic Victors: 124-132:

124.

The white poplar of Heracles: In his "Olympic Victors" Eratosthenes says that when Heracles went down to the kingdom of Hades he found the white poplar growing beside the Acheron, and crowned himself with it. Homer calls it "acheroia".

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125: Schol. Pind. Ol. IX. 1:

Ἐρατοσθένης δέ φησι μὴ ἐκινίκιον εἶναι τὸ Ἀρχιλόχου μέλος, ἀλλ' ὕμνον εἰς Ἡρακλέα, τριπλόον δέ, οὐδιὰ τὸ ἐκ τριῶν στροφῶν συγκεῖσθαι, ἀλλὰ διὰ τὸ τρὶς ἐφυμνιάζεσθαι τὸ Καλλίνικε. περὶ δὲ τοῦ Τήνελλα Ἐρατοσθένης φησίν ὅτι ὅτε ὁ νικηφορικὸς μὴ παρῆν, ὁ ἔξαρχος αὐτὸ μεταλαβὼν ἔλεγεν ἔξω τοῦ μέλους· ὁ δὲ τῶν κωμαστῶν χορὸς ἐπέβαλε τὸ Καλλίνικε. καὶ οὕτω συνειρόμενον γέγονε τὸ Τήνελλα Καλλίνικε. ἡ δὲ ἀρχὴ τοῦ μέλους ἐστίν· Ὦ Καλλίνικε, χαῖρ', ἄναξ Ἡράκλεις.

126: Schol. Eurip. Hec. 574:

φύλλοις ἔβαλλον. Ἐρατοσθένης φησὶ περὶ τῆς φυλλοβολίας, ὡς πάλαι χωρὶς ἄθλων ἀγωνιζομένων ἀνθρώπων, τῷ νικήσαντι καθάπερ ἔρανον εἰσφέροντες ἔρριπτον τῶν θεατῶν ὅπως ἕκαστος ἠπόρει. διὸ δὴ σύνηθες ἐγίνετο, κύκλῳ περιπορευόμενον ἐκαγείρειν καὶ λαμβάνειν τὸ διδόμενον. οἱ μὲν οὖν ἐμπορευόμενοι διάφορα δῶρα, τῶν δὲ λοιπῶν οἱ μὲν οὖν ἐγγὺς καθήμενοι στεφάνους ἐπετίθεσαν, οἱ δὲ ἀνώτερῳ τοῦτο ὅπερ ἦν λοιπὸν ἔβαλλον τοῖς ἄνθεσι καὶ φύλλοις. καὶ νῦν ἐπὶ τοῖς ἐπιφανῶς ἀγωνιζομένοις

125.

Eratosthenes says that the "song of Archilochus" is not a victory ode but a hymn to Heracles, and that it is called "triple", not because it consists of three strophes, but because of the thrice-repeated "Callinike" (Fair Victor). As for the word "Tenella", Eratosthenes says that, when there was no harpist present, the chorus-leader used to say it, outside the song, when taking up the tune, and the chorus of revellers added their "Callinike!" Thus it happened that the phrase "Tenella Callinike!" was put together. The actual beginning of the song is: "Hail, fair victor, Lord Heracles. . . . ."

126.

They pelted with leaves: On "leaf-pelting", Eratosthenes says that when in former times men competed in the Games without prizes, all the spectators used to throw according to their capacity, as though making a contribution to the winner. Thus it naturally became customary for him to go round about to pick up and receive what was offered. Those who were travelling on business would throw superior gifts, while, of the rest, those who were sitting near used to put garlands on them, and those on the higher benches did what was left for them--pelted them with flowers and leaves. Nowadays, too, when men put up a particularly good contest, they throw in front

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προβάλλουσι ζώνας, πέταλα, χιτωνίσκους, πετάσους, κρηπῖδας. ἕως μὲν οὖν ἦν ἀγώνισμα κατὰ τὴν Ὀλυμπίαν ἦν, δαψιλὴς ἐγίνετο ἡ τῶν δωρεῶν δόσις· κολυπλασιαζομένων δὲ τούτων ταῦτα ἐμειοῦτο εἰς πολλὰ καταμεριζομένα· καὶ τέλος ἡ φυλλοβολία κατελείφθη. ταῦτα οὖν περὶ τοὺς χρόνους Εὐριπίδου.

127: Schol. Odyss. Mediol θ'. 190:

ὁ δίσκος λίθος ἦν, καὶ Ἐρατοσθένης ἐν Ὀλυμπιακοῖς ἱστορεῖ, τὸν μὲν σόλον λέγει σίδηρον ἢ ξύλινον ἢ χαλκοῦν τετρημένον κατὰ τὸ μέσον, καὶ ἔχοντα καλῶδιον ἐξημμένον, ὃ ἐχόμενοι βάλλουσιν οἱ ἀγωνιζόμενοι. οὕτω καὶ ἐπὶ Πατρόκλῳ κέχρηται· διό φησι· αὐτὰρ Πηλείδης θῆκε σόλον ὃν πρὶν μὲν βίηφι πάσκε. ὅθεν κατωμάδιον αὐτὸν λέγεσθαι· ὅσσα δὲ δίσκου οὖρα κατωμαδίοιο πέλονται. διὰ τοῦτο καὶ νῶν ἔφη, τὸν βα περιστρέψας.

128: Athenaeus IV p. 154 A:

Ἐρατοσθένης δ' ἐν πρώτῳ Ὀλυμπιονικῶν τοὺς Τυρρηνοὺς φησι πρὸς αὐλὸν πυκτεύειν.

129: Hesychius:

Ἐφώδιων. Ἐρατοσθένης διὰ τοῦ τ Ἐφώτιων

of them belts, flowers, tunics, hats, and shoes.

So long as there was only the one competition, at Olympia, the presentation of gifts was abundant; but when they were multiplied, they grew less as they were divided among many, and finally the "leaf-pelting" was abandoned.

All this relates to the age of Euripides.

127.

The discus was a stone. In his "Olympic Games" Eratosthenes describes the σόλος as of iron, wood, or bronze, with a hole in the middle and a rope attached, holding which the competitors throw it. This is the sense in which it is used in the story of Patroclus. Thus the poet says: "Then the son of Peleus gave as the prize the "solos" which formerly (Eetion) used to throw." Hence comes the term "throwing over-arm": "As far as the limits of a discus(-throw)." Therefore he adds next: "Whirling it round".

128.

In the first book of the "Olympic Victors", Eratosthenes says that the Etruscans box to the flute.

129.

Ephodion: Eratosthenes records Ephodion with a

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ἀναγράφει Μαινάλιον περιοδονίκην παγκρατιαστήν· ὁ δὲ Πολέμων διὰ τοῦ δ.

130: Diog. Laert. VIII, 47:

καὶ ἕτερον (Πυθαγόραν), ὡρικὰ πεπραγματευμένον, ὡς Διονύσιος ἱστορεῖ. Ἐρατοσθένης δέ φησι, καθὸ καὶ Φαβωρῖνος ἐν τῇ η' παντοδαπῆς ἱστορίας παρατίθεται, τοῦτον εἶναι τὸν πρῶτον ἐντέχνως πυκτεύσαντα ἐπὶ τῆς ὀγδόης τε καὶ τεττρακοστῆς Ὀλυμπιάδος, κομήτην καὶ ἁλουργίδα φοροῦντα, ἐκπριθέντα τ' ἐκ τῶν παίδων, καὶ χλευασθέντα αὐτίκα προσβῆναι τοὺς ἄνδρας, καὶ νικῆσαι.

131: Diog. Laert. VIII, 51:

λέγει δὲ καὶ Ἐρατοσθένης ἐν τοῖς Ὀλυμπιονίκαις, τὴν πρώτην καὶ ἑβδομηκόστην Ὀλυμπιάδα νενικηκέναι τὸν τοῦ Μέτωνος πατέρα, μάρτυρι χρώμενος Ἀριστοτέλει.

132: Schol. Menander, Ox. Pap. III 409:

Ἀστυάνακτος. τοῦ Μιλησίου Ἀστυάνακτος πολλοὶ σφόδρα τῶν κωμῳδιογράφων μέμνηνται· ἐγένετο γὰρ παγκρατιαστὴς πράτιστος τῶν καθ' αὐτόν, ἠγωνίσατο δὲ καὶ πυγμῇ. Ἐρατοσθένης δ' ἐν τῷ τῶν Ὀλυμπιονικῶν προθεὶς ρις Ὀλυμπιάδα φησίν. Ἀστυάναξ ὁ Μιλήσιος ϛ' τὴν περίοδον ἀκονττί.

T, as a Maenalian pancratiast who was victorious in all the games. Polemon spells it with a D.

130.

A second was Pythagoras, who behaved in the Doric manner, according to the story told by Dionysius. Eratosthenes says, and his version is corroborated by Favorinus in Book 8 of his "Miscellany", that Pythagoras was the first to box on a definite system. In the forty-eighth Olympiad he appeared wearing long hair and a purple robe, was barred from the boys' class, and though jeered at he went on to the men's class and won.

131.

Eratosthenes says in his "Olympic Victors", on the authority of Aristotle, that the father of Meton was victorious at the seventy-first Olympiad.

132.

Astyanax: Very many of the comic writers mention Astyanax. He became the champion pancratiast of his time, and also boxed. Eratosthenes in his work on "Olympic Victors", setting out the 116th Olympiad, says: "Astyanax of Miletus for the sixth time won the championship without effort."

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GEOGRAPHY:

Book I: 133-163:

133: Strabo C 1:

οἵ τε γὰρ ἠρῶτοι θαρρήσαντες αὐτῆς ἅψασθαι τοιοῦτοι δή τινες ὑπῆρξαν· Ὅμηρός τε καὶ Ἀναξίμανδρος ὁ Μιλήσιος καὶ Ἑκαταῖος, ὁ πολίτης αὐτοῦ, καθὼς καὶ Ἐρατοσθένης φησί.

134: Strabo, C 16:

χωρὶς δὲ τούτων ὁ Ἐρατοσθένης ἑαυτῷ μάχεται· μικρὸν γὰρ πρὸ τῆς λεχθείσης ἀποφάσεως ἐναρχόμενος τοῦ περὶ τῆς γεωγραφίας λόγου φησὶν ἅπαντας κατ' ἀρχὰς φιλοτίμως ἔχειν εἰς τὸ μέσον φέρειν τὴν ὑπὲρ τῶν τοιούτων ἱστορίαν, Ὅμηρον γοῦν ὑπὲρ τὰ τῶν Αἰθιόπων ὅσα ἐπύθετο καταχωρίσαι εἰς τὴν ποιήσιν καὶ περὶ τῶν κατ' Αἴγυπτον καὶ Λιβύην, τὰ δὲ δὴ κατὰ τὴν Ἑλλάδα καὶ τοὺς σύνεγγυς τόπους καὶ λίαν περιέργως ἐξενηνοχέναι, πολυτρήρωνα μὲν τὴν Θίσβην λέγοντα Ἀλίαρτον δὲ ποιήεντα ἐσχατόωσαν δὲ Ἀνθηδόνα, Λίλαιαν δὲ κηγῆς ἐπὶ Κηφισσοῖο, καὶ οὐδεμίαν προσθήκην πεινῶς ἀπορρίπτειν.

GEOGRAPHY:

Book I: 133-163:

133.

The first who found courage to tackle it, as Eratosthenes says himself, were men of this kind: namely, Homer, Anaximander of Miletus, and Hecataeus, his fellow townsman.

134.

Apart from this Eratosthenes himself is inconsistent. A little before the previously mentioned remark, at the beginning of his geographical work, he says that all writers begin by ostentatiously exhibiting their learning in such matters. Homer, at any rate, spread over his poetry the knowledge he had gained about Ethiopia and all concerned with Egypt and Libya, while particularly Greece and its immediate neighbourhood he described with even excessive care. Thus he calls Thisbe "haunt of doves", (Il. 2,502) Haliartus "grassy", (Il. 2,503) Anthedon "distant", (Il. 2,508) Lilaea "by the sources of Cephisus", (Il. 2,523) and throws away no epithet without effect.

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135: Strabo C. 16:

τοῦτο μὲν δὴ ὀρθῶς ἂν λέγοις, ὦ Ἐρατόσθενες· ἐκεῖνα δ'οὐκ ὀρθῶς, ἀφαιρούμενος αὐτὸν τὴν τοσαύτην πολυμάθειαν καὶ τὴν ποιητικὴν γραῶδη μυθολογίαν ἀποφαίνων, ἣ δέδοται πλάττειν, φῇς, ὃ ἂν αὐτῇ φαίνηται ψυχαγωγίας χάριν.

136: Strabo C. 16:

ὁ δ'ἐπήνεγκεν, ὅτι ψυχαγωγίας μόνον, διδασκαλίας δ'οὔ. καὶ προσπεριεργάζεταί τε, πυνθανόμενος τί συμβάλλεται πρὸς ἀρετὴν ποιητοῦ πολλῶν ὑπάρξαι τόπων ἔμπειρον ἢ στρατηγίας ἢ γεωργίας ἢ ῥητορικῆς ἢ οἷα δὴ περιποιεῖν αὐτῷ τινες ἐβουλήθησαν;

137: Strabo C. 298 f.:

ἃ δ''Απολλόδωρος ἐν τῷ δευτέρῳ Περὶ νεῶν προσοιμιαζόμενος εἴρηκεν, ἥκιστα λέγοιτ'ἂν· ἐπαινεῖ γὰρ Ἐρατοσθένους ἀπόφασιν, ὅτι φησὶν ἐκεῖνος καὶ Ὅμηρον καὶ τοὺς ἄλλους τοὺς παλαιοὺς τὰ μὲν Ἑλληνικὰ εἰδέναι, τῶν δὲ πόρρω πολλὴν ἔχειν ἀπειρίαν, ἀπείρους μὲν μακρῶν ὁδῶν ὄντας, ἀπείρους δὲ τοῦ ναυτίλλεσθαι . . . ποταμῶν γοῦν περὶ τετταράκοντα ῥεόντων εἰς τὸν Πόντον, μηδὲ τῶν ἐνδοξοτάτων μηδένος μεμνῆσθαι. οἷον Ἴστρου,

135.

You may be right, Eratosthenes, in saying this, but you are not right when you rob him (Homer) of his great and extensive learning and hold up poetry as a collection of old wives' tales permitted, so you say, to fabricate anything it likes for the sake of entertainment.

136.

His actual words were: "For entertainment, not edification." He even labours the point further, when he asks how it conduces to the excellence of a poet to be skilled in many subjects, in geographical or military knowledge, in agriculture or oratory, or whatever qualities people have seen fit to attribute to Homer.

137.

What Apollodorus says in the second book of his "Ships" scarcely merits quotation. He expresses approval of the remark of Eratosthenes that Homer and the other ancient writers are familiar with Greek geography but quite lack experience of distant places; that they have no experience of long distances or of navigation. . . . . He points out that, although there are about forty rivers flowing into the Pontus, Homer does not mention any

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Ταναΐδος, Βορυσθένους, Ὑπάνιος, Φάσιδος, Θερμώδοντος,
"Αλυος· ἔτι δὲ Σκυθῶν μὲν μὴ μεμνῆσθαι, πλάττειν δὲ
ἀγανούς τινας Ἱππημολγοὺς καὶ Γαλακτοφάγους Ἀβίους
τε. Παφλαγόνας τε τοὺς ἐν τῇ μεσογαίᾳ ἱστορημέναι
παρὰ τῶν πεζῇ τοῖς τόποις πλησιασάντων, τὴν παραλίαν
δὲ ἀγνοεῖν· καὶ εἰκότως γε. ἄπλουν γὰρ εἶναι τότε
τὴν θάλατταν ταύτην, καὶ καλεῖσθαι, Ἄξενον διὰ τὸ
δυσχείμερον καὶ τὴν ἀγριότητα τῶν περιοικούντων ἐθ-
νῶν, καὶ μάλιστα τῶν Σκυθικῶν, ξενοθυτούντων καὶ σαρκο-
φαγούντων καὶ τοῖς κρανίοις ἐκπώμασι χρωμένων· ὕστε-
ρον δ' Εὔξεινον κεκλῆσθαι, τῶν Ἰώνων ἐν τῇ παραλίᾳ
πόλεις κτισάντων· ὁμοίως δ' ἀγνοεῖν καὶ τὰ περὶ Αἴ-
γυπτον καὶ Λιβύην, οἷον τὰς ἀναβάσεις τοῦ Νείλου
καὶ προσχώσεις τοῦ πελάγους, ὃν οὐδαμοῦ μεμνῆσθαι,
οὐδὲ τοῦ ἰσθμοῦ τοῦ μεταξὺ τῆς Ἐρυθρᾶς καὶ τῆς
Αἰγυπτίας θαλάττης, οὐδὲ τῶν κατὰ τὴν Ἀραβίαν
καὶ Αἰθιοπίαν καὶ τὸν ὠκεανον, εἰ μὴ Ζήνωνι τῷ φιλοσό-
φῳ προσεκτέον γράφοντι·

Αἰθιοπάς θ' ἱκόμην καὶ Σιδονίους Ἄραβάς τε.

οὐ θαυμαστὸν εἶναι περὶ Ὁμήρου· καὶ γὰρ
τοὺς ἔτι νεωτέρους ἐκείνου πολλὰ ἀγνοεῖν καὶ τερατο-
λογεῖν· Ἡσίοδον μὲν Ἠμίκυνας λέγοντα καὶ Με-
γαλοκέφαλους καὶ Πυγμαίους, Ἀλκμᾶνα δὲ Στεγανόπο-
δας, Αἰσχύλον δὲ Κυνοκεφάλους καὶ Στερνοφθάλμους καὶ
Μονομμάτους, καὶ ἄλλα μυρία. ἀπὸ δὲ τούτων ἐπὶ τοὺς

even of the best known, such as the Ister, Tanais, Borysthenes, Hypanis, Phasis, Thermodon, or Halys. Further, not only does he not mention the Scythians, but he invents "noble Mare-milkers, Milk-drinkers and Frugal". (Il. 13, 5-6) He has learnt of the Paphlagonians of the interior from people who have approached the district by land, but of the coast he is ignorant. This was quite natural, too, for this sea was in those days not opened to navigation, and was called "Axenos" (Unfriendly) because of its stormy nature and the savagery of the tribes that dwelt round it, especially the Scythian tribes: they had the reputation of murdering foreigners, of cannibalism, and of using skulls for drinking-vessels. Later on it was named "Euxinos" (Friendly), after the Ionians had founded cities on the coast. In the same way Homer was unfamiliar with the districts of Egypt and Libya, of the ascents of the Nile and its approaches to the sea, which he nowhere mentions; nor did he know of the isthmus between the Erythraean and Egyptian seas, or of districts in Arabia, Ethiopia and the Ocean—unless we should pay attention to Zeno the philosopher, who wrote:

"I arrived at the Ethiopians, the Sidonians and the Arabs."

There is, however, says Eratosthenes, no reason for surprise about Homer. Even writers junior to him

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συγγραφέας βαδίζει Ῥιπαῖα ὄρη λέγοντας καὶ τὸ Ὠγύιον ὄρος καὶ τὴν τῶν Γοργόνων καὶ Ἑσπερίδων κατοικίαν καὶ τὴν παρὰ Θεοκόμπῳ Μεροπίδα γῆν, παρ' Ἑκαταίῳ δὲ Κιμμερίδα πόλιν, παρ' Ἐφήμερῳ δὲ τὴν Παγχαίαν γῆν, παρ' Ἀριστοτέλει δὲ ποταμίους λίθους ἐξ' ἄμμου, ἐκ δὲ τῶν ὄμβρων τήκεσθαι· ἐν δὲ τῇ Λιβύῃ Διονύσου πόλιν εἶναι, ταύτην δ' οὐκ ἐνδέχεσθαι δὶς τὸν αὐτὸν ἐξευρεῖν . . . . . ἄλλους δ' αἰτιᾶται ψεύσασθαι περὶ Γερήνων καὶ τοῦ Ἀκακησίου καὶ Δήμου ἐν Ἰθάκῃ, Πελεθρονίου δ' ἐν Πηλίῳ, Γλαυκωπίου δ' ἐν Ἀθήναις. τούτοις δὲ μικρά τινα προσθεὶς τοιαῦτα παύεται, τὰ πλεῖστα μετενέγκας παρὰ τοῦ Ἐρατοσθένους ὡς καὶ πρότερον ἐμνήσθημεν, οὐκ εὖ εἰρημένα, τὸ μὲν γὰρ τοὺς ὑστερον ἐμπειροτέρους γεγονέναι τῶν πάλαι περὶ τὰ τοιαῦτα καὶ Ἐρατοσθένει καὶ τούτῳ δοτέον· . . . . . προῦθεντο μὲν γὰρ διδάξαι, διότι τῶν πόρρω τῆς Ἑλλάδος πλείων ἦν ἄγνοια τοῖς πρεσβυτέροις ἢ τοῖς νεωτέροις· . . . . . Σκυθῶν μὲν γὰρ (μὴ) μεμνῆσθαι κατ' ἄγνοιάν φασι, μηδὲ τῆς περὶ τοὺς ξένους ὠμότητος αὐτῶν,

show great ignorance and make much use of fable. Hesiod, for example, speaks of the Half-dogs, Big-heads and Pygmies, while Alcman speaks of Web-feet, Aeschylus of Dog-heads, Breast-eyes, Single-eyes, and innumerable other marvels. From these he passes on to the statements of historians about Rhipaean Mountains, Mount Ogyius, and the dwelling-places of the Gorgons and the Hesperides; to the land of Meropis in Theopompus, and the city of Cimmeris in Hecataeus; to the land of Panchaea in Euhemerus, to the river-stones of sand in Aristotle, dissolving in the rain; to the existence in Libya of a city of Dionysus which does not allow the same man to find it twice. . . . .

Others he accuses of untruths about Gerena, about Acacesius and Demus in Ithaca, about Pelethronius on Pelion and Glaucopius in Athens. After adding more such small points he stops. Most of these criticisms he has copied from Eratosthenes, as I have already mentioned, and they are incorrect; though it is true that we must grant both to Eratosthenes and to him that more recent writers have acquired more experience than the ancients in such matters. . . . . They set out to show that the senior writers were more ignorant than the junior of places at a distance from Greece. . ... . They say that it was from ignorance that Homer failed to mention the

καταθυόντων καὶ σαρκοφαγούντων καὶ τοῖς κρανίοις ἐκπώμασι χρωμένων, δι' ὃδς Ἄξεινος ὠνομάζετο ὁ Πόντος, κλάττειν δ' ἀγαυούς τινας Ἱππημολγούς, Γαλακτοφάγους Ἀβίους τε, δικαιοτάτους ἀνθρώπους, τοὺς οὐδαμοῦ γῆς ὄντας.

138: Strabo C. 26:

καὶ αὐτὸς δὲ ὑπονοήσας τοῦτο ὁ Ἐρατοσθένης, ὑπολάβοι τις ἄν, φησί, τὸν ποιήτην βούλεσθαι μὲν ἐν τοῖς προσεσπερίοις τόποις τὴν πλάνην τῷ Ὀδυσσεῖ ποιεῖν, ἀποστῆναι δ' ἀξιὸ τῶν ὑποκειμένων, τὰ μὲν οὐκ ἀκριβῶς πεπυσμένον, τὰ δὲ οὐδὲ προελόμενον οὕτως, ἀλλ' ἐπὶ τὸ δεινότερον καὶ τὸ πρατωδέστερον ἕκαστα ἐξάγειν.

139: Strabo C. 24:

οὐκ ἐπαινεῖ δὲ (Πολύβιος) οὐδὲ τὴν τοιαύτην τοῦ Ἐρατοσθένους ἀπόφασιν, διότι φησὶ τότ' ἄν εὑρεῖν τινα, ποῦ Ὀδυσσεὺς πεπλάνηται, ὅταν εὕρῃ τὸν σκυτέα τὸν συρράψαντα τὸν τῶν ἀνέμων ἀσκόν.

140: Strabo C. 22:

ὁ Ἐρατοσθένης δὲ πρὸς ἀμφοτέρας τὰς ἀποφάσεις ἀπήντηκεν οὐκ ἔυ. πρὸς μὲν τὴν δευτέραν

Scythians, their savagery with foreigners, their murdering and cannibalism and their use of skulls as drinking vessels, because of whom the Pontus was called the Unfriendly Sea, and instead invented "noble Mare-milkers, Milk-drinkers and Frugal ", a most righteous people, who never existed anywhere in the world.

138.

Eratosthenes himself had some idea of this. One might suppose, he says, that the poet wanted to place the wanderings of Odysseus in westerly districts, but abandoned his plan partly because he was not accurately informed and partly from deliberate choice, electing rather to exaggerate everything to make it more strange and miraculous.

139.

Polybius does not approve either of Eratosthenes's remark that one would find where Odysseus wandered when one found the cobbler who sewed together the bag of the winds.

140.

Eratosthenes has opposed both arguments, unsuccessfully. Against the second, he tried at length

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ὅτι πειρᾶται διαβάλλειν φανερῶς ψευδῆ καὶ οὐκ ἄξια λόγου διὰ μακρῶν· πρὸς δὲ τὴν προτέραν, ποιητήν τε ἅπαντα ἀποφήνας φλύαρον, καὶ μήτε τεχνῶν πρὸς ἀρετὴν συντείνειν νομίσας· τῶν τε μύθων τῶν μὲν ἐν τόποις οὐ πεπλασμένοις πεφημισμένων, οἷον ἐν Ἰλίῳ καὶ Ἴδῃ καὶ Πηλίῳ, τῶν δὲ ἐν πεπλασμένοις, καθάπερ ἐν οἷς αἱ Γοργόνες ἢ ὁ Γηρυόνης, ταύτης φησὶ τῆς ἰδίας εἶναι καὶ τοὺς κατὰ τὴν Ὀδυσσέως πλάνην λεγομένους, τοῦ δὲ μὴ πεπλάσθαι λέγοντας ἀλλ' ὑποπεῖσθαι ἐξ αὐτοῦ τοῦ μὴ συμφωνεῖν ἐλέγχεσθαι ψευδομένους· τὰς γοῦν Σειρῆνας τοὺς μὲν ἐπὶ τῆς Πελωριάδος καθιδρύειν, τοὺς δὲ ἐπὶ τῶν Σειρηνουσσῶν πλείους ἢ δισχιλίους διεχουσῶν σταδίους· εἶναι δ' αὐτὰς σκόπελον τρινόρυφον διείργοντα τὸν Κυμαῖον καὶ Ποσειδωνιάτην κόλπον.

141: Strabo C. 23:

Ἐρατοσθένης δὲ Ἡσίοδον μὲν εἰπάζει πεπυσμένον περὶ τῆς Ὀδυσσέως πλάνης, ὅτι κατὰ Σικελίαν καὶ Ἰταλίαν γεγένηται, πιστεύσαντα τῇ δόξῃ μὴ μόνον τῶν ὑφ' Ὁμήρου λεγομένων μεμνῆσθαι, ἀλλὰ καὶ Αἴτνης καὶ Ὀρτυγίας, τοῦ πρὸς Συρακούσας νησίου, καὶ Τυρρηνῶν.

to discredit what is obviously false and not worth argument; against the first, he holds up every poet as a nonsense-monger and considers that their skill in geography and crafts is in no way conducive to virtue. Further, as some of the stories are located in places which are not fictitious, such as Ilion, Ida and Pelion, while others are located in fictitious places, such as the haunts of the Gorgons or Geryon, he says that the tales of Odysseus's wanderings are in this category, and that those who say they are not fictitious but have some foundation are proved to be lying. At any rate, some, he says, place the Sirens on Cape Pelorias, others on the Sirenussae more than two thousand stades away; but that they are, in fact, a three-headed rock dividing the gulfs of Cumae and Posidonia.

141.

Eratosthenes conjectures that Hesiod found out that the wanderings of Odysseus took place in the neighbourhood of Sicily and Italy, and that it was in reliance upon this opinion that he mentioned not only the places named by Homer but also Etna, Ortygia (the islet off Syracuse), and Tyrrhenia.

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142: Strabo C. 44:

'Απολλόδωρος δ'ἐπιτιμᾷ Καλλίμάχῳ συνηγορῶν τοῖς περὶ τὸν 'Ερατοσθένη, διότι, καίπερ γραμματικὸς ὤν, παρὰ τὴν 'Ομηρικὴν ὑπόθεσιν καὶ τὸν ἐξωκεανισμὸν τῶν τόκων, περὶ οὗ τὴν πλάνην φράζει, Γαῦδον καὶ Κόρηυραν ὀνομάζει.

143: Strabo C. 28:

κἀνταῦθα δ'εἰπόντος εὖ τοῦ ποιητοῦ,

Βορέης καὶ Ζέφυρος τώ τε Θρῄκηθεν ἄητον,

οὐκ εὖ δεξάμενος ὁ αὐτὸς συνοφαντεῖ, ὡς καθόλου λέγοντος, ὅτι ὁ Ζέφυρος ἐκ Θράκης πνεῖ, ἐκείνου λεγόντος οὐ καθόλου, ἀλλ'ὅταν κατὰ τὴν Θρακίαν θάλασσαν συμπέσωσι περὶ τὸν Μέλανα κόλπον αὐτοῦ τοῦ Αἰγαίου μέρος οὖσαν. . . . . .ὡς καθόλου οὖν δέχεται, εὖτ'ἀπειρίαν αἰτιᾶται τοῦ ποιητοῦ, ὡς τοῦ Ζεφύρου μὲν ἀπὸ τῆς ἑσπέρας πνέοντος καὶ τῆς 'Ιβηρίας τῆς δὲ Θράκης ἐκεῖσε μὴ διατεινούσης.

144: Strabo C. 29:

'Επιμένων δὲ τοῖς περὶ 'Ομήρου ψευδῶς ὑπολαμβάνουσι καὶ ταῦτά φησιν, ὅτι οὐδὲ τὰ τοῦ Νείλου στόματα οἶδε πλείω ὄντα οὐδ'αὐτὸ τοὔνομα, 'Ησίοδος δὲ οἶδε. μέμνηται γάρ.

142.

Apollodorus, agreeing with Eratosthenes and his followers, reproaches Callimachus because, despite his scholarship, he names Gaudos and Corcyra in defiance of Homer's plan in placing out in the ocean the districts in which he says the wanderings took place.

143.

On this point the poet says correctly:

"Boreas and Zephyrus, which both blow from Thrace." (Il. 9, 5) Eratosthenes takes this in the wrong sense, and accuses him of making a general statement that Zephyrus blows from Thrace, though he is not speaking generally but of when they meet in the Thracian Sea, which is part of the Aegean itself near the Gulf of Melas. . . . . Thus he is taking it generally, when he accuses the poet of ignorance that the Zephyr blows from the west, and from Spain, and that Thrace does not extend as far as that.

144.

Continuing in his untrue assumptions about Homer, he adds that the poet does not knoweven that the Nile has more mouths than one, or even the name of the river itself, whereas Hesiod does; for Hesiod mentions it.

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145: Strabo C. 30:

Οὐκ εὖ δὲ οὐδὲ τοῦτο προφέρουσιν αὐτῷ τὸ περὶ τῆς νήσου τῆς Φαρίας, ὅτι φησὶ πελαγίαν, ὡς κατ'ἄγνοιαν λέγοντι.

146: Strabo C. 30:

Ἡ δ'αὐτὴ ἁμαρτία καὶ περὶ τοῦ ἀγνοεῖν τὸν ἰσθμὸν τὸν μεταξὺ τοῦ Αἰγυπτίου πελάγους καὶ τοῦ Ἀραβίου κόλπου καὶ περὶ τοῦ ψευδῶς λέγεσθαι

Αἰθίοπας, τοὶ διχθὰ δεδαίαται ἔσχατοι ἀνδρῶν ἀνηρῶν.

147: Strabo, C. 802:

φησὶ δ''Ερατοσθένης κοινὸν μὲν εἶναι τοῖς βαρβάροις πᾶσιν ἔθος τὴν ξενηλασίαν,, τοὺς δ'Αἰγυπρίους ἐλέγχεσθαι διὰ τῶν περὶ τὸν Βούσιριν μεμυθευμένων ἐν τῷ Βουσιρίτῃ νομῷ, διαβάλλειν τὴν ἀξενίαν/βουλομένων τοῦ τόπου τούτου τῶν ὕστερον, οὐ βασιλέως, μὰ Δία, οὐδὲ Τυράννου γενομένου τινὸς Βουσίριδος· προσεπιφημισθῆναι δὲ καὶ τὸ Αἰγυπτόνδ'ἴεναι δολίχην ὁδὸν ἀγαλέην τε, προσλαμβάνοντος πρὸς τοῦτο πάμπολυ καὶ τοῦ μηδὲ τὸν ὄντα λιμένα ἀνεῖσθαι τὸν πρὸς τῇ Φάρῳ, φρουρεῖσθαι δ'ὑπὸ βουκόλων λῃστῶν ἐπιτιθεμένων

145.

It is not right either for them to bring up against him the fact that he speaks of the island of Pharos as out at sea, as though this were due to ignorance.

146.

The same mistake is made too about his ignorance of the isthmus between the Egyptian sea and the Arabian Gulf, and about the falsity of the words:

"The Ethiopians, who are divided in two, the furthest of men." (Od. 1, 23)

147.

Eratosthenes says that expulsion of foreigners is a practice common to all uncivilized people; but that the Egyptians are condemned for it because of the legends connected with Busiris in the Busirite district, as later writers wanted to accuse this part of inhospitality: in fact, no such king as Busiris ever existed. He also mentions the line that is quoted in addition:

"A distant way and hard, to visit Egypt,"

and says that strong support is lent to the idea by the fact that not even the existing harbour, the one of Pharos, allowed access, but was guarded by piratical herdsmen who attacked people who anchored there. The Carthaginians, too, were in the habit of sinking any foreigner

τοῖς προσορμιζομένοις· Καρχηδονίους δὲ κατακοντοῦν, εἴ τις τῶν ξένων εἰς Σαρδὼ παραπλεύσειεν ἢ ἐπὶ Στήλας· διὰ δὲ ταῦτ'ἀπιστεῖσθαι τὰ πολλὰ τῶν ἐσπερίων· καὶ τοὺς Πέρσας δὲ κακῶς ἡγεῖσθαι τοῖς πρέσβεσι τὰς ὁδοὺς κύκλῳ καὶ διὰ δυσκόλων.

148: Strabo C. 48:

εἰκών τε τοὺς ἀρχαιοτάτους πλεῖν μὲν κατὰ λῃστείαν ἢ ἐμπορίαν, μὴ πελαγίζειν δέ, ἀλλὰ παρὰ γῆν, καθάπερ τὸν Ἰάσονα, ὅπερ 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.

149: Strabo, C. 7:

φανεροὶ δὲ καὶ οἱ ἑπακολουθήσαντες αὐτῷ ἄνδρες ἀξιόλογοι καὶ οἰκεῖοι φιλοσοφίας· ὧν τοὺς πρώτους μεθ'Ὅμηρον δύο φησὶν Ἐρατοσθένης, Ἀναξίμανδρόν τε, Θαλοῦ γεγονότα γνώριμον καὶ πολίτην, καὶ Ἑκαταῖον τὸν Μιλήσιον· τὸν μὲν οὖν ἐκδοῦναι πρῶτον γεωγραφικὸν πίνακα, τὸν δὲ Ἑκαταῖον καταλιπεῖν γράμμα, πιστούμενον ἐκείνου ἐκ τῆς ἄλλης αὐτοῦ γραφῆς.

who sailed past to Sardo, or the Pillars. For these reasons, he says, most of the stories about western countries are untrustworthy. The Persians also used to guide ambassadors treacherously by circuitous and difficult roads.

148.

He says further that those of the most ancient times made voyages for piracy or commerce, not on the open sea but following the land; like Jason who even left his ships behind and marched from Colchis right to Armenia and Media. He goes on to say that in ancient times no one dared to sail the Euxine or coast along Libya, Syria and Cilicia.

149.

It is obvious that his successors also were men of good repute and familiar with philosophy. According to Eratosthenes, the first two after Homer were Anaximander, an acquaintance and fellow-citizen of Thales, and Hecataeus of Miletus: the former produced the first map of the world, while Hecataeus left a book which is believed to be his from the evidence of his other work.

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150: Strabo C. 47:

οὐδὲ τοῦτ'εὖ Ἐρατοσθένης, ὅτι ἀνδρῶν οὐκ ἀξίων μνήμης ἐπὶ πλέον μέμνηται, τὰ μὲν ἐλέγχων, τὰ δὲ πιστεύων καὶ μάρτυσι χρώμενος αὐτοῖς, οἷον Δαμάστῃ καὶ τοιούτοις ἄλλοις. . . . . ὁ δὲ Δαμάστης χρώμενος μάρτυρι οὐδὲν διαφέρει τοῦ καλοῦντος μάρτυρα τὸν Βεργαῖον ἢ τὸν Μεσσήνιον Εὔημερον καὶ τοὺς ἄλλους, οὓς αὐτὸς εἴρηκε διαβάλλων τὴν φλυαρίαν. καὶ τούτου δ'ἕνα τῶν λήρων αὐτὸς λέγει, τὸν μὲν Ἀράβιον κόλπον λίμνην ὑπολαμβάνοντος εἶναι, Διότιμον δὲ τὸν Στρομβίχου πρεσβείας Ἀθηναίων ἀφηγούμενον διὰ τοῦ Κύδνου ἀνακλεῦσαι ἐκ τῆς Κιλικίας ἐπὶ τὸν Χόασπην ποταμόν, ὃς παρὰ τὰ Σοῦσα ῥεῖ, καὶ ἀφικέσθαι τεσσαρακοστατον εἰς Σοῦσα· ταῦτα δ'αὐτῷ διηγήσασθαι αὐτὸν τὸ Διότιμον. εἶτα θαυμάζειν εἰ τὸν Εὐφράτην καὶ τὸν Τίγριν ἦν δυνατὸν διακόψαντα τὸν Κύδνον εἰς τὸν Χοάσπην ἐκβαλεῖν.

151: Strabo C. 14:

καθάπερ τοῖς προτέροις μέγα τι ἡ Ἀλεξάνδρου στρατεία, ὥς φησιν Ἐρατοσθένης. ὁ μὲν γὰρ τῆς Ἀσίας πολλὴν ἀνεκάλυψεν ἡμῖν καὶ τῶν βορείων τῆς Εὐρώπης ἅπαντα μέχρι τοῦ Ἴστρου.

150.

Eratosthenes is wrong too in mentioning at too great length men who are not worthy of mention, refuting them on some points but on others relying on them, and adducing them as evidence: I mean men like Damastes. . . . .

When he adduces Damastes it is just the same as calling as witness Euhemerus the "Bergaean," or rather Messenian, and all the rest whom he himself names by way of accusing them of writing nonsense. He himself relates one of the idle tales of Damastes: assuming that the Arabian Gulf is a lake, he says that Diotimus the son of Strombichus, when heading an embassy from Athens, sailed up the Cydnus from Cilicia to the river Choaspes, which flows by Susa, and arrived after a journey of forty days at Susa; and that he was told this by Diotimus himself. Then, Eratosthenes says, Damastes expresses surprise that it was possible for the Cydnus to cut across the Euphrates and Tigris and flow into the Choaspes.

151.

. . . . . just as Alexander's expedition much assisted our predecessors(in geographical knowledge) as Eratosthenes remarks. Alexander revealed to us much of Asia and all thenorth of Europe as far as the Ister.

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152: Strabo C. 48:

εἰπὼν δὲ καὶ αὐτός, ὁπόσον προῦβη τὰ τῆς οἰκουμένης εἰς γνῶσιν τοῖς μετ' Ἀλέξανδρον καὶ κατ' αὐτὸν ἤδη, μεταβέβηκεν ἐπὶ τὸν περὶ τοῦ σχήματος λόγου, οὐχὶ περὶ τοῦ τῆς οἰκουμένης, ὅπερ ἦν οἰκειότερον τῷ περὶ αὐτῆς λόγῳ, ἀλλὰ τοῦ τῆς συμπάσης γῆς· δεῖ μὲν γὰρ καὶ τούτου μνησθῆναι, μὴ ἀτάκτως δέ.

153: Strabo, C. 48, 49:

εἰπὼν οὖν ὅτι σφαιροειδὴς ἡ σύμπασα, οὐχ ὡς ἐκ τόρνου δέ, ἀλλ' ἔχει τινὰς ἀνωμαλίας, ἐπιφέρει τὸ πλῆθος τῶν ἐν μέρει μετασχηματισμῶν αὐτῆς, οἳ συμβαίνουσιν ἔκ τε ὕδατος καὶ πυρὸς καὶ σεισμῶν καὶ ἀναφυσημάτων καὶ ἄλλων τοιούτων.

154: Theon. Alex. p. 23:

τὴν δὲ ἀπὸ τῶν ὑψηλοτάτων ὀρῶν ἐπὶ τὰ χθαμαλώτερα πίπτουσαν κάθετον δεικνυσιν Ἐρατοσθένης διὰ τῶν ἐξ ἀποστημάτων μετρουσῶν διοπτρῶν σταδίων ι΄.

155: Strabo C. 49:

Μάλιστα δέ φησι ζήτησιν παρασχεῖν, πῶς ἐν δισχιλίοις καὶ τρισχιλίοις ἀπὸ θαλάττης σταδίοις κατὰ τὴν μεσόγαιαν ὀρᾶται πολλαχοῦ πόγχων καὶ

152.

After himself saying to what extent knowledge of the inhabited world advanced with the successors of Alexander and already in Alexander's own time, he goes on to his argument about the shape, not of the inhabited world, which would have been more suited to his argument on that subject, but of the whole earth: that, too, must of course be mentioned, but not out of its place.

153.

Then, after saying that the earth as a whole is spherical, not as though turned on a lathe but with some irregularities, he goes on to mention its many partial changes of shape, caused by water, earthquakes, eruptions and the like.

154.

Eratosthenes shows, by means of instruments measuring from distant points, that the perpendicular height of the highest mountains, to ground level, is 10 stades.

155.

He says that this especially provides a problem: how is it that at distances of two or three thousand stades from the sea, right inland, are seen in many

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ὀστρέων καὶ χηραμύδων πλῆθος καὶ λιμνοθάλατται,
καθάπερ φησὶ περὶ τὸ ἱερὸν τοῦ Ἄμμωνος καὶ τὴν
ἐπ'αὐτὸ ὁδὸν τρισχιλίων σταδίων οὖσαν· πολλὴν
γὰρ εἶναι χύσιν ὀστρέων, ἄλας τε καὶ νῦν ἔτι
εὑρίσκεσθαι πολλούς, ἀναφυσήματά τε θαλάττης
εἰς ὕψος ἀναβάλλειν, πρὸς ᾧ καὶ ναυαγία θαλατ-
τίων πλοίων δείκνυσθαι, ἃ ἔφασαν διὰ τοῦ χάσματος
ἐκβεβράσθαι, καὶ ἐπὶ στυλιδίων ἀνατεῖσθαι δελ-
φῖνας ἐπιγραφὴν ἔχοντας Κυρηναίων θεωρῶν.

156: Strabo C. 49:

ταῦτα δ'εἰπὼν τὴν Στράτωνος ἐπαινεῖ
δόξαν τοῦ φυσικοῦ, καὶ ἔτι Ξάνθου τοῦ Λυδοῦ,
τοῦ μὲν Ξάνθου λέγοντος ἐπὶ Ἀρταξέρξου γενέσ-
θαι μέγαν αὐχμόν, ὥστ'ἐκλιπεῖν ποταμοὺς καὶ
λίμνας καὶ φρέατα· αὐτὸν τε ἰδεῖν πολλαχῆ
πρόσω ἀπὸ τῆς θαλάττης λίθους τε κογχυλιώδεις
καὶ ὄστρακα πτενώδεα καὶ χηραμύδων τυπώματα καὶ
λιμνοθάλατταν ἐν Ἀρμενίοις καὶ Ματιηνοῖς καὶ ἐν
Φρυγίᾳ τῇ κάτω, ὧν ἕνεκα πείθεσθαι τὰ πεδία ποτὲ
θάλατταν γενέσθαι.

157: Strabo, C. 49, 50:

τοῦ δὲ Στράτωνος ἔτι μᾶλλον ἁπτομένου
τῆς αἰτιολογίας, ὅτι φησὶν οἴεσθαι τὸν Εὔξεινον

places many shells of mussels, oysters or scallops, and salt-water lakes? He mentions in particular the district round the temple of Ammon and the road leading to it, three thousand stades long. There is, he says, a great accumulation of oyster shells, and much salt is found even now, while jets of sea-water shoot up to some height. In addition to this, wreckage of sea-going vessels is pointed out, which the inhabitants told him was cast up through the cleft; and on small columns some dolphins have been dedicated inscribed: "From the sacred embassy of Cyrene."

156.

On this point he approves of the opinion of Strato the scientist, and also that of Xanthus the Lydian. According to Xanthus, in Artaxerxes's time a great drought took place, so that rivers, lakes and wells failed: further, he himself saw in many places, far from the sea, shell-shaped stones, pecten-shaped shells and patterns of scallops, and salt lakes in Armenia, Matieni and lower Phrygia: for these reasons he believed that the plains had once been sea.

157.

Strato touches still more on scientific explanation, and Eratosthenes says that Strato thinks

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μὴ ἔχειν πρότερον τὸ κατὰ Βυζάντιον στόμα, τοὺς δὲ ποταμοὺς βιάσασθαι καὶ ἀνοῖξαι τοὺς εἰς αὐτὸν ἐμβάλλοντας, εἶτ' ἐκπεσεῖν τὸ ὕδωρ εἰς τὴν Προποντίδα καὶ τὸν Ἑλλήσποντον, τὸ δ' αὐτὸ συμβῆναι καὶ περὶ τὴν καθ' ἡμᾶς θάλατταν· καὶ γὰρ ἐνταῦθα τὸν κατὰ Στήλας ἐπραγῆναι πόρον, πληρωθείσης ὑπὸ τῶν ποταμῶν τῆς θαλάττης, κατὰ δὲ τὴν ἔκρυσιν ἀναπαλυφθῆναι τὰ τεναγώδη πρότερον. φέρει δ' αἰτίαν, πρῶτον μὲν ὅτι τῆς ἔξω θαλάττης καὶ τῆς ἐντὸς τοῦδαφος ἕτερόν ἐστιν, ἔπειθ' ὅτι καὶ νῦν ἔτι ταινία τις ὕφαλος διατέτακεν ἀπὸ τῆς Εὐρώπης ἐπὶ τὴν Λιβύην, ὡς ἂν μὴ μίας οὔσης πρότερον τῆς τε ἐντὸς καὶ τῆς ἐκτός. καὶ βραχύτατα μὲν εἶναι τὰ περὶ τὸν Πόντον, τὸ δὲ Κρητικὸν καὶ Σικελικὸν καὶ Σαρδῷον πέλαγος σφόδρα βαθέα. τῶν γὰρ ποταμῶν πλείστων καὶ μεγίστων ῥεόντων ἀπὸ τῆς ἄρκτου καὶ τῆς ἀνατολῆς, ἐκεῖνα μὲν ἰλύος πληροῦσθαι, τὰ ἄλλα δὲ μένειν βαθέα. διὸ καὶ γλυκυτάτην εἶναι τὴν Ποντικὴν θάλατταν, τὰς τ' ἐκρύσεις γίνεσθαι εἰς οὓς ἐγκέκλιται τόπους τὰ ἐδάφη, δοκεῖν δὲ κἂν χωσθῆναι τὸν Πόντον ὅλον εἰς ὕστερον, ἂν μένωσιν αἱ ἐκπτώσεις τοιαῦται· καὶ γὰρ νῦν ἤδη τεναγίζειν τὰ ἐν ἀριστερᾷ τοῦ Πόντου, τόν τε Σαλμυδησσὸν καὶ τὰ καλούμενα Στήθη

the Euxine in
but the rivers
and then the
the Hellespont
our own sea,
was broken th
vers, and upo
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He thinks, to
later on, if
indeed, the
marsh-land,
call The Bres
Scythian dese

the Euxine in former times had no outlet at Byzantium, but the rivers which flow into it forced an opening and then the water poured out into the Propontis and the Hellespont. The same thing also happened with our own sea, for there too the strait at the Pillars was broken through as the sea was filled up by the rivers, and upon the outrush of the water was formerly, salt marsh was uncovered. His explanation is, first that the beds of the outer and the inner sea are on different levels, and, second, that even now a kind of submarine shoal stretches right from Europe to Libya, as though the inner and outer seas were not formerly one. Also, the parts round Pontus are very shallow, while the Cretan, Sicilian and Sardinian seas are extremely deep. The reason for this is that, as the rivers that flow from the north and east are very numerous and large, the former parts are being filled with mud, while the others remain deep. Therefore too the Pontic sea is the sweetest, and the outflows take place towards the parts to which the beds incline. He thinks, too, that the whole Pontus may be silted up later on, if the inflows remain as they are: even now, indeed, the left-hand side of the Pontus consists of marsh-land, that is to say Salmydessus, what seafarers call The Breasts, on either side of the Ister, and the Scythian desert. Perhaps the temple of Ammon was also

ὑπὸ τῶν ναυτικῶν τὰ περὶ τὸν Ἴστρον καὶ τὴν Σκυθῶν ἐρημίαν. τάχα δὲ καὶ τὸ τοῦ Ἄμμωνος ἱερὸν πρότερον ἐπὶ τῆς θαλάττης ὂν ἐκρύσεως γενομένης νῦν ἐν τῇ μεσογαίᾳ κεῖσθαι. εἰκάζει τε τὸ μαντεῖον εὐλόγως ἐπὶ τοσοῦτον γενέσθαι ἐπιφανές τε καὶ γνώριμον ἐπὶ θαλάττῃ ὄν· τόν τε ἐπὶ πολὺ οὕτως ἐκτοπισμὸν ἀπὸ τῆς θαλάττης οὐκ εὔλογον ποιεῖν τὴν νῦν οὖσαν ἐπιφάνειαν καὶ δόξαν· τήν τε Αἴγυπτον τὸ παλαιὸν κλύζεσθαι μέχρι τῶν ἑλῶν τῶν περὶ τὸ Πηλούσιον, καὶ τὸ Κάσιον ὄρος καὶ τὴν Σιρβωνίδα λίμνην· ἔτι γοῦν καὶ νῦν κατὰ τὴν Αἴγυπτον τῆς ἀλμυρίδος ὀρυττομένης ὀφάμμους καὶ πογχυλιώδεις εὑρίσκεσθαι τοὺς βόθρους, ὡς ἂν τεθαλαττωμένης τῆς χώρας καὶ τοῦ τόπου παντὸς τοῦ περὶ τὸ Κάσιον καὶ τὰ Γέρρα καλούμενα τεναγίζοντος, ὥστε συνάπτειν τῷ τῆς Ἐρυθρᾶς πόλπῳ· ἐνδούσης δὲ τῆς θαλάττης ἀνακαλυφθῆναι, μεῖναι δὲ τὴν Σιρβωνίδα λίμνην, εὖτ' ἐκραγῆναι καὶ ταύτην, ὥστε ἑλώδη γενέσθαι. ὡς δ' αὕτως καὶ τῆς καλουμένης Μοιρίδος λίμνης τοὺς αἰγιαλοὺς αἰγιαλοῖς θαλάττης μᾶλλον ἢ ποταμοῦ προσεοικέναι.

158: Strabo Ge. 54, 55:

Ὁ δ' οὕτως ἡδὺς ἐστιν, ὥστε καὶ μαθηματικὸς ὢν οὐδὲ τὴν Ἀρχιμήδους βεβαιοῖ δόξαν, ὅτι φησὶν ἐκεῖνος ἐν τοῖς περὶ τῶν ὀχουμένων, παντὸς ὑγροῦ καθεστηκότος καὶ μένοντος τὴν ἐπιφάνειαν σφαιρικὴν εἶναι,

formerly by the sea, but is now situated inland owing to an outflow. He surmises further that it is reasonable that the oracle became so famous and well-known, if it was on the sea, while its removal to such a distance from the sea does not reasonably explain its present fame and reputation; that Egypt in ancient times was flooded by the sea as far as the marshes round Pelusium, including Mount Casius and Lake Sirbonis; for even now, when the salt-marshes in Egypt are dug up, the trenches are found to be sandy and full of sea-shells, as though the country and the whole marshy district round Casius and what is called Gerrha had been covered by the sea so as to join the Erythrean Sea; and when the sea retreated they were uncovered, though Lake Sirbonis remained, but subsequently it too broke out, so that the land became marshy. In the same way the shores of what is called Lake Moeris are more like the shores of a sea than the banks of a river.

158.

He is so simple that, though a mathematician, he does not even confirm the theory of Archimedes expounded in his work "Floating Bodies", that when any liquid has come to rest and remains still its surface is a segment of a sphere, having the same centre as the earth. This theory is accepted by all who have

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σφαίρας ταὐτὸ κέντρον ἐχούσης τῇ γῇ. ταύτην γὰρ τὴν δόξαν ἀποδέχονται πάντες οἱ μαθημάτων κῶς ἁψάμενοι, ἐκεῖνος δὲ τὴν ἐντὸς θάλατταν, καίπερ μίαν οὖσαν, ὡς φησίν, οὐ νομίζει ὑπὸ μίαν ἐπιφάνειαν τετάχθαι, ἀλλ' οὐδ' ἐν τοῖς σύνεγγυς τόποις. καὶ μάρτυράς γε τῆς τοιαύτης ἁμαθίας ἀρχιτέκτονας ἄνδρας ποιεῖται, καίτοι τῶν μαθηματικῶν καὶ τὴν ἀρχιτεκτονικὴν μέρος τῆς μαθηματικῆς ἀποφηναμένων. φησὶ γὰρ καὶ Δημήτριον διανοῆξαι ἐπιχειρῆσαι τὸν τῶν Πελοποννησίων ἰσθμὸν πρὸς τὸ παρασχεῖν διάπλουν τοῖς στόλοις, κωλυθῆναι δ' ὑπὸ τῶν ἀρχιτεκτόνων ἀναμετρησάντων καὶ ἀπαγγειλάντων μετεωροτέραν τὴν ἐν τῷ Κορινθιακῷ κόλπῳ θάλατταν τῆς κατὰ Κεγχρεὰς εἶναι, ὥστε, εἰ διανόψειε τὸ μεταξὺ χωρίον, ἐπικλυσθῆναι ἂν ἅπαντα τὸν περὶ Αἴγιναν πόρον καὶ αὐτὴν τὴν Αἴγιναν καὶ τὰς πλησίον νήσους, καὶ μηδὲ τὸν διάπλουν ἂν γενέσθαι χρήσιμον. διὰ δὲ τοῦτο καὶ τοὺς εὐρίπους ῥοώδεις εἶναι, μάλιστα δὲ τὸν κατὰ Σικελίαν πορθμόν, ὃν φησιν ὁμοιοπαθεῖν ταῖς κατὰ τὸν ὠκεανὸν πλημμυρίσι τε καὶ ἀμπώτεσι· δὶς γὰρ μεταβάλλειν τὸν ῥοῦν ἑκάστης ἡμέρας καὶ νυκτός, καὶ καθάπερ τὸν ὠκεανὸν δὶς μὲν πλημμυρεῖν, δὶς δὲ ἀναχωρεῖν. τῇ μὲν οὖν πλημμυρίδι ὁμολογεῖν τὸν ἐκ τοῦ Τυῤῥηνικοῦ πελάγους εἰς τὸ Σικελικὸν καταφερόμενον ὡς ἂν ἐκ μετεωροτέρας ἐπιφανείας, ὃν δὴ καὶ κατιόντα ὀνομάζεσθαι, ὁμολογεῖν δ' ὅτι καὶ κατὰ τὸν αὐτὸν καιρὸν ἄρχεταί τε καὶ παύεται καθ' ὃν αἱ πλημμυρίδες· ἄρχεται μὲν γὰρ περὶ τὴν ἀνατολὴν τῆς

touched mathematics at all. He, however, does not think that the inner sea, although he admits that it is continuous, has been brought under the form of a continuous surface, even in adjacent places. He even brings as witnesses to such ignorance men who are engineers, although mathematicians have shown that engineering is a part of mathematics. He says that Demetrius attempted to cut through the Peloponnesian isthmus to provide a passage for his expeditions, but was stopped by the engineers when they had taken measurements and reported that the sea in the Gulf of Corinth was higher than that at Cenchreae, so that if he cut through the intervening land all the narrows about Aegina and Aegina itself with the neighbouring islands would be flooded, and in any case the passage would be of no use. For this reason also the narrows have strong currents, especially the Sicilian strait, which he says behaves like the flood- and ebb-tides in the ocean; for it changes its current twice each day and night, and like the ocean flows and ebbs twice. Thus the current carried down from the Tyrrhenian sea to the Sicilian corresponds with the flood-tide, as though coming from a higher surface- and it is actually called the "descending" current. It corresponds in the sense that it begins and stops at the same time as the flood-tides: it begins about the time when the moon rises and

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σελήνης καὶ τὴν δύσιν, λήγει δ' ὅταν συνάπτῃ τῇ μεσουρανήσει ἑκατέρᾳ, τῇ τε ὑπὲρ γῆς καὶ τῇ ὑπὸ γῆς· τῇ δὲ ἀμπώτει τὸν ἐναντίον, ὃν ἐξιόντα καλεῖσθαι, ταῖς μεσουρανήσεσι τῆς σελήνης ἀμφοτέραις συναρχόμενον, καθάπερ ἀμπώτεις, ταῖς δὲ συνάψεσι ταῖς πρὸς τὰς ἀνατολὰς καὶ δύσεις παυόμενον.

159: Strabo C. 384:

Ἐξαρθὲν γὰρ ὑπὸ σεισμοῦ τὸ πέλαγος κατέκλυσε καὶ αὐτὴν καὶ τὸ ἱερὸν τοῦ Ἑλικωνίου Ποσειδῶνος, ... κατεκλύσθη δ' ἡ Ἑλίκη δυσὶν ἔτεσι πρὸ τῶν Λευκτρικῶν. Ἐρατοσθένης δὲ καὶ αὐτὸς ἰδεῖν φησι τὸν τόπον, καὶ τοὺς πορθμέας λέγειν, ὡς ἐν τῷ πόρῳ ὀρθὸς ἑστήκει Ποσειδῶν χάλκεος, ἔχων ἱππόκαμπον ἐν τῇ χειρί, κίνδυνον φέροντα τοῖς δικτυεύουσιν.

160: Strabo C. 61, 62:

Ἐπάνιμεν δ' ἐπὶ τὰ ἑξῆς, ἀφ' ὧν παρέβημεν. τοῦ γὰρ Ἡροδότου μηδένας Ὑπερβορείους εἶναι φήσαντος, μηδὲ γὰρ Ὑπερνοτίους, γελοίαν φησὶν εἶναι τὴν ἀπόδειξιν καὶ ὁμοίαν ὁ Ἐρατοσθένης τῷ σοφίσματι τούτῳ, εἴ τις λέγοι μηδένας εἶναι ἐπιχαιρεκάκους, μηδὲ γὰρ ἐπιχαιρα-

sets, and slackens when it reaches either meridian, above or below the earth. The opposite current, called the "Outgoing", corresponds with the ebb, beginning when the moon reaches either meridian, like the ebb-tides, and stopping when it arrives at its rising or setting.

159.

The sea was raised by an earthquake and flooded both it (Helice) and the temple of Heliconian Poseidon . ... . . Helice was flooded two years before the battle of Leuctra. Eratosthenes says that he saw the place himself, and that the ferrymen told him that on the strait there used to stand a bronze figure of Poseidon holding in his hand a hippocampus, which caused danger to fishermen.

160.

I shall return to the order of argument from which I digressed.

Whereas Herodotus says that there are no Hyperboreans, for there are no Hypernotians either, Eratosthenes says that the argument is absurd and resembles the quibble: "There are nonewho rejoice at people's misfortunes, for there are none either who rejoice at their good fortunes." Further, he says it happens that there are Hypernotians too: at least

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γάθους· κατὰ τύχην τε εἶναι καὶ 'Υπερνοτίους· κατὰ γοῦν τὴν Αἰθιοπίαν μὴ πνεῖν Νότον, ἀλλὰ κατωτέρω.

161: Strabo C. 62:

'Εξῆς δὲ λέγει πρὸς τοὺς φανερῶς πεπλασμένα καὶ ἀδύνατα λέγοντας, τὰ μὲν ἐν μύθου σχήματι, τὰ δ' ἱστορίας, περὶ ὧν οὐκ ἄξιον μεμνῆσθαι· οὐδ'ἐκεῖνον ἐχρῆν ἐν ὑποθέσει τοιαύτῃ φλυάρους ἐπισκοπεῖν. ἡ μὲν οὖν πρώτη διέξοδος αὐτῷ τῶν ὑπομνημάτων τοιαύτη.

162: Arrian. Anab. V. 3: 1. f.:

οὐ γὰρ ἔγωγε 'Ερατοσθένει τῷ Κυρηναίῳ πάντη ξυμφέρομαι, ὃς λέγει πάντα ὅσα ἐς τὸ θεῖον ἀναφέρεται ἐκ Μακεδόνων πρὸς χάριν τὴν 'Αλεξάνδρου ἐς τὸ ὑπέρογκον ἐπιφημισθῆναι, καὶ γὰρ καὶ σπήλαιον λέγει ἰδόντας ἐν Παραπαμισάδαις τοὺς Μακεδόνας καὶ τινα μῦθον ἐπιχώριον ἀκούσαντας ἢ καὶ αὐτοὺς ξυνθέντας φημίσαι ὅτι τοῦτο ἄρα ἦν τοῦ Προμηθέως τὸ ἄντρον, ἵνα ἐδέδετο, καὶ ὁ ἀετὸς ὅτι ἐκεῖσε ἐφοίτα δαισόμενος τῶν σπλάγχνων τοῦ Προμηθέως, καὶ ὁ 'Ηρακλῆς ὅτι ἐκεῖσε ἀφικόμενος τόν τε ἀετὸν ἀπέκτεινε καὶ τὸν Προμηθέα τῶν δεσμῶν ἀπέλυσε. τὸν δὲ Καύκασον τὸ ὄρος ἐκ τοῦ Πόντου ἐς τὰ πρὸς ἕω μέρη τῆς

Notus does not blow in Ethiopia, but further down (towards the sea - i.e. north).

161.

Next he argues against people whose statements are obviously fictitious and impossible, partly in the guise of myth and partly in that of history: these it is not fitting to mention, nor should he have paid attention to dealers in nonsense in a discourse of this kind. So much, then, for the exposition in the first of his Essays.

162.

I myself do not altogether agree with Eratosthenes of Cyrene when he says that everything reported by the Macedonians on sacred matters was grossly exaggerated to please Alexander. He says that the Macedonians, seeing a cave in the Parapamisus range and hearing some local tale, themselves made up the story that this was actually the cave where Prometheus was bound; that the eagle used to visit it to feast on his entrails, and that Heracles arrived there, killed the eagle and freed Prometheus from his chains. He says further that the Macedonians in this account extended the Caucasus range from the Black Sea towards the eastern parts of the earth and the country of the

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γῆς καὶ τὴν Παραπαμισαδῶν χώραν ὡς ἐπὶ Ἰνδοὺς μετάγειν τῷ λόγῳ τοὺς Μακεδόνας, Παραπάμισον ὄντα τὸ ὄρος αὐτοὺς καλοῦντας Καύκασον τῆς Ἀλεξάνδρου ἕνεκα δόξης, ὡς ὑπὲρ τὸν Καύκασον ἄρα ἐλθόντα Ἀλέξανδρον. ἔν τε αὐτῇ τῇ Ἰνδῶν γῇ βοῦς ἰδόντας ἐγκεκαυμένας βόκαλον τεκμηριοῦσθαι ἐπὶ τῷδε ὅτι Ἡρακλῆς ἐς Ἰνδοὺς ἀφίκετο. ὅμοια δὲ καὶ ὑπὲρ Διονύσου τῆς πλάνης ἀκιστεῖ Ἐρατοσθένης.

163: Strabo C. 70:

διαφερόντως δ'ἀκιστεῖν ἄξιον Δημάχῳ τε καὶ Μεγασθένει. οὗτοι γὰρ εἰσιν οἱ τοὺς Ἐνωτοκοίτας καὶ τοὺς Ἀστόμους καὶ Ἄρριναι ἱστοροῦντες, ... περὶ ὧν ἕτερος τὸν ἕτερον ἐλέγχει, ὅπερ καὶ Ἐρατοσθένης φησίν.

Parapamisadae right to India, themselves giving the name of Caucasus to a range which was really Parapamisus for the glory of Alexander, to show that Alexander had actually gone beyond the Caucasus. In India itself, seeing oxen branded with (the sign of) a club, they took this as proof that Heracles penetrated into India. Eratosthenes also disbelieves similar stories about the wanderings of Dionysus.

163.

We should in particular distrust Deimachus and Megasthenes. These are the recorders of the Sleep-in-Ears, the Mouthless and the Noseless people . . . . . On these matters they refute each other, as Eratosthenes himself says.

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GEOGRAPHY:

Book II: 164-186:

164: Strabo C. 62:

Ἐν δὲ τῇ δευτέρᾳ πειρᾶται διόρθωσίν τινα ποιεῖσθαι τῆς γεωγραφίας, καὶ τὰς ἑαυτοῦ λέγει ὑποθέσεις λήψεις· . . . . . τὸ μὲν οὖν τὰς μαθηματικὰς ὑποθέσεις εἰσάγειν καὶ φυσικὰς εὖ λέγεται, καὶ ὅτι εἰ σφαιροειδὴς ἡ γῆ, καθάπερ καὶ ὁ κόσμος, περιοικεῖται, καὶ τὰ ἄλλα τὰ ποιαῦτα. . . . . καὶ περὶ τοῦ σχήματος δ'ἐν τοῖς ἑξῆς διὰ πλειόνων καταδεικνὺς ὅτι σφαιροειδὴς καὶ ἡ γῆ συν τῇ ὑγρᾷ φύσει καὶ ὁ οὐρανός, ἀλλοτριολογεῖν ἂν δόξειεν· ἁρπεῖ γὰρ τὸ ἐπὶ μικρόν.

165: Euseb. Praep. Ev. XV. 53:

Ἐρατοσθένης τὸν ἥλιον ἀπέχειν ἀπὸ τῆς γῆς σταδίων μυριάδας τετρακοσίας καὶ ὀκτακισμυρίας, τὴν δὲ σελήνην ἀπέχειν τῆς γῆς μυριάδας οη' σταδίων.

166: Macrobius in Somn. Scip. I, 20. p.109

Eratosthenes in libris dimensionum sic ait: Mensura terrae septies et vicies multiplicata mensuram solis efficiet.

GEOGRAPHY:

Book II: 164-186:

164.

In Book Two he attempts a kindoof general correction of geographical practice, and explains his own basic assumption . . . . . His introduction, indeed, of mathematical and scientific principles is sound, and also his statement that, if the earth is spherical, like the universe, it is inhabited all round, and so on . . . . . In discussing the shape of the earth in his succeeding argument, when he shows that both the earth with its liquid content, and the heavens also, are spherical, he would appear to be wandering from the subject. A short statement would be enough.

165.

Eratosthenes says the sun is four million eight hundred thousand stades from the earth, and the moon seven hundred and eighty thousand.

166.

In his books of measurements Eratosthenes says: "The measurements of the earth, multiplied twenty-seven times, will give the measurement of the sun."

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167: Cleomed. cycl. theor. meteor. I, 10:

Περὶ δὲ τοῦ μεγέθους τῆς γῆς πλείους μὲν γεγόνασι δόξαι παρὰ τοῖς φυσικοῖς· βελτίους δὲ τῶν ἄλλων εἰσὶν ἥ τε Ποσειδωνίου καὶ ἡ Ἐρατοσθένους· αὕτη μὲν διὰ γεωμετρικῆς ἐφόδου δεικνύουσα τὸ μέγεθος αὐτῆς, ἡ δὲ τοῦ Ποσειδωνίου ἐστὶν ἁπλουστέρα. Ἑκάτερος δὲ αὐτῶν ὑποθέσεις τινὰς λαμβάνων, διὰ τῶν ἀκολούθων ταῖς ὑποθέσεσιν ἐπὶ τὰς ἀποδείξεις παραγίνεται. . . . . Ἡ δὲ τοῦ Ἐρατοσθένους γεωμετρικῆς ἐφόδου ἐχομένη, καὶ δοκοῦσά τι ἀσαφέστερον ἔχειν . . . . Ὑπὸ τῷ αὐτῷ κεῖσθαι φησι μεσημβρινῷ Συήνην καὶ Ἀλεξάνδρειαν. ἐπεὶ οὖν μέγιστοι τῶν ἐν τῷ κόσμῳ οἱ μεσημβρινοί, δεῖ καὶ τοὺς ὑποκειμένους τούτοις τῆς γῆς κύκλους μεγίστους εἶναι ἀναγκαίως. Ὥστε ἡλίκον ἂν τὸν διὰ Συήνης καὶ Ἀλεξανδρείας ἥκοντα κύκλον τῆς γῆς ἡ ἔφοδος ἀποδείξει αὕτη, τηλικοῦτος καὶ ὁ μέγιστος ἔσται τῆς γῆς κύκλος. Φησὶ τοίνυν, καὶ ἔχει οὕτως, τὴν Συήνην ὑπὸ τῷ θερινῷ τροπικῷ κεῖσθαι κύκλῳ. Ὁκόταν οὖν ἐν καρκίνῳ γενόμενος ὁ ἥλιος, καὶ θερινὰς ποιῶν τροπάς, ἀκριβῶς μεσουρανήσῃ, ἄσκιοι γίνονται οἱ τῶν ὡρολογείων γνώμονες ἀναγκαίως, κατὰ κάθετον ἀκριβῆ τοῦ ἡλίου ὑπερκειμένου· καὶ τοῦτο γίνεσθαι λόγος ἐπὶ σταδίους τὴν διάμετρον. Ἐν Ἀλεξανδρείᾳ δὲ

167.

Among the scientists there have been numerous opinions about the size of the earth. Those of Posidonius and Eratosthenes are preferable to the rest. The latter showed its size by a geometrical approach, but Posidonius's method is simpler. Each man took certain premises, and arrived at his proof by means of deductions from the premisses. ... . .

The method of Eratosthenes depends on a geometrical approach, and appears to contain an element of uncertainty . . . . .

He says that Syene and Alexandria lie under the same meridian. Now as meridians are the great circles of the celestial sphere, the terrestrial circles corresponding with them must necessarily be great circles. Thus whatever this experiment shows to be the size of the terrestrial circle passing through Syene and Alexandria, this will be the size of the terrestrial great circle. Now Eratosthenes says, as is indeed the case, that Syene lies beneath the circle of the summer tropic. When, therefore, the sun is in the sign of the Crab at the time of the summer solstice, at the exact moment when it reaches the zenith the fingers of sundials necessarily lose their shadows owing to the fact that the sun is vertically overhead. It is said that this

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τῇ αὐτῇ ὥρᾳ ἀποβάλλουσιν οἱ τῶν ὡρολογείων γνώμονες σκιάν, ὅτε πρὸς ἄρκτῳ μᾶλλον τῆς Συήνης ταύτης τῆς πόλεως κειμένης. Ὑπὸ τῷ μεσημβρινῷ τοίνυν καὶ μεγίστῳ κύκλῳ τῶν πόλεων κειμένων, ἂν περιαγάγωμεν περιφέρειαν ἀπὸ τοῦ ἄκρου τῆς τοῦ γνώμονος σκίας ἐπὶ τὴν βάσιν αὐτὴν τοῦ γνώμονος τοῦ ἐν Ἀλεξανδρείᾳ ὡρολογείου, αὕτη ἡ περιφέρεια τμῆμα γενήσεται τοῦ μεγίστου τῶν ἐν τῇ σκάφῃ κύκλων· ἐπεὶ μεγίστῳ κύκλῳ ὑπόκειται ἡ τοῦ ὡρολογείου σκάφη. εἰ οὖν ἐξῆς νοήσαιμεν εὐθείας διὰ τῆς γῆς ἐκβαλλομένας ἀφ' ἑκατέρου τῶν γνωμόνων, πρὸς τῷ κέντρῳ τῆς γῆς συμπεσοῦνται. ἐπεὶ οὖν τὸ ἐν Συήνῃ ὡρολογεῖον κατὰ κάθετον ὑπόκειται τῷ ἡλίῳ, ἂν ἐπινοήσωμεν εὐθεῖαν ἀπὸ τοῦ ἡλίου ἥκουσαν ἐπ' ἄκρον τοῦ ὡρολογείου τὸν γνώμονα, μία γενήσεται εὐθεῖα ἡ ἀπὸ τοῦ ἡλίου μέχρι τοῦ κέντρου τῆς γῆς ἥκουσα. ἂν οὖν ἑτέραν εὐθεῖαν νοήσωμεν ἀπὸ τοῦ ἄκρου τῆς σκιᾶς τοῦ γνώμονος ἐπὶ τὸν ἥλιον ἀναγαγομένην ἀπὸ τῆς ἐν Ἀλεξανδρείᾳ σκάφης, αὕτη καὶ ἡ προειρημένη εὐθεῖα παράλληλοι γενήσονται, ἀπὸ διαφόρων γε τοῦ ἡλίου μερῶν ἐπὶ διάφορα μέρη τῆς γῆς διήκουσαι. εἰς ταύτας οὖν παραλλήλους οὔσας ἐμπίπτει εὐθεῖα ἡ ἀπὸ τοῦ κέντρου τῆς γῆς ἐπὶ τὸν ἐν Ἀλεξανδρείᾳ γνώμονα ἥκουσα, ὥστε τὰς ἐναλλὰξ γωνίας ἴσας ποιεῖν· ὧν ἡ μέν ἐστι πρὸς τῷ κέντρῳ τῆς γῆς

happens over a belt three hundred stades across. In Alexandria at the same time the fingers of the sundials throw a shadow, as this city lies further to the north than Syene. Now as the cities lie under the (same) meridian great circle, if we describe an arc from the end of the finger's shadow to the base of the finger in the sundial in Alexandria, this arc will be a segment of the great circle in the bowl, since the bowl of the sundial lies under the great circle. If then we go on to imagine straight lines produced from each finger through the earth, they will meet in the centre of the earth. Therefore since the sundial in Syene lies vertically under the sun, if we suppose a straight line falling from the sun on the top of the finger, the straight line from the sun to the centre of the earth will coincide with it. If we then suppose another straight line drawn to the sun from the endof the shadow in the bowl at Alexandria, this and the former straight line will be parallel as they fall from different parts of the sun upon different parts of the earth. Now the straight line from the centre of the earth to the finger at Alexandria cuts these straight lines, which are parallel, making the alternate angles equal; one of them being at the

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κατὰ σύμπτωσιν τῶν εὐθείων, αἱ ἀπὸ τῶν ὡρολογείων ἤχθησαν ἐπὶ τὸ κέντρον τῆς γῆς, γινομένη· ἡ δὲ κατὰ σύμπτωσιν ἄκρου τοῦ ἐν Ἀλεξανδρείᾳ γνώμονος καὶ τῆς ἀπ' ἄκρας αὐτοῦ σκιᾶς ἐπὶ τὸν ἥλιον διὰ τῆς πρὸς αὐτὸν ψαύσεως ἀναχθείσης γεγενημένη. καὶ ἐπὶ μὲν ταύτης βέβηκε περιφέρεια ἡ ἀπ' ἄκρου τῆς σκιᾶς τοῦ γνώμονος ἐπὶ τὴν βάσιν αὐτοῦ περιαχθεῖσα· ἐπὶ δὲ τῆς πρὸς τῷ κέντρῳ τῆς γῆς ἡ ἀπὸ Συήνης διήκουσα εἰς Ἀλεξάνδρειαν. Ὅμοιαι τοίνυν περιφέρειαί εἰσιν ἀλλήλαις, αἱ ἐπ' ἴσων γε γωνιῶν βεβηκυῖαι. ὃν ἄρα λόγον ἔχει ἡ ἐν τῇ σκάφῃ πεντηκοστὸν μέρος εὑρίσκεται τοῦ οἰκείου κύκλου· δεῖ οὖν ἀναγκαίως καὶ τὸ ἀπὸ Συήνης εἰς Ἀλεξάνδρειαν διάστημα πεντηκοστὸν εἶναι μέρος τοῦ μεγίστου τῆς γῆς κύκλου· καὶ ἔστι τοῦτο σταδίων πεντακισχιλίων. ὁ ἄρα σύμπας κύκλος γίνεται μυριάδων εἴκοσι πέντε. καὶ ἡ μὲν Ἐρατοσθένους ἔφοδος τοιαύτη.

168: Cleomed. I. 10:

Τίθεται δὲ καὶ χειμεριναῖς Τροπαῖς ὡρολογεῖα εἰς ἑκατέραν τῶν πόλεων, καὶ ἑκατέρων σκιᾶς ἀποβαλλόντων, μείζων μὲν ἡ ἐν Ἀλεξανδρείᾳ εὑρίσκεται ἀναγκαίως, διὰ τὸ πλέον ἀφεστάναι τοῦ χειμερινοῦ τροπικοῦ τὴν πόλιν ταύτην. λαμβάνοντες οὖν τὴν ὑπεροχὴν τῆς σκιᾶς, καθ' ἣν ὑπερέχεται ἡ ἐν Συήνῃ ὑπὸ τῆς ἐν Ἀλεξανδρείᾳ, εὑρίσκουσι καὶ ταύτην μέρος πεντηκοστὸν

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centre of the earth, at the meeting-place of the straight lines produced from the sundials, the other at the meeting-place of the top of the finger at Alexandria and the line drawn from the end of its shadow to the sun through the point of contact. The latter angle is subtended by the arc drawn from the end of the finger's shadow to its base, while the one at the centre of the earth is subtended by the arc from Syene to Alexandria. Therefore these arcs are equal to one another, subtending as they do equal angles. The proportion of the angle in the bowl to its own circle is found in fact to be one fiftieth; therefore the distance from Syene to Alexandria must be one fiftieth of the terrestrial great circle, and this distance is five thousand stades. Thus the whole circle contains two hundred and fifty thousand.

This is the approach of Eratosthenes.

168.

At the winter solstice sundials are set up in each of the two cities, and, when each throws a shadow, that at Alexandria is necessarily found to be greater as this city stands further from the winter tropics. If then the amount is taken by which the shadow at Syene is exceeded by that at Alexandria, it is found that this too is one fiftieth

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τοῦ μεγίστου τῶν ἐν τῷ ὡρολογείῳ κύκλων. Καὶ οὕτω καὶ ἀπὸ τούτου γνώριμον γίνεται, ὅτι πέντε καὶ εἴκοσι μυριάδων ἐστὶν ὁ μέγιστος τῆς γῆς κύκλος.

169: Ptol. magn. synt. I. 10:

κατελαβόμεθα τὴν ἀπὸ τοῦ βορειοτάτου πέρατος ἐπὶ τὸ νοτιώτατον περιφέρειαν, ἥτις ἐστὶν ἡ μεταξὺ τῶν τροπικῶν τμημάτων, πάντοτε γινομένην μζ' καὶ μείζονος μὲν διμοίρου τμήματος, ἐλάσσονες δὲ ἡμίσους τετάρτου· δι'οὗ συνάγεται σχεδὸν ὁ αὐτὸς λόγος τῷ τοῦ Ἐρατοσθένους, ᾧ καὶ ὁ Ἵππαρχος συνεχρήσατο· γίνεται γὰρ τοιούτων ἡ μεταξὺ τῶν τροπικῶν ια' ἔγγιστα, οἵων ἐστὶν ὁ μεσημβρινὸς πγ'.

170: Achill. Tat. Isag., Uranolog.: (157c)

Πρῶτος δὲ Παρμενίδης περὶ τῶν ζωνῶν ἐπίνησε λόγον. περὶ δὲ τοῦ ἀριθμοῦ αὐτῶν πόλλη διαφωνία τοῖς μετ'αὐτὸν γέγονεν. οἱ μὲν γὰρ ἓξ αὐτὰς εἶπον, ὡς Πολύβιος καὶ Ποσειδώνιος, τὴν διακεκαυμένην εἰς δύο διαιροῦντες. οἱ δὲ πέντε παρέλαβον· ὥσπερ Ἐρατοσθένης, καὶ ἄλλοι πολλοί, οἷς καὶ ἡμεῖς κατηκολουθήσαμεν. περὶ δὲ οἰκήσεων πάλιν, καὶ τῶν ἐνοικούντων, καὶ ὀνομάτων, γέγονε πολλὴ ταραχή, καὶ περὶ ἀντιχθόνων καὶ ἀντιπόδων.

of the sundial's great circle. Therefore from this fact too it is clear that the terrestrial great circle is two hundred and fifty thousand (stades).

169.

I have taken the arc from the northern limit to the southern, that is to say the segment between the tropics, as measuring altogether 47 degrees and more than a half, but less than three-quarters. Thus this estimate nearly agrees with that of Eratosthenes, of which Hipparchus also made use; for the distance between the tropics is approximately 11 of the units of which the meridian contains 83.

170.

Parmenides was the first to bring up the question of the zones. There has been much disagreement among his successors about their number. Some, like Polybius and Posidonius have said that there are six, splitting the torrid zone into two. Others, like Eratosthenes and many others, whom I myself have followed, have taken them to be five. There has, again, been much disagreement about their habitability and inhabitants, about their names, and

171: Strabo C. 97:

ἐκ δ', ὥσπερ Ἐρατοσθένης φησίν, ἡ ὑποκίπτουσα τῷ ἰσημερινῷ ἐστιν εὔκρατος, καθάπερ καὶ Πολύβιος ὁμοδοξεῖ . . . . . πολὺ κρεῖττον τρίτην εὔκρατον ταύτην ποιεῖν στενήν τινα, ἢ τὰς ὑπὸ τοῖς τροπικοῖς εἰσάγειν.

172: Geminus, 51, A:

ἀναμεμετρημένου δὲ τοῦ μεγίστου κύκλου τῶν ἐν τῇ γῇ κατὰ τὸν ἐν τῷ κόσμῳ μεσημβρινὸν καὶ εὑρημένου μυριάδων, με' καὶ σταδίων, β', τῆς διαμέτρου μυριάδων η' καὶ σταδίων, δ', διαιρουμένου τε τοῦ μεσημβρινοῦ κύκλου εἰς μέρη ξ', καλεῖται τὸ ἓν τμῆμα ἑξηκοστόν· ὃ γίνεται δσ' στάδια. ἐὰν γὰρ μερισθῶσιν αἱ με' μυριάδες καὶ τὰ β' στάδια εἰς μέρη ξ', γίνεται τὸ ἑξηκοστὸν σταδίων, δσ'. ἔστιν οὖν τὰ μεταξὺ τῶν ζωνῶν διαστήματα τοῦτον ἀφωρισμένα τὸν τρόπον. τῶν μὲν κατεψυγμένων ζωνῶν δύο τὸ κλάτος ἑκατέρας αὐτῶν ἑξηκοστῶν ,ε', ἅπερ εἰσὶ στάδιοι μέν, μεσ'. τῶν δὲ εὐκράτων δύο ζωνῶν τὸ κλάτος ἑκατέρας αὐτῶν ἑξηκοστῶν, ε', ἃ γίνεται στάδιοι μέν, κα'. τῆς δὲ διεκπεπαυμένης ζώνης τὸ κλάτος ἑξηκοστῶν η', ὥστε ἀπὸ τοῦ ἰσημερινοῦ ἐφ' ἑκάτερα πρὸς τοὺς τροπικοὺς ἑξηκοστὰ εἶναι δ', ἃ γίνεται στάδια μέν, ,ιϛω'. γίνονται οὖν ἀπὸ μὲν τοῦ πόλου τοῦ ἐν τῇ γῇ, ὃς κεῖται κατὰ τὸν ἐν τῷ κόσμῳ πόλον μέχρι τοῦ ἐν τῇ

about Antichthones and Antipodes.

171.

If, as Eratosthenes says, the zone beneath the equator is temperate, as Polybius also admits, ... it is much better to make this a third temperate zone, though narrow, than to include the zones under the tropics.

172.

The great circle of the earth, corresponding with the celestial meridian, being measured and found to be 252, 000 stades, and its diameter 84, 000, if the meridian is split into 60 parts, each part is called a sixtieth. This works out at 4, 200 stades, for if 252, 000 stades is divided into 60 parts, the sixtieth works out at 4, 200 stades. The distance between the zones, then, are defined the following way: the breadth of each of the two frigid zones is 6 sixtieths, making 25, 200 stades; the breadth of each of the two temperate zones is 5 sixtieths, making 21,000 stades; while the breadth of the torrid zone is 8 sixtieths, so that from the equator in each direction to the tropics is 4 sixtieths, making 16, 800 stades. So from the terrestrial pole, corresponding with the celestial pole, to

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γῇ ἀρκτικοῦ, στάδιοι μὲν ,νεσ΄· ἀπὸ δὲ τοῦ ἐν τῇ γῇ ἀρκτικοῦ, ὃς κεῖται κατὰ τὸν ἐν τῷ κόσμῳ ἀρκτικὸν, πρὸς τὸν ἐν τῇ γῇ τροπικὸν, ὃς κεῖται κατὰ τὸν ἐν τῷ κόσμῳ θερινὸν τροπικόν, στάδιοι μὲν, να΄. ἀπὸ δὲ τοῦ θερινοῦ τροπικοῦ μέχρι τοῦ ἐν τῇ γῇ ἰσημερινοῦ, ὃς κεῖται κατὰ τὸν ἐν τῷ κόσμῳ ἰσημερινόν, στάδιοι, ιϛω΄. πάλιν ἀπὸ τοῦ ἰσημερινοῦ πρὸς τὸν ἕτερον τροπικὸν, ιϛω΄· ἀπὸ δὲ τοῦ τροπικοῦ πρὸς τὸν ἀρκτικὸν στάδια, ,να΄, ἀπὸ δὲ τοῦ ἀρκτικοῦ πρὸς τὸν ἕτερον πόλον, νεσ΄· ὥστε συνάγεσθαι τὸ μεταξὺ τῶν πόλων διάστημα μυριάδων ,ιβ΄ καὶ σταδίων ,ξ΄. ὅπερ ἐστὶν ἥμισυ τῆς περιμέτρου τῆς γῆς.

173: Strabo, C. 112:

νοείσθω δὴ πεντάζωνος, καὶ ὁ ἰσημερινὸς τεταγμένος ἐν αὐτῇ κύκλος, καὶ ἄλλος τούτῳ παράλληλος, ὁρίζων τὴν κατεψυγμένην ἐν τῷ βορείῳ ἡμισφαιρίῳ, καὶ διὰ τῶν πόλων τις τέμνων τούτους πρὸς ὀρθάς. τοῦ δὴ βορείου ἡμισφαιρίου δύο περιέχοντος τεταρτημόρια τῆς γῆς, ἃ ποιεῖ ὁ ἰσημερινὸς πρὸς τὸν διὰ τῶν πόλων, ἑκατέρῳ τούτων ἀπολαμβάνεται τετράπλευραν χωρίον, οὗ ἡ μὲν βόρειος πλευρὰ ἥμισυ τοῦ πρὸς τῷ πέλῳ παραλλήλου ἐστίν, ἡ δὲ νότιος τοῦ ἰσημερινοῦ ἥμισυ, αἱ δὲ λοιπαὶ πλευραὶ τμήματά εἰσι τοῦ διὰ τῶν πόλων, ἀντικείμενα ἀλλήλοις, ἴσα τὸ μῆκος. ἐν θατέρῳ δὴ τῶν τετραπλεύρων

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the arctic circle is 25,200 stades; from the arctic circle, corresponding with the celestial arctic circle, to the terrestrial tropic corresponding with the celestial summer tropic, is 21,000 stades. From the summer tropic to the terrestrial equator, corresponding with the celestial equator, is 16,800 stades. Again from the equator to the other tropic is 16,800; from the tropic to the (ant)arctic circle 21,000, and from the (ant)arctic circle to the other pole 25,200 stades. Thus the distance between the poles comes to 126,000 stades, which is half the circumference of the earth.

173.

Let us assume (a sphere) with five zones. Let the equatorial circle be drawn on the sphere, and another parallel to it, bounding the frigid zone in the northern hemisphere. Let there be a circle through the poles, cutting these at right angles. Then, as the northern hemisphere contains two quarters of the earth, formed by the equator and the circle drawn through the poles, in each of these a quadrilateral is separated off, of which the northern side is half of the parallel adjacent to the pole, the southern a half of the equator, and the other two are segments of the circle through the poles, opposite to each other and equal in length. In one of

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τούτων (ὁποτέρῳ δ'οὐδὲν ἂν διαφέρειν δόξειεν) ἱδρῦσθαι φάμεν τὴν καθ'ἡμᾶς οἰκουμένην, περίκλυστον θαλάττῃ καὶ ἐοικυῖαν νήσῳ·

Strabo C. 113:

Προκείσθω δὴ ἡ μὲν νῆσος ἐν τῷ λεχθέντι τετραπλεύρῳ. δεῖ δὲ λαβεῖν τὸ μέγεθος αὐτῆς τὸ φαινόμενον, ἀφελόντας ἀπὸ μὲν τοῦ ὅλου μεγέθους τῆς γῆς τὸ ἡμισφαίριον τὸ καθ'ἡμᾶς, ἀπὸ δὲ τούτου τὸ ἥμισυ, ἀπὸ δ'αὖ τούτου πάλιν τὸ τετράπλευρον, ἐν ᾧ δὴ τὴν οἰκουμένην κεῖσθαι φαμεν. ἀνάλογον δὲ καὶ περὶ τοῦ σχήματος ὑπολαβεῖν δεῖ, τὸ φαινόμενον τοῖς ὑποκειμένοις ἐφαρμόττοντα. ἀλλ'ἐπείδη τὸ μεταξὺ τοῦ ἰσημερινοῦ καὶ τοῦ ληφθέντος παραλλήλου τούτῳ πρὸς τῷ πόλῳ τμῆμα τοῦ βορείου ἡμισφαιρίου σκόνδυλός ἐστι τὸ σχῆμα, ὁ δὲ διὰ τοῦ πόλου δίχα τέμνων τὸ ἡμισφαίριον δίχα τέμνει καὶ τὸν σκόνδυλον καὶ ποιεῖ τὸ τετράπλευρον, ἔσται δηλονότι σκονδύλου ἐπιφανείας ἥμισυ τὸ τετράπλευρον ᾧ ἐπίκειται τὸ Ἀτλαντικὸν πέλαγος· ἡ δ'οἰκουμένη χλαμυδοειδὴς ἐν τούτῳ νῆσος, ἐλάττων ἢ ἥμισυ τοῦ τετραπλεύρου μέρος οὖσα. φανερὸν δὲ τοῦτο ἔκ τε γεωμετρίας . . . . . αὐτὸ γὰρ τὸ διὰ θάλατος ἀοίκητον τοῦ τετραπλεύρου, πλάτος μὲν ἔχον δικτακισχιλίων καὶ δικτακοσίων σταδίων, μῆκος δὲ τὸ μέγιστον μυριάδων δώδεκα καὶ ἑξακισχιλίων, ὅσον ἐστὶν ἥμισυ τοῦ ἰσημερινοῦ,

these quadrilaterals, and it would appear to make no difference which, I say our inhabited world is situated, like an island washed all round by the sea.

Let the island, then, lie in the quadrilateral I have described. We must take its size as it appears, separating from the whole size of the earth our own hemisphere, from this one half, and from this again the quadrilateral in which I say our inhabited world lies. By similar reasoning we must also make our supposition about its shape, fitting what is evident to our assumptions. But since the segment of the northern hemisphere between the equator and the circle drawn parallel to it next to the pole is a spinning-whorl in shape, and the circle through the pole, cutting the hemisphere in half, also cuts the spinning-whorl in half and thus forms the quadrilateral, clearly the quadrilateral on which the Atlantic lies will be the shape of half a spinning-whorl. The inhabited world will be a cloak-shaped island within this, as it is less than half the size of the quadrilateral. This is proved by geometry too. . . . . For the part of the quadrilateral which is uninhabitable because of heat, eight thousand eight hundred stades in breadth, and a hundred and twenty-six thousand long at its maximum, that is to say half of the equator (is by itself more than

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μεῖζόν ἐστι τοῦ ἡμίσους τῆς οἰκουμένης, καὶ ἔτι πλέον ἄν εἴη τὸ λοιπόν.

174: Hipp. ap. Strab. I. C. 56:

καὶ γὰρ κατ'αὐτὸν Ἐρατοσθένη τὴν ἐκτὸς θάλατταν ἅπασαν συρροῦν εἶναι, ὥστε καὶ τὴν ἑσπέριον καὶ τὴν Ἐρυθρὰν θάλατταν μίαν εἶναι.

175: Strabo C. 74:

. . . . . καὶ περίπλουν ἔχειν ἀπὸ τῆς Ἰνδικῆς δυνατόν, ὡς φησιν ὁ τῶν τόπων ἡγησάμενος τοὐτων Πατροκλῆς.

176: Galen: Εἰς τὸ Ἱπποκράτους περὶ Χυμων Ὑπόμνημα C. 568:

ἡ μεῖς δὲ ἐν τῷ διαγράμματι κατὰ τὸν Κυρηναικὸν Ἐρατοσθένην τὸν κόσμον εἰς τέσσαρα διαιρήσομεν, εἰς τὴν ἀνατολήν, δύσιν, μεσημβρίαν καὶ τὴν ἄρκτον, καὶ τοὺς πρώτους τῶν ἀνέμων ἐν τούτοις θήσομεν. εἶτα τοὺς ἄλλους τοὺς ἐν τῷ μεταξὺ ὄντας τέσσαρας. ὡς ἀναμέσον τοῦ ἀπηλιώτου καλουμένου καὶ νότου κατὰ τὴν χειμερινὴν ἀνατολὴν εὖρον. ἀναμέσον δὲ τοῦ νότου καὶ τοῦ ζεφύρου κατὰ τὴν χειμερινὴν δύσιν τὸν λίβα. ἀναμέσον δὲ τοῦ ζεφύρου καὶ τοῦ ἀπαρκτίου τὸν καλούμενον καῦρον. ἀναμέσον δὲ τοῦ ἀπαρκτίου τε καὶ ἀπηλιώτου βορρᾶν. ἔστω τοίνυν ἐν τῷ ἰσῳ ἐπιπέδῳ κέντρον τὸ α, τοῦ δὲ γνώμονος τοῦ ρ σκιὰ ἡ πρὸ τῆς μέσης ἡμέρας ἡ ο, ἀφ'οὗ β, ἀπὸ δὲ τοῦ α κέντρου

half the size of the inhabited world, and) the rest would be greater still.

174.

Even according to Eratosthenes himself the outer sea is entirely continuous, so that the western sea (the Atlantic) and the Erythrean (the Indian Ocean) are one.

175.

Also he says it (the northern outlet from the Caspian) provides a possible route for sailing round from India, according to Patrocles who governed these districts.

176.

In my diagram I shall divide the world into four, like Eratosthenes of Cyrene: east, west, south, and north. In these divisions I shall place the chief winds, and afterwards those in between, four in number. Thus, between the wind called Apeliotes and Notus, by the winter sunrise, is Eurus; between Notus and Zephyrus, by the winter sunset, is Lips; between Zephyrus and Aparctias is the wind called Caurus; and between Aparctias and Apeliotes is Boreas.

Now on the level plane let there be a centre A. Let the shadow O of the gnomon R before mid-day fall on the point B. With centre A and radius AB describe a

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πρὸς τὸ τῆς σκιᾶς σημεῖον δ β ἄχθω κύκλος. ἀνατεθέντος δὲ τοῦ γνώμονος, ὅπου καὶ πρότερον ἦν, ἀναμένειν χρὴ ἕως ἂν ἐλάττων γένηται. καὶ πάλιν αὐξανομένη τὴν πρὸς τὴν μέσην ἡμέραν τὴν κ σκιὰν τῇ πρὸ τῆς μέσης ἡμέρας σκιᾷ ἴσην ἐργάζεται καὶ ἅπτεται τῆς τοῦ κύκλου γραμμῆς τῆς γ, τότε δὲ ἀπὸ τοῦ β σημείου καὶ τοῦ γ γεγράφθω κατὰ χιασμὸν γραμμή, ἀφ' οὗ τὸ δ. ἔπειτα πάλιν κατὰ χιασμὸν ἀφ' οὗ τὸ δ καὶ τὸ κέντρον ἄχθω γραμμὴ πρὸς τὸ πέρας εἰς τὰς αζ γραμμάς, αὕτη γὰρ ἡ γραμμὴ ἐνδείξεταί σοι τὴν μεσημβρινήν τε καὶ ἀρκτικὴν χώραν. λαμβανέτω δὲ ἐξῆς ὅλου τοῦ κύκλου τὸ δεκαεκταῖον μέρος καὶ τίθεσθον τὸ κέντρον ἐν τῇ μεσημβρινῇ γραμμῇ, ἥπερ τοῦ κύκλου ἅπτεται κατὰ τὸ ε, καὶ ποιητέον σημεῖον ἀπ' ἀριστερῶν καὶ δεξιῶν, ἀφ' οὗ τὸ η καὶ τὸ θ. ὡσαύτως δὲ ἐν τῇ ἀρκτικῇ χώρᾳ κατὰ τὴν γραμμὴν τὴν ἀρκτικὴν τὸ κέντρον θετέον ἀφ' οὗ τὸ ζ καὶ ἀπὸ τῆς δεξίας καὶ εὐωνύμου σημεῖα ποιητέον τὰ ε καὶ κ, καὶ ἀπὸ τοῦ η εἰς κ καὶ ἀπὸ τοῦ θ εἰς ι διὰ τοῦ κέντρου ἄχθωσαν γραμμαί. τὸ μὲν οὖν διάστημα ἀπὸ τοῦ η πρὸς τὸ θ τοῦ νότου πνεύματος καὶ τῆς μεσημβρίας ἔσται χωρίον, τὸ δὲ ἀπὸ τοῦ ι καὶ κ τῶν ἄρκτων. τὰ δὲ λοιπὰ μέρη ἀπὸ δεξίας τρία, ἀπ' ἀριστερᾶς δὲ ἴσον ἀριθμὸν διαιρετέον ἴσως τὰ μὲν πρὸς τὴν ἀνατολὴν πρὸς τὸ λ καὶ μ, καὶ ἀπὸ δυσμῶν πρὸς τὸ ν καὶ ο. ἀπὸ τοῦ μ πρὸς τὸ ο, ἀπὸ δὲ τοῦ λ πρὸς τὸ ν κατὰ χιασμὸν ἀκτέαι γραμμαί.

circle B. After replacing the gnomon in position, wait while the shadow shortens toward mid-day. When it lengthens again and becomes equal to the shadow before mid-day, and meets the circumference of the circle at G, then from the points B and G draw straight lines intersecting in the point D. Now join D and the centre and produce to the opposite side of the circle at Z; this line will indicate the directions south and north.

Next take one sixteenth part of the whole circumference. Place the point of the compasses on the south-line, which meets the circumference at E, and mark the points H and T on the left and right. In the same way on the northern side place the compasses on the north-line at Z and on the right and left mark the points I and K. Join HK and TI through the centre. The space between H and T will then be the district of the south and of the wind Notus, and that between I and K that of the north. The remaining part on the right must be divided into three equal parts and that on the left into the same number, by the points L and M to the east and the points N and O to the west. Join MO and LN by intersecting lines.

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κατὰ μὲν οὖν τοῦτον τὸν τρόπον ὀκτὼ ἔσται ἴσα τῶν ἀνέμων τε καὶ πνευμάτων κατὰ περίοδον διαστήματα. τρεῖς γοῦν ἀνατολικοὶ ἄνεμοί εἰσιν ὡς εὖρος, ὅτι ἀπὸ τῆς ἕω βέει, δεύτερος δὲ ἀπὸ τῶν ἀνατολῶν κατὰ τὸν θερινὸν καὶ τροπικὸν ὅρον, βορρείς, ὃν Ὅμηρος αἰθρηγενέτην καλεῖ. τρίτος δὲ ἀπὸ τῆς χειμερινῆς ἀνατολῆς πλείων, ὅτι ἐν τῷ μεταξὺ κεῖται τοῦ τε νότου καὶ τοῦ εὔρου εὐρόνοτος καλούμενος. τρεῖς δέ εἰσι τούτοις ἐναντίοι ἀπὸ τῶν δυσμῶν, εἷς μὲν ἀργέστης ὃν καὶ καῦρόν τινες ὀνομάζουσιν, ὅσπερ ἀντιπνεῖ τῷ βορρᾷ, ἕτερος δὲ ζέφυρος, ὃς ἀντιπνεῖ τῷ εὔρῳ, τρίτος δὲ λίψ, ὃς ἀντὶ τοῦ εὐρονότου πνεῖν φαίνεται. ἡ δὲ μεσημβρία ἕνα μόνον ἄνεμον ἔχειν λέγεται τὸν νότον, τοὔνομα ἀπὸ τῆς φύσεως αὐτοῦ ἔχοντα, ἀχλυώδης γάρ ἐστι καὶ νοτίδας ἐπιφέρει· ἡ δὲ ἄρκτος καὶ αὐτὴ ἕνα κατέχει τὴν ἀκαρκτίαν. τοῦτο δὲ γίνεται ὅτι ἀνατολὴ καὶ δύσις μεταβάλλονται, ἡ μεσημβρία δὲ καὶ ἄρκτος μόνιμοι.

177: Strabo C. 62 f.:

Ἑξῆς δὲ τὸ πλάτος τῆς οἰκουμένης ἀφορίζων φησὶν ἀπὸ μὲν Μερόης ἐπὶ τοῦ δι' αὐτῆς μεσημβριοῦ μέχρι Ἀλεξανδρείας εἶναι μυρίους, ἐνθένδε εἰς τὸν Ἑλλήσποντον περὶ ὀκτακισχιλίους ἑκατόν, εἶτ' εἰς Βορυσθένη πεντακισχιλίους, εἶτ' ἐπὶ τὸν κύκλον τὸν διὰ Θούλης (ἣν φησι Πυθέας ἀπὸ μὲν τῆς Βρεττανικῆς ἓξ ἡμερῶν πλοῦν ἀπέχειν πρὸς ἄρκτον, ἐγγὺς δ' εἶναι τῆς πεπηγυίας θαλάττης) ἄλλους

In this way there will be eight equal spaces round the circle for the cardinal and subsidiary winds. There are three easterly winds: first, Eurus, so called because it comes from the Dawn (Eos); second, from the summer tropic sunrise, Boreas, which Homer calls Etherborn; the third, blowing from the winter sunrise, because it lies in between Notus and Eurus is called Euronotus. Opposite to these are the three westerlies: first, Argestes, which some call Caurus, and which blows opposite to Boreas; second, Zephyrus, which blows opposite to Eurus; and the third, Lips, which appears to blow on the opposite side to Euronotus. The south is said to possess only one wind, Notus, so called from its nature, for it is misty and brings the damp. The north likewise has one wind, Aparctias. The reason for this is that sunrise and sunset change, while south and north are constant.

177.

Next, defining the breadth of the inhabited world, he says that the distance from Meroe along the meridian drawn through it to Alexandria is ten thousand stades, from there to the Hellespont about eight thousand one hundred, on to the Borysthenes five thousand, and then to the latitude of Thule (which Pytheas says is six days' sail to the

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ὡς μυρίους χιλίους πεντακοσίους. ἐὰν οὖν ἔτι προσθῶμεν ὑπὲρ τὴν Μερόην ἄλλους τρισχιλίους τετρακοσίους, ἵνα τὴν τῶν Αἰγυπτίων νῆσον ἔχωμεν καὶ τὴν Κινναμωμοφόρον καὶ τὴν Ταπροβάνην, ἔσεσθαι σταδίους τρισμυρίους ὀκτακισχιλίους.

178: Strabo C. 125, 126:

ἔστι δ'ἀπὸ Ῥόδου δίαρμα εἰς Ἀλεξάνδρειαν βορέᾳ τετρακισχιλίων που σταδίων, ὁ δὲ περίπλους διακλάσιος. ὁ δ''Ερατοσθένης ταύτην μὲν τῶν ναυτικῶν εἶναί φησι τὴν ὑπολήψιν περὶ τοῦ διάρματος τοῦ κέλάγους, τῶν μὲν οὕτω λεγόντων, τῶν δὲ καὶ πεντακισχιλίους οὐκ ὀκνούντων εἰπεῖν, αὐτὸς δὲ διὰ τῶν σκιοθηρικῶν γνωμόνων ἀνευρεῖν τρισχιλίους ἑπτακοσίους πεντήκοντα.

179: Strabo, C. 134:

διήκει δ'ὁ παράλληλος οὗτος κατ''Ερατοσθένη διὰ Καρίας, Λυκαονίας, Καταονίας, Μηδίας, Κασπίων πυλῶν, Ἰνδῶν τῶν κατὰ Καύκασον.

180: Strabo, C. 134:

. . . . . μικρὸν δ'ἀρκτικώτερός ἐστιν ὁ διὰ Λυσιμαχείας, ὃν φησιν Ἐρατοσθένης διὰ Μυσίας εἶναι καὶ Παφλαγονίας καὶ τῶν περὶ Σινώπην καὶ Ὑρκανίαν καὶ Βάκτρα.

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north of Britain, and near the frozen sea) some eleven thousand five hundred more. If then we add another three thousand four hundred beyond Meroe, to include the Island of Egypt, the Cinnamon country and Taprobane, the total will come to thirty-eight thousand stades.

178.

The straight passage from Rhodes to Alexandria, with a north wind, is about four thousand stades, while the coasting voyage is double. Eratosthenes says that this is the supposition of sea-farers about the open sea passage, some giving this as the distance, while others do not scruple to say five thousand. He himself, using the shadow-catching gnomon, discovered it to be three thousand, seven hundred and fifty.

179.

According to Eratosthenes this parallel passes through Caria, Lycaonia, Cataonia, Media, the Caspian Gates, and the parts of India next to the Caucasus.

180.

A little further north is the parallel through Lysimachia, which according to Eratosthenes passes through Mysia, Paphlagonia, the district round Sinope, Hyrcania, and Bactra.

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181: Strabo, C. 135:

φησὶ δ''Ερατοσθένης τούτους τῆς Μερόης διέχειν μικρῷ πλείους ἢ δισμυρίους τρισχιλίους, διὰ γὰρ 'Ελλησπόντου εἶναι μυρίους ὀκτακισχιλίους, εἶτα πεντακισχιλίους εἰς Βορυσθένη.

182: Strabo, C. 114:

ὁ μὲν οὖν Μασσαλιώτης Πυθέας τὰ περὶ Θούλην τὴν βορειοτάτην τῶν Βρεττανίδων ὕστατα λέγει, παρ'οἷς ὁ αὐτὸς ἐστι τῷ ἀρκτικῷ ὁ θερινὸς τροπικὸς κύκλος· παρὰ δὲ τῶν ἄλλων οὐδὲν ἱστορῷ, οὔθ' ὅτι Θούλη νῆσος ἔστι τις, οὔτ'εἰ τὰ μέχρι δεῦρο οἰκήσιμά ἐστιν, ὅπου ὁ θερινὸς τροπικὸς ἀρκτικὸς γίνεται.

183: Strabo C. 64, 65:

παραμυθούμενος δ'ἐκεῖ πλέον, ὅτι κατὰ φύσιν ἐστὶ τὸ ἀπὸ ἀνατολῆς ἐπὶ δύσιν διάστημα μεῖζον λέγειν, κατὰ φύσιν φησὶν εἶναι ἀπὸ τῆς ἕω πρὸς τὴν ἑσπέραν μακροτέραν εἶναι τὴν οἰκουμένην, καὶ, καθάπερ εἰρήκαμεν, ὡς οἱ μαθηματικοί, κύκλον συνάπτειν, συμβάλλουσαν αὐτὴν ἑαυτῇ· ὥστ', εἰ μὴ τὸ μέγεθος τοῦ 'Ατλαντικοῦ πελάγους ἐκώλυε, κἂν πλεῖν ἡμᾶς ἐκ τῆς 'Ιβηρίας εἰς τὴν 'Ινδικὴν διὰ τοῦ αὐτοῦ παραλλήλου τὸ λοιπὸν μέρος ὂν τοῦ ὅλου κύκλου· εἴπερ ὁ δι''Αθηνῶν ἐλάττων ἐστὶν εἴκοσι

181.

Eratosthenes says that this district is a little more than twenty-three thousand stades from Meroe, for the parallel through the Hellespont is eighteen thousand, and from there on to the Borysthenes is five thousand.

182.

Pytheas of Massilia, at least, says that the region of Thule, the most northern of the British Isles, is the furthest limit, and that there the summer tropic is the same as the arctic circle. From other authorities I cannot learn at all, either that there is an island called Thule, or whether the land is habitable as far as where the summer tropic becomes the arctic circle.

183.

He urges further that it is according to nature to say that the distance from east to west is greater, and says that it is according to nature for the inhabited world to be greater from east to west. "As I have already stated," he says, "in the mathematical manner, it joins itself and completes a circle. Thus, if the expanse of the Atlantic did not prevent it, we could actually sail the remaining part of the circle from Iberia to India along the same parallel; if, that is, the parallel through Athens, where I have computed the previously-mentioned measurement

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μυριάδων, ὅπου πεποιήμεθα τὸν εἰρημένον σταδιασμὸν ἀπὸ τῆς Ἰνδικῆς εἰς τὴν Ἰβηρίαν.

184: Strabo C. 64:

Διαμαρτὼν δὲ τοῦ πλάτους ἠνάγκασται καὶ τοῦ μήκους ἀστοχεῖν. ὅτι μὲν γὰρ πλέον ἢ διπλάσιον τὸ γνώριμον μῆκος ἐστι τοῦ γνωρίμου πλάτους, ὁμολογοῦσι καὶ οἱ ὕστερον καὶ τῶν παλαιῶν οἱ χαριέστατοι· λέγω δὲ τὸ ἀπὸ τῶν ἄκρων τῆς Ἰνδικῆς ἐπὶ τὰ ἄκρα τῆς Ἰβηρίας τοῦ ἀπ' Αἰθιόπων ἕως τοῦ κατὰ Ἰέρνην κύκλου, ὁρίσας δὲ τὸ λεχθὲν πλάτος, τὸ ἀπὸ τῶν ἐσχάτων Αἰθιόπων μέχρι τοῦ διὰ Θούλης ἐκτείνει πλέον ἢ δεῖ τὸ μῆκος, ἵνα ποιήσῃ πλέον ἢ διπλάσιον τοῦ λεχθέντος πλάτους. φησὶ γοῦν τὸ μὲν τῆς Ἰνδικῆς μέχρι τοῦ Ἰνδοῦ ποταμοῦ τὸ στενότατον σταδίων μυρίων ἑξακισχιλίων· τὸ γὰρ ἐπὶ τὰ ἀκρωτήρια τεῖνον τρισχιλίοις εἶναι μεῖζον· τὸ δὲ ἔνθεν ἐπὶ Κασπίους πύλας μυρίων τετρακισχιλίων, εἶτ' ἐπὶ τὸν Εὐφράτην μυρίων, ἐπὶ δὲ τὸν Νεῖλον ἀπὸ τοῦ Εὐφράτου πεντακισχιλίων, ἄλλους δὲ χιλίους καὶ τριακοσίους μέχρι Κανωβικοῦ, στόματος, εἶτα μέχρι τῆς Καρχηδόνος μυρίους τρισχιλίους πεντακοσίους, εἶτα μέχρι Στηλῶν ὀκτακισχιλίους τοὐλάχιστον· ὑπεραίρειν δὴ τῶν ἑπτὰ μυριάδων ὀκτακοσίοις. δεῖν δὲ ἔτι προσθεῖναι τὸ ἐντὸς Ἡρακλείων στηλῶν πύρτωμα τῆς Εὐρώπης, ἀντικείμενον μὲν τοῖς Ἴβηροι, προπεπτωκὸς δὲ πρὸς τὴν ἑσπέραν,

from India to Iberia, is in fact less than two hundred thousand stades in circumference."

184.

Since he fails to estimate the breadth correctly he is bound to miss the length also. Both the later writers and the most able of the ancients agree that the known length is more than double the known breadth: I mean that from the extremities of India to the extremities of Iberia is double the distance from Ethiopia to the Latitude of Ierne. Eratosthenes, having defined the said breadth from the limits of Ethiopia to the latitude of Thule, stretches out the length more than is proper in order to make it more than double the said breadth. At least he says that the narrowest part of India, as far as the river Indus, measures sixteen thousand stades: the part stretching to the capes is three thousand greater. From there to the Caspian Gates is fourteen thousand, from there to the Euphrates ten thousand, from the Euphrates to the Nile five thousand. To the mouth at Canopus is another thirteen hundred, from there to Carthage thirteen thousand five hundred, and to the Pillars at least eight thousand. The total, then, he says, is eight hundred in excess of seventy thousand. There is still to be added the bulge of Europe outside the Pillars of Heracles, lying in front of Iberia and projecting westwards: this is not less than

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οὐκ ἔλαττον σταδίων τρισχιλίων, καὶ τὰ ἀκρωτήρια τά τε ἄλλα καὶ τὸ τῶν Ὠστιμίων, ὃ καλεῖται Κάβαιον, καὶ τὰς κατὰ τοῦτο νήσους, ὧν τὴν ἐσχάτην Οὐξισάμην φησὶ Πυθέας ἀπέχειν ἡμερῶν τριῶν πλοῦν. ταῦτα δ'εἰπὼν τὰ τελευταῖα οὐδὲν πρὸς τὸ μῆκος συντείνοντα προσέθηκε τὰ περὶ τῶν ἀκρωτηρίων καὶ τῶν Ὠστιμίων καὶ τῆς Οὐξισάμης καὶ ὧν φησι νήσων. (ταῦτα γὰρ πάντα προσαρκτιά ἐστι καὶ Κελτικά, οὐκ Ἰβηρικά, μᾶλλον δὲ Πυθέου πλάσματα.) προστίθησί τε τοῖς εἰρημένοις τοῦ μήκους διαστήμασιν ἄλλους σταδίους δισχιλίους μὲν πρὸς τῇ δύσει, δισχιλίους δὲ πρὸς τῇ ἀνατολῇ, ἵνα σώσῃ τὸ μὴ πλέον ἢ ἥμισυ τοῦ μήκους τὸ πλάτος.

185: Strabo C. 65:

Ἐξῆς δὲ περὶ τῶν ἠπείρων εἰκὼν γεγονέναι πολὺν λόγον, καὶ τοὺς μὲν τοῖς ποταμοῖς διαιρεῖν αὐτάς, τῷ τε Νείλῳ καὶ τῷ Ταναΐδι, νήσους ἀποφαίνοντας, τοὺς δὲ τοῖς ἰσθμοῖς, τῷ μεταξὺ τῆς Κασπίας καὶ τῆς Ποντικῆς θαλάσσης καὶ τῷ μεταξὺ τῆς Ἐρυθρᾶς καὶ τοῦ Ἐκβήγματος, τούτους δὲ χερρονήσους αὐτὸς λέγειν, οὐχ ὁρᾶν φησι, πῶς ἂν εἰς πρᾶγμά τι καταστρέφοι ἡ ζήτησις αὕτη, ἀλλὰ μόνον ἔριν διαιτώντων μᾶλλον κατὰ Δημόκριτον εἶναι. μὴ ὄντων γὰρ ἀκρωρειῶν ὄρων καθάπερ Κολυττοῦ καὶ Μελίτης, οἷον στηλῶν ἢ περιβόλων, τοῦτο μὲν ἔχειν φάναι ἡμᾶς, ὅτι τουτὶ μέν ἐστι Κολυττός, τουτὶ δὲ Μελίτη, τοὺς

three thousand stades. There are also the capes, especially that of the Ostimii, named Cabaeum, and the islands in this neighbourhood, of which Pytheas says the furthest, Uxisame, is three days' sail away. After mentioning these last places, though they all together do not affect the length, he adds the parts about the capes, the Ostimii, Uxisame, and the islands he mentions; all of which lie to the north, and are rather Celtic than Spanish, or more likely still inventions of Pytheas. Further, he adds to the said distances of the length another two thousand stades to the west and two thousand to the east, to save the breadth from being more than half the length.

185.

Next he says that there has been much argument about the continents: some have divided them by the rivers Nile and Tanais, explaining that they are islands, others by the isthmuses between the Caspian and Pontic Seas, and between the Erythraean Sea and the Outbreak (of Lake Sirbonis), claiming that they are peninsulas. He does not see how this research can effect anything practical; it is just a matter for those who, like Democritus, live on disputation. When there are no exact boundaries, such as stone pillars or fences as with Colyttus and Melite, all we can say is: "This is Colyttus, and this is Melite", but

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ὄρους δὲ μὴ ἔχειν εἰπεῖν. διὸ καὶ συμβαίνειν κρίσεις πολλάκις περὶ χωρίων τινῶν, καπάπερ Ἀργείοις μὲν καὶ Λακεδαιμονίοις περὶ Θυρέας, Ἀθηναίοις δὲ καὶ Βοιωτοῖς περὶ Ὠρωποῦ. ἄλλως τε τοὺς Ἕλληνας τὰς τρεῖς ἠπείρους ὀνομάσαι, οὐκ εἰς τὴν οἰκουμένην ἀποβλέψαντας, ἀλλ' εἰς τε τὴν σφετέραν καὶ τὴν καταντικρὺ τὴν Καρικήν, ἐφ' ᾗ νῦν Ἴωνες καὶ οἱ ἑξῆς· χρόνῳ δὲ ἐπὶ πλέον προιόντας ἀεὶ καὶ πλειόνων γνωριζομένων χωρῶν εἰς τοῦτο καταστρέψαι τὴν διαίρεσιν.

186: Strabo C. 66:

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·

we cannot define the boundaries. In this way occur frequent disputes about some places, like those about Thyreae between the Argives and the Spartans, or about Oropus between the Athenians and the Boeotians. Further the Greeks named the three continents irrationally, not with regard to the whole inhabited world, but only with regard to their own country and that facing them, Caria, where the Ionians live now and their neighbours. As in time they advanced further and new countries became known they brought their division to its present position.

186.

Towards the end of the Essay he censures people who divide the whole mass of mankind into two categories, Greeks and foreigners, and also those who advised Alexander to treat Greeks as friends and foreigners as enemies. It would be better, he says, to make this division according to goodness and badness; for many of the Greeks are bad, and many foreigners civilized, such as the Indians and Arianians, and still more the Romans and Carthaginians, whose states are so admirably organized. Thus Alexander paid no attention to his advisers, but received and honoured as many men of good reputation as he could.

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GEOGRAPHY:

Book III: 187-285:

187: Strabo 2. 67, 68:

Ἐν δὲ τρίτῳ τῶν γεωγραφικῶν καθιστάμενος τὸν τῆς οἰκουμένης πίνακα γραμμῇ τινι διαιρεῖ δίχα ἀπὸ δύσεως ἐπ'ἀνατολὴν παραλλήλῳ τῇ ἰσημερινῇ γραμμῇ. πέρατα δ'αὐτῆς τίθησι πρὸς δύσει μὲν τὰς Ἡρακλείους στήλας, ἐπ'ἀνατολῆς δὲ τὰ ἄκρα καὶ ἔσχατα ὄρη τῶν ἀφοριζόντων ὀρῶν τὴν πρὸς ἄρκτον τῆς Ἰνδικῆς πλευράν. γράφει δὲ τὴν γραμμὴν ἀπὸ Στηλῶν διά τε τοῦ Σικελικοῦ πορθμοῦ καὶ τῶν μεσημβρινῶν ἄκρων τῆς τε Πελοποννήσου καὶ τῆς Ἀττικῆς, καὶ μέχρι τῆς Ῥοδίας καὶ τοῦ Ἰσσικοῦ κόλπου. μέχρι μὲν δὴ δεῦρο διὰ τῆς θαλάττης φησὶν εἶναι τὴν λεχθεῖσαν γραμμὴν καὶ τῶν παρακειμένων ἠπείρων (καὶ γὰρ αὐτὴν ὅλην τὴν καθ'ἡμᾶς θάλατταν οὕτως ἐπὶ μῆκος τετάσθαι μέχρι τῆς Κιλικίας) εἶτα ἐπ'εὐθείας πως ἐκβάλλεσθαι παρ' ὅλην τὴν ὀρεινὴν τοῦ Ταύρου μέχρι τῆς Ἰνδικῆς· τὸν γὰρ Ταῦρον ἐπ'εὐθείας τῇ ἀπὸ Στηλῶν θαλάττῃ τεταμένον δίχα τὴν Ἀσίαν διαιρεῖν ὅλην ἐπὶ μῆκος, τὸ μὲν αὐτῆς μέρος βόρειον ποιοῦντα, τὸ δὲ νότιον· ὥσθ'ὁμοίως καὶ αὐτὸν ἐπὶ τοῦ δι'Ἀθηνῶν ἱδρῦσθαι παραλλήλου καὶ τὴν ἀπὸ Στηλῶν μέχρι δεῦρο θάλατταν.

GEOGRAPHY:

Book III: 187-285:

187.

In the third book of his "Geography" he establishes the map of the inhabited world by dividing it in half with a line drawn from west to east parallel to the equator. For the ends of this line he takes the Pillars of Heracles in the west, and in the east the capes and furthest parts of the mountains which bound the northern side of India. He draws it from the Pillars through the Sicilian Strait and the southern capes of the Peloponnese and Attica, as far as Rhodes and the Gulf of Issus. Up to here, he says, the said line lies through the sea and the adjacent continents; and indeed our sea itself stretches in this way lengthwise as far as Cilicia. Thence it continues more or less straight along the whole range of the Taurus as far as India; for the Taurus, extending in a straight line with the sea from the Pillars, divides all Asia in half lengthwise, making of it a northern and a southern part. Thus the range and the sea from the Pillars to here are situated in the same way on the parallel through Athens.

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Ταῦτα δ'εἰκὼν οἴεται δεῖν διορθῶσαι τὸν ἀρχαῖον γεωγραφικὸν πίνακα. πολὺ γὰρ ἐπὶ τὰς ἄρκτους παραλλάττειν τὰ ἑωθινὰ μέρη τῶν ὀρῶν κατ'αὐτόν, συνεπισπᾶσθαι δὲ καὶ τὴν Ἰνδικὴν ἀρκτικωτέραν ἢ δεῖ γινομένην. πίστιν δὲ τούτου φέρει μίαν μὲν τοιαύτην, ὅτι τὰ τῆς Ἰνδικῆς ἄκρα τὰ μεσημβρινώτατα ὁμολογοῦσι πολλοὶ τοῖς κατὰ Μερόην ἀνταίρειν τόποις, ἀπό τε τῶν ἀέρων καὶ τῶν οὐρανίων τεκμαιρόμενοι, ἐντεῦθεν δ'ἐπὶ τὰ βορειότατα τῆς Ἰνδικῆς τὰ πρὸς τοῖς Καυκασίοις ὄρεσι Πατροκλῆς, ὁ μάλιστα πιστεύεσθαι δίκαιος διά τε τὸ ἀξίωμα καὶ διὰ τὸ μὴ ἰδιώτης εἶναι τῶν γεωγραφικῶν, φησὶ σταδίους μυρίους καὶ πεντακισχιλίους· ἀλλὰ μὴν καὶ τὸ ἀπὸ Μερόης ἐπὶ τὸν δι'Ἀθηνῶν παράλληλον τοσοῦτόν πώς ἐστιν, ὥστε τῆς Ἰνδικῆς τὰ προσάρκτια μέρη συνάπτοντα τοῖς Καυκασίοις ὄρεσιν εἰς τοῦτον τελευτᾶν τὸν κύκλον.

Ἄλλην δὲ πίστιν φέρει τοιαύτην, ὅτι τὸ ἀπὸ τοῦ Ἰσσικοῦ κόλπου διάστημα ἐπὶ τὴν θάλατταν τὴν Ποντικὴν τρισχιλίων πώς ἐστι σταδίων πρὸς ἄρκτον ἰόντι καὶ τοὺς περὶ Ἀμισὸν ἢ Σινώπην τόπους, ὅσον καὶ τὸ πλάτος τῶν ὀρῶν λέγεται· ἐκ δὲ Ἀμισοῦ πρὸς τὴν ἰσημερινὴν ἀνατολὴν φερομένῳ πρῶτον μὲν ἡ Κολχίς ἐστιν, ἔπειτα ἡ ἐπὶ τὴν Ὑρκανίαν θάλατταν ὑπέρθεσις καὶ ἡ ἐφεξῆς ἡ ἐπὶ Βάκτρα καὶ τοὺς ἐπέκεινα Σκύθας ὁδὸς δεξιὰ ἔχοντι τὰ ὄρη· αὕτη δ'ἡ γραμμὴ διὰ Ἀμισοῦ πρὸς δύσιν

After saying this he thinks fit to readjust the old map. According to it, he says, the eastern parts of the mountains deviate far to the north, and India is pulled with them, thus becoming more northerly than it should. One proof he adduces of this is to the effect that many agree that the southernmost capes of India rise opposite to the district round Meroe, judging by the climate and the celestial phenomena, and that from there to the northern extremities of India, by the Caucasus mountains, Patrocles, who is most worthy of belief owing to his good reputation and his being no layman in geography, says the distance is fifteen thousand stades. Well, then, the distance from Meroe to the parallel through Athens is about sufficient to make the northern parts of India, touching as they do the Caucasus mountains, end at this parallel.

Another proof he adduces is to the effect that the distance from the Gulf of Issus to the Pontic Sea is about three thousand stades if you go northwards towards the district round Amisus or Sinope, which is equal to the reputed breadth of the mountains. If you proceed towards the equinoctial sunrise, the first place is Colchis, next the pass to the Hyrcanian sea, and after that the road to Bactra and the Scythians beyond, with the mountains on the right. This line, produced through

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ἐκβαλλομένη διὰ τῆς Προποντίδος ἐστι καὶ τοῦ Ἑλλησπόντου, ἀπὸ δὲ Μερόης ἐπὶ τὸν Ἑλλήσποντον οὐ πλείους εἰσι τῶν μυρίων καὶ ὀκτακισχιλίων σταδίων, ὅσοι καὶ ἀπὸ τοῦ μεσημβρινοῦ πλευροῦ τῆς Ἰνδικῆς πρὸς τὰ περὶ τοὺς Βακτρίους μέρη, προστεθέντων τρισχιλίων τοῖς μυρίοις καὶ πεντακισχιλίοις, ὧν οἱ μὲν τοῦ πλάτους ἦσαν τῶν ὀρῶν, οἱ δὲ τῆς Ἰνδικῆς.

188: Strabo, C. 87:

καίτοι ἐκεῖνόν γε καὶ παρὰ τετρακοσίους στάδίους αἰσθητὰ ἀποφαίνεσθαι τὰ παραλλάγματα, ὡς ἐπὶ τοῦ δι' Ἀθηνῶν παραλλήλου καὶ τοῦ Ῥόδου. . . . ὁ μὲν οὖν δι' Ἀθηνῶν παράλληλος γνωμονικῶς ληφθεὶς καὶ ὁ διὰ Ῥόδου καὶ Καρίας, εἰκότως ἐν σταδίοις τοσούτοις αἰσθητὴν ἐποίησε τὴν διαφοράν. ὁ δ' ἐν πλάτει μὲν τρισχιλίων σταδίων, μήκει δὲ καὶ τετρακισμυρίων ὄρους, πελάγους δὲ τρισμυρίων λαμβάνων τὴν ἀπὸ δύσεως ἐπ' ἰσημερινὰς ἀνατολὰς γραμμήν, καὶ τὰ ἐφ' ἑκατέρον τὸ μέρος τὰ μὲν νότια ὀνομάζων, τὰ δὲ βόρεια, καὶ ταῦτα πλινθία παλῶν καὶ σφραγῖδας, νοείσθω πῶς καὶ ταῦτα λέγει καὶ πλευρὰ τὰ μὲν ἀρκτικά, τὰ δὲ νότια, καὶ πῶς τὰ μὲν ἑσπέρια, τὰ δὲ ἑωθινά· καὶ τὸ μὲν παρὰ πολὺ διαμαρτανόμενον παρορῶν ὑπεχέτω λόγον (δίκαιον γάρ), τὸ δὲ παρὰ μικρὸν οὐδὲ παριδὼν ἐλεγκτέος ἐστίν.

Amisus westwards, lies through the Propontus and the Hellespont. From Meroe to the Hellespont the distance is not more than eighteen thousand stades, namely the distance from the southern side of India to the parts about Bactria with the addition of three thousand to the fifteen thousand, partly for the breadth of the mountains, partly for that of India.

188.

Yet (says Hipparchus) even he indicates that differences in latitude are noticeable over four hundred stades, as in the cases of the parallel through Athens and Rhodes. . . . . At least the taking by instruments of the parallel through (i. e. latitude of) Athens and that of Rhodes and Caria naturally, considering the number of stades, showed a noticeable difference. When he, in a case of three thousand stades' breadth and forty thousand stades' length of mountain, and thirty thousand stades of sea, takes his line from west to equinoctial east and names the parts on one side "southern" and those on the other "northern", calling them "tiles" and "seals", we must realize what he means by these terms "northern sides" and "southern sides", "western sides" and "eastern sides". When he overlooks a large error, let him undergo examination, as is just, but for a small error, even if he has overlooked it, he is not to be refuted.

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189: Strabo C. 89, 90:

Οὐ τοῦτο οὖν λεκτέον πρὸς τὸν Ἐρατοσθένη, ἀλλ' ὅτι τῶν ἐν πλάτει λεγομένων καὶ μεγεθῶν καὶ σχημάτων εἶναί τι δεῖ μέτρον, καὶ ὅπου μὲν μᾶλλον, ὅπου δὲ ἔλαττον συγχωρητέον. ληφθέντος γὰρ τοῦ τῶν ὀρῶν πλάτους τῶν ἐπὶ τὰς ἰσημερινὰς ἀνατολὰς ἐκτεινομένων τρισχιλίων σταδίων, ὁμοίως δὲ καὶ τοῦ τῆς θαλάττης τῆς μέχρι Στηλῶν,

. . . . .

οἷον ἐν τῷ πλάτει τοῦ Ταύρου παντὸς καὶ τῆς μέχρι Στηλῶν θαλάττης, ὑποκειμένων τρισχιλίων σταδίων, νοεῖται ἕν τι παραλληλόγραμμον χωρίον, τό περιγράφον τό τε ὄρος ἅπαν καὶ τὴν λεχθεῖσαν θάλατταν.

190: Strabo, C. 522:

οὕτω μὲν τοίνυν προσάρκτια ἂν εἴη τὰ ἔθνη ταῦτα, ἐπειδὴ καὶ ἐντὸς τοῦ Ταύρου, Ἐρατοσθένης δέ, πεποιημένος τὴν διαίρεσιν εἰς τὰ νότια μέρη καὶ τὰ προσάρκτια καὶ τὰ ὑπ' αὐτοῦ λεγομένας σφραγῖδας, τὰς μὲν βορείους καλῶν, τὰς δὲ νοτίους, ὄρια ἀποφαίνει τῶν κλιμάτων ἀμφοῖν τὰς Κασπίους πύλας· εἰκότως οὖν τὰ νοτιώτερα πρὸς ἕω τείνοντα τῶν Κασπίων πυλῶν νότια ἂν ἀποφαίνοι, ὧν ἔστι καὶ ἡ Μηδία καὶ ἡ Ἀρμενία, τὰ δὲ βορειότερα πρόσβορα, κατ' ἄλλην καὶ ἄλλην διά-

189.

This, then, is no argument against Eratosthenes, but rather that his broad statements both of sizes and of shapes need some standard, and that in some cases more adjustment has to be made, in others less. If, for instance, the breadth of the mountains stretching towards the equinoctial east, and likewise that of the sea as far as the Pillars, are taken as three thousand stades . . . . .In the case of the breadth of the whole Taurus and of the sea as far as the Pillars, if three thousand stades is assumed, a single parallelogram is visualized bounding the whole range and the said sea.

190.

These tribes, then, may well be taken as northern, as they are inside the Taurus. Eratosthenes, when he makes his division into southern and northern parts, and what he calls "Seals", some of which he names as northern and others as southern, takes as the boundaries of the two "climata" the Caspian Gates. He could quite naturally make the parts to the south-east of the Caspian Gates, including Media and Armenia, "southern" and those to the north "northern", as this would follow whatever distribution

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ταξιν τούτου συμβαίνοντος. τάχα δὲ οὐκ ἐπέβαλε τούτῳ, διότι ἔξω τοῦ Ταύρου πρὸς νότον οὐδέν ἐστιν οὔτε τῆς Ἀρμενίας μέρος οὔτε τῆς Μηδίας.

191: Strabo C. 69:

ταῦτα γὰρ ὁ Ἐρατοσθένης λαμβάνει πάντα ὡς καὶ ἐκπαρτυρούμενα ὑπὸ τῶν ἐν τοῖς τόποις γενομένων, ἐντετυχηκὼς ὑπομνήμασι πολλοῖς, ὧν εὐπόρει βιβλιοθήκην ἔχων τηλικαύτην ἡλίκην αὐτὸς Ἵππαρχός φησι.

192: Strabo C. 93, 94:

τοῦ γὰρ Ἐρατοσθένους ἐπὶ τῶν πόρρω διεστηκότων τὰ παραδεδομένα φάσκοντος ἐρεῖν διαστήματα, μὴ διισχυριζομένου δέ, καὶ λέγοντος ὡς παρέλαβε, προστιθέντος δ'ἔστιν ὅπου τὰ ἐπ'εὐθείας μᾶλλον καὶ ἧττον.

193: Strabo C. 78:

καὶ δὴ τοῦ νοτίου μέρους πρώτην εἰκὼν σφραγῖδα τὴν Ἰνδικήν, δευτέραν δὲ τὴν Ἀριανήν, ἐχούσας τι εὐπερίγραφον, ἴσχυσεν ἀμφοτέρων ἀποδοῦναι καὶ μῆκος καὶ πλάτος, τρόπον δέ τινα καὶ σχῆμα ὡς ἂν γεωμετρικός. τὴν μὲν γὰρ Ἰνδικὴν ῥομβοειδῆ φησι διὰ τὸ τῶν πλευρῶν τὰς μὲν θαλάττῃ κλύζεσθαι τῇ τε

is otherwise made. Perhaps, however, he did not pay attention to the fact that no part either of Armenia or of Media lies to the south outside the Taurus.

191.

Eratosthenes takes all these points as established by the evidence of people who have been in the actual places. He came in contact with many records, of which he had plenty if he had a library as large as Hipparchus says himself.

192.

Eratosthenes says that, where distances in far-off places are concerned, he will give the measurements assigned by tradition but without guaranteeing them, and stating further that they are traditional and adding in some places "in a more or less straight line".

193.

Thus after naming India as the first Seal of the southern half, and Ariana as the second, since they possessed an outline easy to draw, he was able to represent the length and breadth of each and to some extent their shapes as well, as a geometer naturally would. India he describes as rhomboid in shape, because two of its sides are washed by the southern

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νοτίῳ καὶ τῇ ἑῴᾳ, μὴ πάνυ κολπώδεις ἠόνας ποιούσῃ, τὰς δὲ λοιπάς, τὴν μὲν τῷ ὄρει, τὴν δὲ τῷ ποταμῷ, πάνταθθα τοῦ εὐθυγράμμου σχήματος ὑπό τι σωζομένου·

194: Strabo C. 76:

Πάλιν δ' ἐκείνου τὸν Δείμαχον ἰδιώτην ἐνδείξασθαι βουλομένου καὶ ἄπειρον τῶν τοιούτων· οἴεσθαι γὰρ τὴν Ἰνδικὴν μεταξὺ κεῖσθαι τῆς τε φθινοπωρινῆς ἰσημερίας καὶ τῶν τροπῶν τῶν χειμερινῶν, μεγασθένει τε ἀντιλέγειν φήσαντι ἐν τοῖς νοτίοις μέρεσι τῆς Ἰνδικῆς τάς τε ἄρκτους ἀποκρύπτεσθαι καὶ τὰς σκιὰς ἀντιπίπτειν· μηδέτερον γὰρ τούτων μηδαμοῦ τῆς Ἰνδικῆς συμβαίνειν· ταῦτα δὲ φάσκοντος ἀμαθῶς λέγεσθαι· τότε γὰρ τὴν φθινοπωρινὴν τῆς ἐαρινῆς διαφέρειν οἴεσθαι κατὰ τὴν διάστασιν τὴν πρὸς τὰς τροπὰς ἀμαθές, τοῦ τε κύκλου τοῦ αὐτοῦ ὄντος καὶ τῆς ἀνατολῆς· τοῦ τε διαστήματος τοῦ ἐπὶ τῆς γῆς τροπικοῦ ἀπὸ τοῦ ἰσημερινοῦ, ὧν μεταξὺ τίθησι τὴν Ἰνδικὴν ἐκεῖνος, δειχθέντος ἐν τῇ ἀναμετρήσει πολὺ ἐλάττονος τῶν δισμυρίων σταδίων, συμβῆναι ἂν καὶ κατ' αὐτὸν ἐκεῖνον, ὅπερ αὐτὸς νομίζει, οὐχ ὃ ἐκεῖνος· δυεῖν μὲν γὰρ ἢ καὶ τριῶν μυριάδων οὖσαν τὴν Ἰνδικὴν οὐδὲ πεσεῖν μεταξὺ τοσού-

and eastern seas, forming shores not much interrupted by gulfs, while the others (are bounded) respectively by the mountain range and the river and here too the rectilinear form is kept within a little.

194.

The same happens again when Eratosthenes wishes to show up Deimachus as a layman and without experience in such matters. He says that he (D.) thinks that India lies between the autumnal equinox and the winter tropic, and contradicts Megasthenes when he says that in the southern parts of India the bears are hidden and the shadows fall in reverse, on the ground that neither of these phenomena happens anywhere in India, and that when he speaks like that he speaks in ignorance. To think, he says, that the autumn equinox differs from the spring equinox in distance from the tropics is ignorant, for both its path and its rising are the same. Further, as the distance of the terrestrial tropic from the equator, between which Deimachus places India, has been shown in the section on the measurement (of the earth) to be much less than twenty thousand stades, even according to Deimachus himself, not his view but that of Eratosthens would be true; for India could not fall inside such a space if it measured twenty or

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του διαστήματος, ὅσην δ'αὐτὸς εἴρηκε, πεσεῖν ἂν· τῆς δ'αὐτῆς ἀγνοίας εἶναι καὶ τὸ μηδαμοῦ τῆς Ἰνδικῆς ἀποκρύπτεσθαι φάσκειν τὰς ἄρκτους μηδὲ τὰς σκιὰς ἀντικίπτειν, ὅτε γε πεντακισχιλίους προελθόντι ἀπ'Ἀλεξανδρείας εὐθὺς συμβαίνειν ἄρχεται. ταῦτα δὴ εἰπόντα, εὐθύνει πάλιν οὐκ εὖ ὁ Ἵππαρχος, ...

195: Strabo C. 688:

μάλιστα δ'ἐκ τῆς διαίτης ἐδόκει 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.

Τὴν Ἰνδικὴν περιώρικεν ἀπὸ μὲν τῶν ἄρκτων τοῦ Ταύρου τὰ ἔσχατα ἀπὸ τῆς Ἀριανῆς μέχρι τῆς ἑώας θαλάττης, ἄκρα οἱ ἐπιχώριοι κατὰ μέρος Παροπάμισόν τε καὶ Ἠμωδὸν καὶ Ἶμαον καὶ ἄλλα ὀνομάζουσι, Μακεδόνες δὲ Καύκασον· ἀπὸ δὲ τῆς ἑσπέρας ὁ Ἰνδὸς ποταμός· τὸ δὲ νότιον καὶ τὸ πρόσωπον πλευρόν, πολὺ μείζω τῶν ἑτέρων ὄντα, προπέπτωκεν εἰς τὸ Ἀτλαντικὸν πέλαγος, καὶ γίνεται ῥομβοειδὲς τὸ τῆς χώρας σχῆμα, τῶν μειζόνων

thirty thousand stades, though it could if it is the size which Eratosthenes himself gives. It is, he says, part of the same ignorance to say that nowhere in India do the Bears set or the shadows fall in reverse, when the phenomena begin to happen if you travel even five thousand stades from Alexandria. When he says this, Hipparchus is again not right in correcting him.

195.

It was especially apparent from my survey at that point that the summary set out by Eratosthenes in the third book of his "Geography" about what was considered as India at the time when Alexander visited it is the most trustworthy account . . . . . The account of Eratosthenes is as follows.

India is bounded on the north by the end of the Taurus, from Ariana to the Eastern Sea. These mountains are called by the inhabitants Paropamisus, Emodus, Imaus and other names, but by the Macedonians Caucasus. The western boundary is the River Indus. The southern and eastern sides, which are much longer than the others, project into the Atlantic making the shape of the country rhomboid, as each of the longer sides is quite three thousand stades longer than the side opposite, and the cape formed by the eastern

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πλευρῶν ἑκατέρου πλεονεκτοῦντος παρὰ τὸ ἀπεναντίον πλευρὸν καὶ τρισχιλίοις σταδίοις, ὅσων ἐστὶ τὸ κοινὸν ἄκρον τῆς ἑωθινῆς παραλίας καὶ τῆς μεσημβρινῆς, ἔξω προπεπτωκὸς ἐξ' ἴσης ἐφ' ἑκάτερον παρὰ τὴν ἄλλην ἠιόνα. τὴν μὲν οὖν ἑσπερίου πλευρᾶς ἀπὸ τῶν Καυνασίων ὁρῶν ἐπὶ τὴν νότιον θάλατταν στάδιοι μάλιστα λέγονται μύριοι τρισχίλιοι παρὰ τὸν Ἰνδὸν ποταμὸν μέχρι τῶν ἐκβολῶν αὐτοῦ· ὥστ' ἀπεναντίον ἡ ἑωθινὴ προσλαβοῦσα τοὺς τῆς ἄκρας τρισχιλίους ἔσται μυρίων καὶ ἑξακισχιλίων σταδίων. τοῦτο μὲν οὖν πλάτος τῆς χώρας τό τ' ἐλάχιστον καὶ τὸ μέγιστον μῆκος δὲ τὸ ἀπὸ τῆς ἑσπέρας ἐπὶ τὴν ἕω· τούτου δὲ τὸ μὲν μέχρι Παλιβόθρων ἔχοι τις ἂν βεβαιοτέρως εἰπεῖν, καταμεμέτρηται γὰρ σχοινίοις, καὶ ἔστιν ὁδὸς βασιλικὴ σταδίων μυρίων· τὰ δ' ἐκείνενα στοχασμῷ λαμβάνεται διὰ τῶν ἀνάπλων τῶν ἐκ θαλάττης διὰ τοῦ Γάγγου ποταμοῦ μέχρι Παλιβόθρων· εἶτα ὀκτὼ σταδίων δισχιλίων. ἔσται δὲ τὸ πᾶν, ᾗ βραχύτατος, μυρίων ἑξακισχιλίων, ὡς ἔκ τε τῆς ἀναγραφῆς τῶν στάθμων τῆς πεπιστευμένης μάλιστα λαβεῖν Ἐρατοσθένης φησί· καὶ ὁ Μεγασθένης οὕτω συναποφαίνεται, Πατροκλῆς δὲ χιλίοις ἐλαττόν φησι. τούτῳ δὴ πάλιν τῷ διαστήματι προστεθὲν τὸ τῆς ἄκρας διάστημα τὸ προκεῖμενον ἐπὶ πλέον πρὸς τὰς ἀνατολάς, οἱ τρισχίλιοι στάδιοι ποιήσουσι τὸ μέγιστον μῆκος· ἔστι δὲ τοῦτο τὸ ἀπὸ τῶν ἐκβολῶν τοῦ Ἰνδοῦ ποταμοῦ παρὰ τὴν ἐξῆς ἠιόνα, μέχρι τῆς λεχθείσης ἄκρας καὶ τῶν ἀνατολικῶν αὐτῆς τερμόνων· οἰκοῦσι δ' ἐνταῦθα οἱ Κωνιακοὶ καλούμενοι.

and southern coasts projects an equal distance in both directions beyond the rest of the shore. Now the measurement of the western side from the Caucasus mountains to the southern sea is estimated at thirteen thousand stades along the Indus to its mouths: thus on the opposite side the east coast, including the three thousand for the cape, will measure sixteen thousand stades. These measurements are the least and greatest breadths of the country. Length is taken from west to east. It is possible to give that to Palibothra with some reliability, for it is measured in schoeni: it is a royal road ten thousand stades long. Beyond, estimates are made by guesswork from the voyages up the River Ganges from the sea to Palibothra: it may come to about two thousand stades. The total, at the shortest place, is sixteen thousand; this is what Eratosthenes says he makes it from the most trusted record of stages. Megasthenes agrees with this, while Patrocles gives it as a thousand less. If to this is added the length of the cape projecting further east, the three thousand stades will give the greatest length--that is, from the mouths of the River Indus along the coast adjoining, up to the cape already mentioned and the eastern limits of India. There the people called Coniaci live.

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196: Strabo C. 690:

ἅπασα δ'ἐστι κατάρρυτος ποταμοῖς ἡ Ἰνδική, τοῖς μὲν εἰς δύο τοὺς μεγίστους συρρηγνυμένοις, τόν τε Ἰνδὸν καὶ τὸν Γάγγην, τοῖς δὲ κατ'ἴδια στόματα ἐκδιδοῦσιν εἰς τὴν θάλατταν· ἅπαντες δ'ἀπὸ τοῦ Καυκάσου τὴν ἀρχὴν ἔχουσι καὶ φέρονται μὲν ἐπὶ τὴν μεσημβρίαν τὸ πρῶτον, εἶθ'οἱ μὲν μένουσιν ἐπὶ τῆς αὐτῆς φορᾶς, καὶ μάλιστα οἱ εἰς τὸν Ἰνδον συμβάλλοντες, οἱ δ'ἐπιστρέφονται πρὸς ἕω, καθάπερ καὶ ὁ Γάγγης ποταμός. οὗτος μὲν οὖν καταβὰς ἐκ τῆς ὀρεινῆς ἐπειδὰν ἄψηται τῶν πεδίων, ἐπιστρέψας πρὸς ἕω καὶ ῥυεὶς παρὰ τὰ Παλίβοθρα, μεγίστην πόλιν, πρόεισιν ἐπὶ τὴν ταύτῃ θάλατταν καὶ μιὰν ἐκβολὴν ποιεῖται, μέγιστος ὢν τῶν κατὰ τὴν Ἰνδικὴν ποταμῶν. ὁ δὲ Ἰνδὸς δυσὶ στόμασιν εἰς τὴν μεσημβρινὴν ἐκπίπτει θάλατταν, ἐμπεριλαμβάνων τὴν Παταληνὴν καλουμένην χώραν, παραπλησίαν τῷ κατ'Αἴγυπτον Δέλτα. ἐκ δὲ τῆς ἀναθυμιάσεως τῶν τοσούτων ποταμῶν καὶ ἐκ τῶν ἐτησίων, ὡς Ἐρατοσθένης φησί, βρέχεται τοῖς θερινοῖς ὄμβροις ἡ Ἰνδική, καὶ λιμνάζει τὰ πέδια· ἐν μὲν οὖν τούτοις τοῖς ὄμβροις λίνον σπείρεται καὶ κεγχρος· πρὸς τούτοις σήσαμον, ὄρυζα, βόσμορον. τοῖς δὲ χειμερινοῖς καιροῖς πυροί, κριθαί, ὄσπρια καὶ ἄλλοι καρποὶ ἐπώδιμοι, ὧν ἡμεῖς ἄπειροι. σχεδὸν δέ τι τοῖς ἐν Αἰθιοπίᾳ καὶ κατ'Αἴγυπτον τὰ αὐτὰ φύεται καὶ ἐν τῇ Ἰνδικῇ, καὶ τῶν ἐν τοῖς ποταμοῖς, πλὴν ἵππου ποταμίου, τὰ ἄλλα φέρουσι καὶ οἱ Ἰνδικοί· Ὀνησίκριτος δὲ καὶ τοὺς ἵππους γίνεσθαί φησι. τῶν δ'ἀνθρώπων οἱ

196.

Rivers flow all over India. Some join up with the two largest, the Indus and the Ganges, others flow into the sea by their own mouths. All of them have their sources in the Caucasus and travel southwards first: afterwards some continue in the same course, especially those which meet the Indus, while others turn to the east, like the Ganges. This, the greatest river in India, descends from the mountain regions and, on reaching the plains, turns eastward and flows by the great city of Palibothra. It then advances to the sea on that side and forms a single mouth. The Indus empties into the southern sea by two mouths, enclosing the land named Patalene, which resembles the Delta in Egypt. As a result of the mists rising from so many rivers and also of the annual winds, according to Eratosthenes, India is watered by summer rains, and the plains are flooded. During these rains flax and millet are sown, and in addition to these, sesame, rice, and bosmoron. In the winter season wheat, barley, pulses, and other edible crops unknown to us are sown. Indeed, practically the same things grow in India as in Ethiopia and Egypt: the Indian rivers, too, contain the same creatures except the hippopotamus, though Onesicritus says this is also found. Of the people, those of the north resemble the Ethiopians in colouring,

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μὲν μεσημβρινοὶ τοῖς Αἰθιοψίν εἰσιν ὅμοιοι κατὰ τὴν χροιάν, κατὰ δὲ τὴν ὄψιν καὶ τὴν τρίχωσιν τοῖς ἄλλοις (οὐδὲ γὰρ οὐλοτριχοῦσι διὰ τὴν ὑγρότητα τοῦ ἀέρος), οἱ δὲ βόρειοι τοῖς Αἰγυπτίοις.

Τὴν δὲ Ταπροβάνην πελαγίαν εἶναί φασι νῆσον, ἀπέχουσαν τῶν νοτιωτάτων τῆς Ἰνδικῆς τῶν κατὰ τοὺς Κωνιακοὺς πρὸς μεσημβρίαν ἡμερῶν ἑπτὰ πλοῦν, μῆκος μὲν ὡς πεντακισχιλίων σταδίων ἐπὶ τὴν Αἰθιοπίαν· ἔχειν δὲ καὶ ἐλέφαντας. τοιαῦται μὲν αἱ τοῦ Ἐρατοσθένους ἀποφάσεις.

197: Strabo, C. 510:

Ἐρατοσθένης δέ φησι καὶ ἐν τῇ Ἰνδικῇ φύεσθαι ἐλάτην καὶ ἐντεῦθεν ναυπηγήσασθαι τὸν στόλον Ἀλεξάνδρου· πολλὰ δὲ καὶ ἄλλα τοιαῦτα συγκρούειν Ἐρατοσθένης πειρᾶται, ἡμῖν δ' ἀποχρώντως εἰρήσθω περὶ αὐτῶν.

198: Plin. VI # 81:

Eratosthenes et mensuram prodidit (Taprobanes insulae) longitudinis VII M stad., latitudinis V M, nec urbis esse sed vicos DCC.

199: Strabo C. 78:

τὴν δ'' Ἀριανὴν διῶν τάς γε τρεῖς πλευρὰς ἔχουσιν εὐφυεῖς πρὸς τὸ ἀποτελέσαι παραλληλόγραμμον

though in features and hair they resemble the other Indians: their hair does not curl, either, because of the dampness of the air. Those of the north are like the Egyptians.

Taprobane is said to be an island out at sea, a voyage of seven days south of the southern extremities of India, where the Coniaci live, about eight thousand stades long in the direction of Ethiopia. There are elephants there too.

These are the remarks of Eratosthenes.

197.

Eratosthenes, however, says that the ~~pine~~ fir does grow in India too, and that Alexander built the ships for his expedition from it. Eratosthenes tries to reconcile many other similar contradictions, but I have said quite enough about them.

198.

Eratosthenes also gave the measurements (of the island of Taprobane) as 7000 stades in length and 5000 in breadth. According to him there are no cities, but 700 villages.

199.

He sees that Ariana has three of its sides very suitably placed to complete the shape of a paral-

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σχῆμα, τὴν δ'ἑσπέριον οὐκ ἔχων σημείοις ἀφορίσαι διὰ τὸ ἐπαλλάττειν ἀλλήλοις τὰ ἔθνη, γραμμῇ τινι ὅμως δηλοῖ τῇ ἀπὸ Κασπίων πυλῶν ἐπὶ τὰ ἄκρα τῆς Καρμανίας τελευτώσῃ τὰ συνάπτοντα πρὸς τὸν Περσικὸν κόλπον. ἑσπέριον μὲν οὖν καλεῖ τοῦτο τὸ πλευρόν, ἑῷον δὲ τὸ παρὰ τὸν Ἰνδόν.

200: Strabo C. 723:

. . . . . περὶ ὧν Ἐρατοσθένης οὕτως εἴρηκεν (οὐ γὰρ ἔχομέν τι λέγειν βέλτιον περὶ αὐτῶν)· ὁρίζεσθαι μὲν γάρ φησι τὴν Ἀριανὴν ἐκ μὲν τῶν πρὸς ἕω τῷ Ἰνδῷ, πρὸς νότον δὲ τῇ μεγάλῃ θαλάττῃ, πρὸς ἄρκτον δὲ τῷ Παροπαμίσῳ καὶ τοῖς ἐξῆς ὄρεσι μέχρι Κασπίων πυλῶν, τὰ δὲ πρὸς ἑσπέραν τοῖς αὐτοῖς ὄροις, οἷς ἡ μὲν Παρθυηνὴ πρὸς Μηδίαν, ἡ δὲ Καρμανία πρὸς τὴν Παραιταπηνὴν καὶ Περσίδα διώρισται· πλάτος δὲ τῆς χώρας τὸ τοῦ Ἰνδοῦ μῆκος τὸ ἀπὸ τοῦ Παροπαμισοῦ μέχρι τῶν ἐκβολῶν, μύριοι καὶ δισχίλιοι σταδιοι (οἱ δὲ τρισχιλίους φασί)· μῆκος δὲ ἀπὸ Κασπίων πυλῶν, ὡς ἐν τοῖς Ἀσιατικοῖς σταθμοῖς ἀναγέγραπται, διττόν. μέχρι μὲν Ἀλεξανδρείας τῆς ἐν Ἀρίοις ἀπὸ Κασπίων πυλῶν διὰ τῆς Παρθυαίας μιὰ καὶ ἡ αὐτὴ ὁδός· εἶθ'ἡ μὲν ἐπ'εὐθείας διὰ τῆς Βακτριανῆς καὶ τῆς ὑπερβάσεως τοῦ ὄρους εἰς Ὀρτόσπανα ἐπὶ τὴν ἐν Βάκτροις τρίοδον, ἥτις ἐστὶν ἐν τοῖς Παροπαμισάδαις· ἡ δ'ἐκτρέπεται μικρὸν ἀπὸ τῆς Ἀρίας

lelogram, but he cannot define the western side mathematically, because the different races overlap. All the same, he shows it by a dotted line from the Caspian Gates ending at the capes of Carmania, adjacent to the Persian Gulf. This side, then, he calls the western, and that along the Indus the eastern.

200.

Of these districts Eratosthenes gives the following account; I cannot give any better.

Ariana is bounded on the east by the Indus, to the south by the great sea, to the north by the Paropamisus, and the adjoining mountains as far as the Caspian Gates, to the west by the same boundaries as divide Parthyene from Media and Carmania from Paraetacene and Persia. The breadth of the country is the length of the Indus from the Paropamisus to its mouths, namely twelve thousand stades, though some say thirteen thousand. Its length from the Caspian Gates, as it is recorded in the "Stages of Asia", is measured in two ways. To Alexandria in Ariana from the Caspian Gates through Parthyaea is one and the same road: then one goes straight on through Bactria and the mountain pass to Ortospana at the road-junction from Bactra among the Paropamisadae; while the other turns slightly southwards away from Ariana to Prophthasia in Drangiana, af-

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πρὸς νότον εἰς Προφθασίαν τῆς Δραγγιανῆς· εἶτα πάλιν ἡ λοιπὴ μέχρι τῶν ὁρίων τῆς Ἰνδικῆς καὶ τοῦ Ἰνδοῦ· ὥστε μακροτέρα ἐστὶν αὕτη ἡ διὰ τῶν Δραγγῶν καὶ Ἀραχωτῶν, σταδίων μυρίων πεντακισχιλίων τριακοσίων ἡ πᾶσα. εἰ δή τις ἀφέλοι τοὺς χιλίους τριακοσίους, ἔχοι ἂν τὸ λοιπὸν τὸ ἀπ' εὐθείας μῆκος τῆς χώρας, μυρίων καὶ τετρακισχιλίων· οὐ πολὺ γὰρ ἔλαττον τὸ τῆς παραλίας, κἂν παραυξῶσί τινες αὐτό, πρὸς τοῖς μυρίοις τὴν Καρμανίαν ἑξακισχιλίων τιθέντες· ἡ γὰρ σὺν τοῖς κόλποις φανοῦνται τιθέντες ἢ σὺν τῇ ἐντὸς τοῦ Περσικοῦ κόλπου παραλίᾳ τῇ Καρμανικῇ. ἐπεκτείνεται δὲ τοὔνομα τῆς Ἀριανῆς μέχρι μέρους τινὸς καὶ Περσῶν καὶ Μηδῶν καὶ ἔτι τῶν πρὸς ἄρκτον Βακτρίων καὶ Σογδιανῶν· εἰσὶ γάρ πως καὶ ὁμόγλωττοι παρὰ μικρόν.

201: Strabo C. 514:

λέγει δὲ (Ἐρατοσθένης) καὶ οὕτω τὰ διαστήματα· ἀπὸ Κασπίων πυλῶν εἰς Ἰνδοὺς εἰς μὲν Ἑκατόμπυλον χιλίους ἐννακοσίους ἑξήκοντά φασιν, εἰς δ' Ἀλεξάνδρειαν τὴν ἐν Ἀρίοις τετρακισχιλίους πεντακοσίους τριάκοντα, εἶτ' εἰς Προφθασίαν τὴν ἐν Δραγγῇ χιλίους ἑξακοσίους, οἱ δὲ πεντακοσίους, εἶτ' εἰς Ἀραχωτοὺς τὴν πόλιν τετρακισχιλίους ἑκατὸν εἴκοσιν, εἶτ' εἰς Ὀρτόσπανα, ἐπὶ τὴν ἐκ Βάκτρων τρίοδον, δισχιλίους, εἶτ' εἰς τὰ ὅρια τῆς Ἰνδικῆς χιλίους· ὁμοῦ μύριοι πεντακισχίλιοι τριακόσιοι.

ter which the rest of it goes right to the boundaries of India, and the Indus. Thus this road, through Drangiana and Arachosia, is longer, totalling fifteen thousand three hundred stades. If thirteen hundred are deducted, the remainder will be the length of the country in a straight line, namely fourteen thousand. The length of the coast is not much less, even though some writers increase it, adding to the ten thousand six hundred for Carmania; for they obviously take it including either the gulfs or the Carmanian coast inside the Persian Gulf. The name of Ariana is extended over some part of the Persians and Medians, and even of the Bactrians and Sogdianians in the north, for these do speak very nearly the same language.

201.

Eratosthenes gives the following distances too, from the Caspian Gates to India: to Hecatompylus is estimated as nineteen hundred and sixty stades; to Alexandria in Ariana four thousand five hundred and thirty; next, to Prophthasia in Drangiana sixteen hundred, or, according to some estimates, fifteen hundred; next, to the city of Arachoti four thousand one hundred and twenty; next, to Ortospana at the Bactrian crossroads two thousand; next, to the boundaries of India a thousand. This makes a total of fifteen thousand three hundred.

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202: Strabo C. 720:

οἰκοῦσι δὲ Ἄρριες πρῶτον, ὁ μώνυμοι τῷ ποταμῷ Ἄρβει τῷ ὁρίζοντι αὐτοὺς ἀπὸ τῶν ἑξῆς Ὠρειτῶν ὅσον χιλίων σταδίων ἔχοντες παραλίαν, ὡς φησι Νέαρχος· Ἰνδῶν δ'ἐστὶ μερὶς καὶ αὕτη. εἶτ''Ωρεῖται ἔθνος αὐτόνομον· τούτων δ'ὁ παράπλους, χιλίων ὀκτακοσίων, ὁ δὲ τῶν ἑξῆς Ἰχθυοφάγων ἑπτακισχίλιοι,τετρακόσιοι, οἱ δὲ τῶν Καρμανίων τρισχίλιοι ἑπτακόσιοι μέχρι Περσίδος· ὥσθ'οἱ σύμπαντες μύριοι δισχίλιοι ἐνναοσίοι.

203: Strabo C. 724:

ἡ δὲ τάξις τῶν ἐθνῶν τοιαύτη· παρὰ μὲν τὸν Ἰνδὸν οἱ Παροπαμισάδαι, ὧν ὑπέρκειται ὁ Παροπαμισὸς ὄρος, εἶτ''Αραχωτοὶ πρὸς νότον, εἶτ'ἐφεξῆς πρὸς νότον Γεδρωσηνοὶ σὺν τοῖς ἄλλοις τοῖς τὴν παραλίαν ἔχουσιν· ἅπασι δὲ παρὰ τὰ πλάτη τῶν χωρίων παράκειται ὁ Ἰνδός. τούτων δ'(ἐκ μέρους) τῶν παρὰ τὸν Ἰνδὸν ἔχουσί τινα Ἰνδοί, πρότερον ὄντα Περσῶν· ἃ ἀφείλετο μὲν ὁ Ἀλέξανδρος τῶν Ἀριανῶν καὶ κατοικίας ἰδίας συνεστήσατο, ἔδωκε δὲ Σέλευκος ὁ Νικάτωρ Σανδροκόττῳ, συνθέμενος ἐπιγαμίαν καὶ ἀντιλαβὼν ἐλέφαντας πεντακοσίους. τοῖς Παροπαμισάδαις δὲ παράκεινται πρὸς τὴν ἑσπέραν Ἄριοι, τοῖς δὲ Ἀραχωτοῖς Δράγγαι καὶ τοῖς Γεδρωσίοις·

202.

The first inhabitants (west of the Indus) are the Arbies, who bear the same name as the River Arbis, which divides them from their neighbours, the Oreitae. According to Nearchus their seaboard measures about a thousand stades: this too is part of India. Next are the Oreitae, an independent tribe, past whom the coasting voyage is eighteen hundred stades. That past their neighbours the Fish-Eaters is seven thousand four hundred, and past the Carmanians to Persia three thousand seven hundred. The total distance is thus twelve thousand nine hundred.

203.

The tribes are arranged as follows. Along the Indus are the Paropamisadae, above whom lies the Paropamisus range. Then to the south are the Arachoti, and next the Gedroseni and the other occupants of the coast. Alongside the breadths of all these territories lies the Indus. Some of these territories along the Indus are held by Indians, though formerly they belonged to the Persians. Alexander took them away from the Arii and set up separate settlements, and Seleucus Nicator gave them to Sandracottus, making an agreement for intermarriage and receiving in exchange five hundred elephants. Alongside the Paropamisadae to the west lie the Arii, and alongside the Arachoti the Drangae and the Gedrosii.

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οἱ δ''Αριοι τοῖς Δράγγαις ἅμα καὶ πρὸς ἄρκτον παράκεινται καὶ πρὸς ἑσπέραν, ἐγκυκλούμενοι μικρά πως. ἡ δὲ Βακτριανὴ τῷ τε 'Αρίῳ πρὸς ἄρκτον παράκειται καὶ τοῖς Παροπαμισάδαις, δι'ὧνπερ 'Αλέξανδρος ὑπερέβαλε τὸν Καύκασον, ἐλαύνων τὴν ἐπὶ Βάκτρων· πρὸς ἑσπέραν δὲ ἐφεξῆς εἰσι τοῖς 'Αρίοις Παρθυαῖοι καὶ περὶ τὰς Κασπίους πύλας· πρὸς νότον δὲ τούτοις ἡ ἔρημος τῆς Καρμανίας, εἶθ'ἡ λοιπὴ Καρμανία καὶ Γεδρωσία.

204: Strabo, C. 726:

'Η δὲ Καρμανία τελευταία μὲν ἐστι τῆς ἀπὸ τοῦ 'Ινδοῦ παραλίας, ἀρκτικωτέρα δ'ἐστὶ πολὺ τῆς τοῦ 'Ινδοῦ ἐκβολῆς· τὸ μέντοι πρῶτον αὐτῆς ἄκρον ἔκκειται πρὸς νότον εἰς τὴν μεγάλην θάλατταν, ποιήσασα δὲ τὸ στόμα τοῦ Περσικοῦ κόλπου πρὸς τὴν ἀπὸ τῆς εὐδαίμονος 'Αραβίας ἄκραν, ἐν ἀπόψει οὖσαν, κάμπτεται πρὸς τὸν Περσικὸν κόλπον, ἕως ἂν συνάψῃ τῇ Περσίδι·

205: Strabo C. 78, 79:

Οὕτω δ'ὀλοσχερεῖ τινι τύπῳ τὴν δευτέραν ἀποδιδοὺς σφραγῖδα, πολὺ ταύτης ὀλοσχερέστερον ἀποδίδωσι τὴν τρίτην σφραγῖδα κατὰ πλείους αἰτίας. πρώτην μὲν τὴν λεχθεῖσαν, ὅτι οὐκ εὐκρινῶς ἀφώρισται ἡ ἀπὸ Κασπίων πυλῶν ἐπὶ Καρμανίαν, ἥτις κοινή ἐστι τῇ τριτῇ πρὸς τὴν δευτέραν σφραγῖδα πλευρά· ἔπει θ'ὅτι εἰς τὴν νότιον πλευρὰν ὁ Περσικὸς ἐμπίπτει κόλπος, ὅπερ καὶ αὐτὸς φησιν,

The Arii adjoin the Drangae to the north as well as to the west, more or less enclosing a small part of their territory. Bactria lies to the north alongside Aria and the Paropamisadae, by way of whose land Alexander crossed the Caucasus when marching to Bactra. Westwards, next to the Arii are the Parthians and the district around the Caspian Gates. South of these is the desert of Carmania, and then the rest of Carmania and Gedrosia.

204.

Carmania is the last of the seaboard beginning from the Indus, but it is much further north than the mouth of the Indus. Its first cape, however, projects southwards into the great sea. After forming the entrance to the Persian Gulf with the cape of Arabia Felix, which is in sight in the distance, Carmania bends towards the Persian Gulf until it adjoins Persis.

205.

Thus he represents the second Seal in rough outline, but the third he represents much more roughly than the second, for a number of reasons. First is that already mentioned, that the side from the Caspian Gates to Carmania, which is common to the second and third Seals, is not exactly defined; second, that the Persian Gulf interrupts the southern side, as he himself says, so that he is compelled

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ὥστ' ἠνάγκασται τὴν ἐκ Βαβυλῶνος λαβεῖν γραμμήν, ὡς ἂν εὐθείάν τινα διὰ Σούσων καὶ Περσεπόλεως μέχρι τῶν ὁρων τῆς Καρμανίας καὶ τῆς Περσίδος, ἣ δυνατὸς ἦν εὑρεῖν μεμετρημένην ὁδόν, σταδίων οὖσαν τὴν ὅλην μυριῶ πλειόνων ἢ ἐννακισχιλίων· ἦν νότιον μὲν καλεῖ πλευράν, παράλληλον δ' οὐ λέγει τῇ βορείῳ. δῆλον δ' ὅτι οὐδ' ὁ Εὐφράτης, ᾧ τὸ ἑσπέριον ἀφορίζει πλευρόν, σύνεγγύς ἐστιν εὐθεία γραμμῇ, ἀλλ' ἀπὸ τῶν ὁρῶν ἐκ τὴν μεσημβρίαν ῥυείς, εἶτ' ἐπιστρέψει πρὸς ἕω καὶ πάλιν πρὸς νότον μέχρι τῆς εἰς θάλατταν ἐκβολῆς. δηλοῖ δὲ τὸ μὴ εὐθύπορον τοῦ ποταμοῦ, φράζων τὸ σχῆμα τῆς Μεσοποταμίας, ὃ ποιοῦσι συμπίπτοντες εἰς ἓν ὅ τε Τίγρις καὶ ὁ Εὐφράτης, ὑπηρεσίῳ παραπλήσιον, ὡς φησι. καὶ μὴν τὸ ἀπὸ Θαψάκου μέχρι τῆς Ἀρμενίας οὐδὲ πᾶν μεμετρημένον ἔχει τὸ ἑσπέριον πλευρὸν τὸ ἀφοριζόμενον ὑπὸ τοῦ Εὐφράτου, ἀλλά φησι τὸ πρὸς τῇ Ἀρμενίᾳ μέρος καὶ τοῖς ἀρκτικοῖς ὄρεσι μὴ ἔχειν εἰπεῖν πόσον ἐστὶ διὰ τὸ ἀμέτρητον εἶναι. διὰ δὴ ταῦτα πάντα τυπωδῶς φησιν ἀποδιδόναι τὴν τρίτην μερίδα· καὶ γὰρ καὶ τὰ διαστήματά φησιν ἐκ πολλῶν συναγαγεῖν τῶν τοὺς σταθμοὺς πραγματευσαμένων· ὧν τινας καὶ ἀνεπιγράφους καλεῖ.

. . . . .

Ὁ μὲν δὴ οὕτως φησὶ τὴν τρίτην μερίδα τυπωδῶς ἀποδίδεσθαι μυρίων σταδίων ἀπὸ Κασπίων πυλῶν ἐπὶ τὸν Εὐφράτην, κατὰ μέρος δὲ διαιρῶν, ὡς ἀναγεγραμμένην εὗρε τὴν μέτρησιν, οὕτω τίθησιν, ἔμπαλιν τὴν ἀρχὴν ἀπὸ

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to take the line from Babylon as a more or less straight line through Susa and Persepolis to the boundaries of Carmania and Persis, where he was able to find a measured road a little more than nine thousand stades long altogether. This he calls the southern side, but he does not say it is parallel to the northern. Obviously, too, the Euphrates, by which he marks off the western side, is nothing like a straight line, but after flowing southwards from the mountains it turns eastwards and again to the south until it flows into the sea. He points out that the river does not flow straight when he describes the shape of Mesopotamia as it is formed by the junction of the Tigris and Euphrates--"like a galley", to use his own words. Further, of the western side from Thapsacus to Armenia, which is marked by the Euphrates, he has not full measurements, but says that he cannot give the length of the part adjoining Armenia and the northern mountains, because it has not been measured. For all these reasons, then, he says that he represents the third section in rough outline only. The distances, too, he says that he put together from many writers who worked on itineraries. Some of these works he even mentions as having no titles.

He says, then, that he represents the third section thus in outline, as measuring ten thousand stades from the Caspian Gates to the Euphrates. Splitting it up into its parts, he puts down the measurements just as he

τοῦ Εὐφράτου ποιησάμενος καὶ τῆς κατὰ Θάψακον διαβάσεως αὐτοῦ. μέχρι μὲν δὴ τοῦ Τίγριδος, ὅπου Ἀλέξανδρος διέβη, σταδίους δισχιλίους καὶ τετρακοσίους γράφει· ἐντεῦθεν δ'ἐπὶ τοὺς ἑξῆς τόπους διὰ Γαυγαμήλων καὶ τοῦ Λύκου καὶ Ἀρβήλων καὶ Ἐκβατάνων, ἧ Δαρεῖος ἐκ τῶν Γαυγαμήλων ἔφυγε μέχρι Κασπίων πυλῶν, τοὺς μυρίους ἐκπληροῖ, τριακοσίοις μόνον πλεονάσας. τὸ μὲν δὴ βόρειον πλευρὸν οὕτω καταμετρεῖ, οὐ παράλληλον τοῖς ὄρεσι θείς, οὐδὲ τῇ διὰ Στηλῶν καὶ Ἀθηνῶν καὶ Ῥόδου γραμμῇ· ἡ γὰρ Θάψακος πολὺ τῶν ὁρῶν ἀφέστηκε, συμπίπτει δὲ καὶ τὸ ὄρος καὶ ἡ ἀπὸ Θαψάκου ὁδὸς ἐπὶ τὰς Κασπίους πύλας. καὶ τά γε προσάρκτια μέρη τοῦ ὄρους ταῦτ'ἐστίν.

Ἀποδοὺς δὲ τὸ βόρειον οὕτω πλευρόν, τὸ δὲ νότιον, φησί, παρὰ μὲν τὴν θάλατταν οὐκ ἔστι λαβεῖν διὰ τὸ τὸν Περσικὸν ἐμπίπτειν κόλπον, ἀπὸ Βαβυλῶνος δὲ διὰ Σούσων καὶ Περσεπόλεως ἕως τῶν ὁρίων τῆς τε Περσίδος καὶ τῆς Καρμανίας σταδίους εἶναι ἐννακισχιλίους καὶ διακοσίους, νότιον μὲν λέγων, παράλληλον δ'οὐ λέγων τῷ βορείῳ τὸ νότιον. τὴν δὲ διαφωνίαν τοῦ μήκους φησὶ συμβαίνειν τοῦ τε βορείου τεθέντος πλευροῦ καὶ τοῦ νοτίου, διὰ τὸ τὸν Εὐφράτην μέχρι τινὸς πρὸς μεσημβρίαν βυένται πρὸς τὴν ἕω πολὺ ἐγκλίνειν.

Τῶν δὲ πλαγίων πλευρῶν τὴν ἑσπερίαν λέγει πρῶτον· ἣν ὁποία τίς ἐστιν, εἴτε μία εἴτε δύο, ἐν μέσῳ πάρεστι σκοπεῖν. ἀπὸ γὰρ τῆς κατὰ Θάψακόν φησι διαβάσεως παρὰ τὸν Εὐφράτην εἰς μὲν Βαβυλῶνα σταδίους εἶναι τετρα-

found them recorded, starting back again from the Euphrates and its crossing at Thapsacus. As far as the Tigris, where Alexander crossed, he makes it two thousand four hundred stades. From there to the various places in order, by way of Gaugamela, the Lycus, Arbela, Ecbatana, the way by which Darius fled from Gaugamela to the Caspian Gates, he makes up the total of ten thousand stades, exaggerating by three hundred only. This is the way in which he measures the northern side, not setting it parallel to the mountains or to the line through the Pillars, Athens, and Rhodes; for Thapsacus is a long way from the mountains, while the mountains and the road from Thapsacus converge at the Caspian Gates. So much for the northern parts of the boundary.

After representing the northern side in this way, he says that it is not possible to take the southern side as following the sea because of the interruption of the Persian Gulf. From Babylon, however, through Susa and Persepolis up to the boundaries of Persis and Carmania the distance is nine thousand two hundred stades, and he calls this the southern side, without stating that the southern side is parallel to the northern. The disagreement in length between the northern and southern sides is due, he says, to the fact that the Euphrates, after flowing for some distance southward, bends considerably to the east.

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κισχιλίους ὀκτακοσίους, ἐντεῦθεν δ'ἐπὶ τὰς ἐκβολὰς
τοῦ Εὐφράτου καὶ πόλιν Τερηδόνα τρισχιλίους· τὰ
δ'ἀπὸ Θαψάκου πρὸς τὰς ἄρκτους μέχρι μὲν τῶν Ἀρ-
μενίων πυλῶν καταμεμετρῆσθαι καὶ εἶναι ὡς χιλίους
ἑκατόν, τοὺς δὲ διὰ Γορδυαίων καὶ Ἀρμενίων μηκέτι·
διὸ δὴ παραλείπειν αὐτούς. τοῦ δὲ πρὸς ἕω πλευροῦ
τὸ μὲν διὰ τῆς Περσικῆς κατὰ μῆκος ἀπὸ τῆς Ἐρυθρᾶς
ὡς ἐπὶ Μηδίαν καὶ τὰς ἄρκτους οὐκ ἔλαττον εἶναι δοκεῖ
τῶν ὀκτακισχιλίων, ἀπὸ δέ τινων ἀκρωτηρίων καὶ ὑπὲρ
τοὺς ἐννακισχιλίους, τὸ δὲ λοιπὸν διὰ τῆς Παραιτακηνῆς
καὶ Μηδίας ἐπὶ Κασπίους πύλας ὡς τρισχιλίων· τὸν δὲ
Τίγριν ποταμὸν καὶ τὸν Εὐφράτην ῥέοντας ἐκ τῆς Ἀρ-
μενίας πρὸς μεσημβρίαν ἐπειδὰν παραμείψωνται τὰ
τῶν Γορδυαίων ὄρη, κύκλον μέγαν περιβαλομένους καὶ
ἐμπεριλαβόντας χώραν πολλὴν τὴν Μεσοποταμίαν ἐπι-
στρέφειν πρὸς χειμερινὴν ἀνατολὴν καὶ τὴν μεσημβρίαν,
πλέον δὲ τὸν Εὐφράτην· γενόμενον δὲ τοῦτον ἔγγιον
δὴ τοῦ Τίγριδος κατὰ τὸ Σεμιράμιδος διατείχισμα καὶ
κώμην καλουμένην Ὦπιν, διασχόντα ταύτης δσον δια-
κοσίους σταδίους, καὶ ῥυέντα διὰ Βαβυλῶνος ἐκπίπτειν
εἰς τὸν Περσικὸν κόλπον. γίνεται δή, φησί, τὸ σχῆμα
τῆς Μεσοποταμίας καὶ Βαβυλωνίας ὑπηρεσίῳ παραπλήσιον,
ὁ μὲν δὴ Ἐρατοσθένης τοιαῦτ'εἴρηκε.

Of the transverse sides he describes the western first. Its nature, and whether it is one line or two, is an open question. From the crossing at Thapsacus along the Euphrates to Babylon is, he says, four thousand eight hundred stades, and from there to the mouth of the Euphrates and the city of Teredon three thousand. The distance from Thapsacus northwards to the Armenian Gates has been measured, and is eleven hundred stades; but the distance in stades through Gordyene and Armenia has not yet been measured. Therefore he omits it from his account. The length of the eastern side, through Persia lengthwise from the Erythraean Sea towards Media and the north appears to be not less than eight thousand stades, or measured from some capes even more than nine thousand. The remainder, through Paraetacene and Media to the Caspian Gates, is about three thousand. The rivers Tigris and Euphrates, flowing southwards from Armenia, when they pass the mountains of Gordyene describe a great circle and enclose much territory, called Mesopotamia: then they turn towards the winter sunrise and the south, especially the Euphrates. It, drawing nearer and nearer to the Tigris by the fortification of Semiramis and a village called Opis, from which it is a mere two hundred stades distant, flows through Babylon and empties into the Persian Gulf. The shape of Mesopotamia and Babylon, he says, is thus similar to that of a galley. Such, then, are the remarks of Eratosthenes.

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206: Strabo C. 86:

φησὶ γὰρ (Ἵππαρχος) αὐτὸν λέγειν τὸ ἐκ Βαβυλῶνος εἰς μὲν Κασπίους πύλας διάστημα σταδίων ἑξακισχιλίων ἑπτακοσίων, εἰς δὲ τοὺς ὄρους τῆς Καρμανίας καὶ Περσίδος πλειόνων ἢ ἑνακισχιλίων, ὅπερ ἐπὶ γραμμῆς κεῖται πρὸς ἰσημερινὰς ἀνατολὰς εὐθείας ἀγομένης· . . . . .

εἰρηκότος γὰρ ἀπὸ Κασπίων πυλῶν εἰς μὲν Βαβυλῶνα τοὺς λεχθέντας, εἰς δὲ Σοῦσα σταδίους εἶναι τετρακισχιλίους ἑνακοσίους, ἀπὸ δὲ Βαβυλῶνος τρισχιλίους τετρακοσίους, ...

207: Strabo, C. 727:

μῆκος μὲν οὖν ἐστι κατ' Ἐρατοσθένη τὸ ἐπὶ τὰς Ἄρκτους καὶ τὰς Κασπίους πύλας περὶ ὀκτακισχιλίων, κατά τινας προκιπτούσας ἄκρας, λοιπὴ δ' ἐστὶν ἐπὶ Κασπίους πύλας οὐ πλεῖον ἢ τῶν δισχιλίων· πλάτος δὲ τὸ ἐν μεσογαίᾳ τὸ ἀπὸ Σούσων εἰς Περσέπολιν στάδιοι τετρακισχίλιοι διακόσιοι, κάντευθεν ἐπὶ τοὺς τῆς Καρμανίας ὄρους ἄλλοι χίλιοι ἑξακόσιοι.

208: Steph Byzant. v. Ἀσσυρία :

Λέγονται καὶ Ἀσσυρικοὶ (codd. Pal. Ἀσσύριοι) καὶ Ἄσσυρες παρὰ Ἐρατοσθένει· ἴσως ὡς ἀπὸ τοῦ Ἰλλυριοὶ Ἴλλυρες.

206.

(Hipparchus) says that he (Eratosthenes) calls the distance from Babylon to the Caspian Gates six thousand seven hundred stades, and that to the boundaries of Carmania and Persis more than nine thousand, on a line drawn straight to the equinoctial sunrise. . . . .

He (Eratosthenes) gives the above distance from the Caspian Gates to Babylon, and says that to Susa it is four thousand nine hundred stades, while from Babylon (to Susa) it is three thousand four hundred. . . . .

207.

Its (Persis) length, then, towards the north and the Caspian Gates, is, according to Eratosthenes, about eight thousand stades in the neighbourhood of some projecting capes, and the rest to the Caspian Gates is not more than two thousand. Its breadth in the interior from Susa to Persepolis is four thousand two hundred, and from there to the borders of Carmania is another sixteen hundred.

208.

In Eratosthenes the Assyrioi are also called "Assyres"; perhaps on the analogy of "Illyres" for "Illyrii"

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209: Strabo C. 743:

Γίνεται δ'ἐν τῇ Βαβυλωνίᾳ καὶ ἄσφαλτος πολλή, περὶ ἧς Ἐρατοσθένης μὲν οὕτως εἴρηκεν. ὅτι ἡ μὲν ὑγρά, ἣν καλοῦσι νάφθαν, γίνεται ἐν τῇ Σουσίδι, ἡ δὲ ξηρά, δυναμένη πήττεσθαι, ἐν τῇ Βαβυλωνία· ταύτης δ'ἐστὶν ἡ πηγὴ τοῦ Εὐφράτου πλησίον· πλημμύροντος δὲ τούτου κατὰ τὰς τῶν χιόνων τήξεις καὶ αὐτὴ πληροῦται καὶ ὑπέρχυσιν εἰς τὸν ποταμὸν λαμβάνει· ἐνταῦθα δὲ συνίστανται βῶλοι μεγάλαι πρὸς τὰς οἰκοδομὰς ἐπιτήδειαι τὰς διὰ τῆς ὀπτῆς πλίνθου.

210: Strabo C. 746:

διαρρεῖ δ'ὁ Τίγρις τὴν Θωπῖτιν καλουμένην λίμνην, κατὰ πλάτος μέσην· περαιωθεὶς δ'ἐπὶ θάτερον χεῖλος κατὰ γῆς δύεται μετὰ πολλοῦ φόφου καὶ ἀναφυσημάτων· ἐπὶ πολὺ δ'ἐνεχθεὶς ἀφανής, ἀνίσχει πάλιν οὐ πολὺ ἄπωθεν τῆς Γορδυαίας· οὕτω δὲ σφοδρῶς διεκβάλλει τὴν λίμνην, ὡς φησιν Ἐρατοσθένης, ὥστε ἁλμυρὰν αὐτὴν οὖσαν καὶ ἄνιχθυν γλυκεῖαν κατὰ τοῦτ'εἶναι τὸ μέρος καὶ βοώδη καὶ ἰχθύων πλήρη.

211: Strabo C. 765 f:

Ὁ μὲν οὖν Περσικὸς κόλπος λέγεται καὶ ἡ κατὰ Πέρσας θάλαττα· φησὶ δὲ περὶ αὐτῆς Ἐρατοσθένης οὕτως, ὅτι τὸ μὲν στόμα φησὶν εἶναι στενὸν οὕτως, ὥστ' ἐξ' Ἀρμόζων, τοῦ τῆς Καρμανίας ἀκρωτηρίου τῆς Ἀραβίας

209.

In Babylonia also much asphalt is formed, and Eratosthenes gives the following account of it. The liquid, called naphtha, is formed in Susis, the dry, which can be made solid, in Babylon: the source of the latter is near the Euphrates. When the river is in flood at the time when the snows melt, the source is also filled, and overflows into the river. There great lumps coagulate, suitable for buildings made of baked brick.

210.

The Tigris flows through the middle of the lake called Thopitis, breadthwise. When it has crossed to the other bank it sinks underground with a loud noise and spouting. After travelling unseen for a great distance, it reappears not far from Gordyaea. It crosses the lake in such strength, according to Eratosthenes, that although the lake itself is salt and without fish, in this part it is fresh, flowing, and full of fish.

211.

Now the Persian Gulf is also called the Persian Sea. Eratosthenes says of it that its entrance is so narrow that from Harmozi, the cape in Carmania, the cape at Macae in Arabia is visible. From the entrance the right-hand coast, curving round, bends at first away

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ἀφορᾶται τὸ ἐν Μάκαις· ἀπὸ δὲ τοῦ στόματος ἡ ἐν δεξίᾳ παραλίᾳ περιφερὴς οδσα κατ'ἀρχὰς μὲν ἀπὸ τῆς Καρμανίας πρὸς ἕω μικρόν,εἶτα πρὸς ἄρκτον νεύει, καὶ μετὰ ταῦτα πρὸς τὴν ἑσπέραν μέχρι Τερηδόνος καὶ τῆς ἐκβολῆς τοῦ Εὐφράτου· περιέχει δὲ τὴν τε Καρμανίων παραλίαν καὶ τὴν Περσῶν καὶ Σουσίων καὶ Βαβυλωνίων ἀπὸ μέρους,ὅσον μυρίων οδσα σταδίων· περὶ ἂν καὶ ἡμεῖς εἰρήκαμεν τὸ δ'ἐντεῦθεν ἐξῆς ἐπὶ τὸ στόμα πάλιν ἄλλοι τοσοῦτοι, καθάπερ καὶ Ἀνδροσθένη λέγειν φησὶ τὸν Θάσιον, τὸν καὶ Νεάρχῳ συμπλεύσαντα καὶ καθ'αὐτόν· ὥστε δῆλον ἐκ τούτου εἶναι, διότι μικρὸν ἀπολείπεται τῷ μεγέθει τῆς κατὰ τὸν Εὔξεινον θαλάττης αὕτη ἡ θάλαττα· λέγειν δέ φησιν ἐκεῖνον περιπεπλευκότα στόλῳ τὸν κόλπον, ὅτι ἀπὸ Τερηδόνος ἐξῆς ἐν δεξίᾳ ἔχοντι τὴν ἤπειρον ὁ παράπλους ἔχει προκειμένην νῆσον Ἶκαρον, καὶ ἱερὸν Ἀπόλλωνος ἅγιον ἐν αὐτῇ καὶ μαντεῖον Ταυροπόλου.

Παραπλεύσαντι δὲ τῆς Ἀραβίας εἰς δισχιλίους καὶ τετρακοσίους σταδίους ἐν βαθεῖ κόλπῳ κεῖται πόλις Γέρρα, Χαλδαίων φυγάδων ἐκ Βαβυλῶνος οἰκούντων γῆν ἁλμυρίδα καὶ ἐχόντων ἁλίνας τὰς οἰκίας, ἃς, ἐπειδὴ λεπίδες τῶν ἁλῶν ἀφιστάμεναι κατὰ τὴν ἐπίκαυσιν τὴν ἐκ τῶν ἡλίων συνεχεῖς ἀποπίπτουσι, καταρραίνοντες ὕδασι πυκνὰ τοὺς τοίχους συνέχουσι· διέχει δὲ τῆς θαλάττης διακοσίους σταδίους ἡ πόλις· ἐμπορικοὶ δ'εἰσὶν οἱ Γερραῖοι τὸ πλέον τῶν Ἀραβίων φορτίων καὶ ἀρωμάτων. Ἀριστόβουλος δὲ τοὐναντίον φησὶ τοὺς Γερραίους τὰ πολλὰ σχε-

from the capes of Carmania slightly eastwards, then northwards, and later westwards to Teredon and the mouth of the Euphrates. It includes the coast of Carmania and partly those of Persis, Susis, and Babylonia, totalling about ten thousand stades: about these districts I have spoken already. From there on to the entrance again is a similar number of stades, as he says is stated by Androsthenes of Thasos, who sailed both with Nearchus and on his own. Thus it is clear from these measurements that this sea falls little short of the Euxine in size. He says that Androsthenes, having sailed round the gulf with an expedition, states that the coasting voyage with the mainland on the right shows next in order from Teredon the island Icarus lying in front, and on it a temple sacred to Apollo and an oracle of (Artemis) Tauropolus.

After the traveller has sailed along Arabia for two thousand four hundred stades, in a deep gulf lies the city of Gerrha. Chaldean fugitives from Babylon live there on salt soil in houses of salt: these, since flakes continually fall off, dropping away because of the burning action of the sun, they frequently sprinkle with water and consolidate their walls. The city is two hundred stades from the sea. The people of Gerrha are for the most part land-traders in Arabian products and spices. Aristobulus on the other hand says that they mostly trade with Babylonia on rafts; that from there they sail their products

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δίαις εἰς τὴν Βαβυλωνίαν ἐμπορεύεσθαι, ἐκεῖθεν δὲ τῷ Εὐφράτῃ τὰ φορτία ἀναπλεῖν εἰς Θάψακον, εἶτα πεζῇ κομίζεσθαι πάντη.

Πλεύσαντι δ'ἐπὶ πλέον ἄλλαι νῆσοι, Τύρος καὶ Ἄραδος, εἰσίν, ἱερὰ ἔχουσαι τοῖς Φοινικικοῖς ὅμοια· καὶ φασί γε οἱ ἐν αὐταῖς οἰκοῦντες τὰς ὁμωνύμους τῶν Φοινίκων νήσους καὶ πόλεις ἀποίκους ἑαυτῶν. διέχουσι δὲ αἱ νῆσοι αὗται Τερηδόνος μὲν δεχήμερον πλοῦν, τῆς δὲ κατὰ τὸ στόμα ἄκρας τῆς ἐν Μάναις ἡμερήσιον.

Ἀπὸ δὲ τῆς Καρμανίας εἰρήκασι καὶ Νέαρχος καὶ Ὀρθαγόρας νῆσον Ὠγυρίν κεῖσθαι πρὸς νότον πελαγίαν ἐν διςχιλίοις σταδίοις, ἐν ᾗ τάφος Ἐρύθρα δείκνυται, χῶμα μέγα ἀγρίοις φοίνιξι κατάφυτον· τοῦτον δὲ βασιλεῦσαι τῶν τόπων καὶ ἀπ'αὐτοῦ τὴν θάλατταν ἐπώνυμον καταλιπεῖν· δηλῶσαι δὲ ταῦτά φησιν αὐτοῖς Μιθρωπάστην τὸν Ἀρσίτου τοῦ Φρυγίας σατράπου, φυγόντα μὲν Δαρεῖον, διατρίψαντα δ'ἐν τῇ νήσῳ, συμμίξαντα δὲ αὐτοῖς καταχθεῖσιν εἰς τὸν Περσικὸν πόλπον καὶ ζητοῦντα πάθοδον δι'αὐτῶν εἰς τὴν οἰκείαν.

Καθ'ὅλην δὲ τὴν τῆς Ἐρυθρᾶς παραλίαν κατὰ βυθοῦ φύεται δένδρα ὅμοια δάφνῃ καὶ ἐλαίᾳ, ταῖς μὲν ἀμπώτισιν ὅλα διαφανῆ γιγνόμενα, ταῖς δὲ πλημμυρίσιν ἔσθ'ὅτε καλυπτόμενα, καὶ ταῦτα τῆς ὑπερκειμένης γῆς ἀδένδρου οὔσης, ὥστε ἐπιτείνεσθαι τὸ παράδοξον. περὶ μὲν οὖν τῆς κατὰ Πέρσας θαλάττης, ἣν ἐῶαν πλευρὰν ἔφα-

up the Euphrates to Thapsacus, and then convey them in all directions by land.

Further along on the voyage are more islands. Tyrus and Aradus, which possess temples like those of the Phoenicians. Indeed, the people who live in them say that the Phoenician islands and cities of the same names are their colonies. These islands are ten days' sail from Teredon, and one day's from the cape at Macae by the entrance.

Both Nearchus and Orthagoras say that the island of Ogyris lies out at sea some two thousand stades to the south of Carmania. There the tomb of Erythras is pointed out, a great mound covered with palms: he was king of the district, and left behind the sea named after him. (Nearchus) says that these things were shown them by Mithropastes, the son of Arsites, the satrap of Phrygia; he, sent into exile by Darius and living on the island, joined them when they arrived in the Persian Gulf and tried to return to his own country by their means.

All along the coast of the Erythraean Sea trees like laurels and olives grow deep down. At low tide they become entirely visible, but at high tide they are sometimes entirely covered; yet the land which is situated above is treeless, so that the contradiction is emphasized. Such, then, are the statements of Eratosthenes about the

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μεν εἶναι τῆς εὐδαίμονος Ἀραβίας, τοιαῦτα εἴρηκεν Ἐρατοσθένης.

212: Strabo C. 85:

Ἐρατοσθένης δὲ τὸ μὲν τῆς οἰκουμένης λαμβάνει μῆκος . . . . . τὸ δὲ τῆς τετάρτης ἐπὶ τῆς διὰ Θαψάκου καὶ Ἡρώων πόλεως μέχρι τῆς μεταξὺ τῶν στομάτων τοῦ Νείλου, ἣν ἀνάγκην, καταστρέφειν εἰς τοὺς περὶ Κάνωβον καὶ Ἀλεξανδρείαν τόπους.

213: Strabo C. 88:

τὸ δὲ θαυμάζειν, πῶς ἐθάρρησεν εἰπεῖν ἑξακισχιλίων σταδίων τὸ ἀπὸ Πηλουσίου εἰς Θάψακον, πλειόνων ὄντων ἢ ὀκτακισχιλίων, οὐκ ὀρθῶς.

214: Strabo C. 741:

Ἐρατοσθένης δέ, τῶν λεμνῶν μνησθεὶς τῶν πρὸς τῇ Ἀραβίᾳ, φησὶ τὸ ὕδωρ ἀπορούμενοι διεξόδων ἀνοῖξαι πόρους ὑπὸ γῆς καὶ δι' ἐκείνων ὑποφέρεσθαι μέχρι Κοιλοσύρων· ἀναθλίβεσθαι δὲ εἰς τοὺς περὶ Ῥινοκόλουρα καὶ τὸ Κάσιον ὄρος τόπους καὶ ποιεῖν τὰς ἐκεῖ λίμνας καὶ τὰ βάραθρα.

215: Strabo C. 767 f:

Ἐπάνειμι δὲ ἐπὶ τὰς Ἐρατοσθένους ἀποφάσεις, ἃς ἐξῆς περὶ τῆς Ἀραβίας ἐκτίθεται. φησὶ δὲ περὶ τῆς

Persian Sea, which, I said, constitutes the eastern side of Arabia Felix.

212.

Eratosthenes takes the length of the inhabited world . . . . . that of the fourth (Seal) on the line stretching through Thapsacus and Heroopolis to the land between the mouths of the Nile. This line must terminate in the districts round Canopus and Alexandria.

213.

His (Hipparchus') surprise, however, over his daring to say that the distance from Pelusium to Thapsacus was six thousand stades, when it was more than eight thousand, is wrong.

214.

When Eratosthenes mentions the lakes near Arabia, he says that the water, deprived of ways out, opens up passages under ground and drains away through them to Coele Syria. It is thrust up into the districts about Rhinocolura and Mount Casius, and makes the lakes and pits there.

215.

I now return to the remarks which Eratosthenes next puts forward about Arabia. Of the northern, desert part, which lies between Arabia Felix, Coele Syria, and

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προσαρκτίου καὶ ἐρήμης, ἥτις ἐστὶ μεταξὺ τῆς τε εὐδαίμονος Ἀραβίας καὶ τῆς Κοιλοσύρων καὶ τῶν Ἰουδαίων, μέχρι τοῦ μυχοῦ τοῦ Ἀραβίου κόλπου, διότι ἀπὸ Ἡρώων πόλεως, ἥτις ἐστὶ πρὸς τῷ Νείλῳ μυχὸς τοῦ Ἀραβίου κόλπου, πρὸς μὲν τὴν Ναβαταίων Πέτραν εἰς Βαβυλῶνα πεντακισχίλιοι ἑξακόσιοι, πᾶσα μὲν πρὸς ἀνατολὰς θερινάς, διὰ δὲ τῶν παρωκεανιτῶν Ἀραβίων ἐθνῶν Ναβαταίων τε καὶ Χαυλοταίων καὶ Ἀγραίων· ὑπὲρ δὲ τούτων ἡ Εὐδαίμων ἐστίν, ἐπὶ μυρίους καὶ δισχιλίους ἐκκειμένη σταδίους πρὸς νότον μέχρι τοῦ Ἀτλαντικοῦ πελάγους. ἔχουσι δ'αὐτὴν οἱ μὲν πρῶτοι μετὰ τοὺς Σύρους καὶ τοὺς Ἰουδαίους ἄνθρωποι γεωργοί· μετὰ δὲ τούτους διαμμός ἐστι γῆ καὶ λυπρά, φοίνικας ἔχουσα ὀλίγους καὶ ἄκανθαν καὶ μυρίκην καὶ ὀρυκτὰ ὕδατα, καθάπερ καὶ ἡ Γεδρωσία· σκηνῖται δ' ἔχουσιν αὐτὴν Ἄμαβες καὶ καμηλοβοσκοί. τὰ δ'ἔσχατα πρὸς νότον καὶ ἀνταίροντα τῇ Αἰθιοπίᾳ βρέχεταί τε θερινοῖς ὄμβροις καὶ διαπορεῖται παραπλησίως τῇ Ἰνδικῇ, ποταμοὺς δ'ἔχει καταναλισκομένους εἰς πεδία καὶ λίμνας. εὐκαρπία δ'ἐστὶν ἥ τε ἄλλη καὶ μελιτουργεῖα δαψιλῆ, βοσκημάτων τε ἀφθονία πλὴν ἵππων καὶ ἡμιόνων καὶ ὑῶν, ὀρνεά τε παντοῖα πλὴν χηνῶν καὶ ἀλεκτορίδων. κατοικεῖ δὲ τὰ μέγιστα τέτταρα ἔθνη τὴν ἐσχάτην λεχθεῖσαν χώραν· Μιναῖοι μὲν ἐν τῷ πρὸς τὴν Ἐρυθρὰν μέρει, πόλις δ'αὐτῶν ἡ μεγίστη Κάρνα ἢ Κάρνανα· ἐχόμενοι δὲ τούτων Σαβαῖοι, μητρόπολις δ'αὐτῶν Μαρίαβα· τρίτον δὲ Κατταβανεῖς, καθήκοντες πρὸς τὰ στενὰ καὶ τὴν διάβασιν τοῦ Ἀραβίου

Judaea, and
he says that
Arabian Gulf
as far as Ba
all towards
Arabian trib
Beyond these
twelve thous
first inhabi
farming peo
tile: it be
water is su
cupied by A
farthest so
summer rain
vers there
and supplyi
in the prod
beasts exce
kinds excep
inhabit thi
part by the
gest city
Sabaeans,
tabanians,

Judaea, and extends to the recess of the Arabian Gulf, he says that from Heroopolis, which is a recess of the Arabian Gulf near the Nile, towards Nabataean Petra and as far as Babylon is five thousand six hundred stades, all towards the summer sunrise through the neighbouring Arabian tribes of Nabataeans, Chaulotaeans, and Agraeans. Beyond these is Arabia Felix, stretching southwards twelve thousand stades as far as the Atlantic. Its first inhabitants after the Syrians and Judaeans are farming people. Past them the land is sandy and infertile: it bears a few palms, thorn, and tamarisk, and water is supplied by wells, as in Gedrosia. It is occupied by Arabs who live in tents and breed camels. The parts farthest south, opposite to Ethiopia, are watered by summer rain and are sown twice a year, like India. Rivers there are completely used up in watering the plains and supplying lakes. The land is fruitful, especially in the production of honey, and there is abundance of beasts except horses, mules, and pigs, and birds of all kinds except geese and chickens. The four largest tribes inhabit this furthest country we have mentioned: in the part by the Erythraean Sea are the Minaeans, whose largest city is Carna or Carnana; next to them are the Sabaeans, whose capital is Mariaba; third are the Catabanians, who come right to the straits and the crossing

κόλπου, τὸ δὲ βασίλειον αὐτῶν Τάμνα καλεῖται· πρὸς ἓω δὲ μάλιστα Χατραμωτῖται, πόλιν δ'ἔχουσι Σάβαταν.

Μοναρχοῦνται δὲ πᾶσαι καὶ εἰσιν εὐδαίμονες, κατασκευασμέναι καλῶς ἱεροῖς τε καὶ βασιλείοις· αἵ τε οἰκίαι ταῖς Αἰγυπτίαις ἐοίκασι κατὰ τὴν τῶν ξύλων ἔνδεσιν· χώραν δ'ἀπέχουσιν οἱ τέτταρες νομοὶ μείζω τοῦ κατ'Αἴγυπτον Δέλτα· διαδέχεται δὲ τὴν βασίλειαν οὐ παῖς παρὰ πατρός, ἀλλ'ὃς ἂν πρῶτος γεννηθῇ τινι τῶν ἐπιφανῶν παῖς μετὰ τὴν κατάστασιν τοῦ βασιλέως· ἅμα γὰρ τῷ καταστα[illegible]ναι τινα εἰς τὴν ἀρχὴν ἀναγράφονται τὰς ἐγκύους γυναῖκας τῶν ἐπιφανῶν, καὶ ἐφιστᾶσι φύλακας· ἧτις δ'ἂν πρώτη τέκῃ, τὸν ταύτης υἱὸν νόμος ἐστιν ἀναληφθέντα τρέφεσθαι βασιλικῶς, ὡς διαδεξόμενον.

φέρει δὲ λιβανωτὸν μὲν ἡ Κατταβανία, σμύρναν δὲ ἡ Χατραμωτῖτις· καὶ ταῦτα δὲ καὶ τὰ ἄλλα ἀρώματα μεταβάλλονται τοῖς ἐμπόροις. ἔρχονται δὲ πρὸς αὐτοὺς ἐξ Αἰλάνων μὲν εἰς Μιναίαν ἐν ἑβδομήκοντα ἡμέραις· ἔστι δ'ἡ Αἴλανα πόλις ἐν θατέρῳ τοῦ 'Αραβίου κόλπου, τῷ κατὰ Γάζαν τῷ Αἰλανίτῃ καλουμένῳ, καθάπερ εἰρήκαμεν· Γεββαῖοι δ'εἰς τὴν Χατραμωτῖτιν ἐν τεταράκοντα ἡμέραις ἀφικνοῦνται. τοῦ δ''Αραβίου κόλπου τὸ μὲν παρὰ τὴν 'Αραβίαν πλευρὸν ἀρχομένοις ἀπὸ τοῦ Αἰλανίτου μυχοῦ, καθάπερ οἱ περὶ 'Αλέξανδρον ἀνέγραψαν καὶ 'Αναξικράτη, μυρίων καὶ τετρακισχιλίων σταδίων

of the Arabian Gulf, and whose royal city is called Tamna. Furthest to the east are the Chatramotitae, whose city is Sabata.

All the cities are monarchically governed, and are prosperous. They are embellished with temples and palaces. The houses resemble the Egyptian in the jointing of their timbers. The four districts cover an area greater than the Egyptian Delta. The kingship is not hereditary, but passes to the first son born to one of the nobles after the king's accession: as soon as anyone has succeeded to the throne, a list is made of the noblemen's wives who are pregnant, and guards are placed over them. Whichever gives birth first, her son is by law taken away and brought up royally as heir apparent.

Gattabania produces frankincense, Chatramotitis myrrh. These and the other spices are exchanged with traders, who travel there, from Aelana to Minaea, within seventy days. The city of Aelana stands on the other recess of the Arabian Gulf, called Aelanites, by Gaza, as has been said. The Gerrhaeans arrive at Chatramotitis within forty days. The side of the Arabian Gulf along Arabia, beginning at the recessof Aelanites, is, according to the records of Alexander and his companions and of Anaxicrates, fourteen thousand stades: this, however, is an exaggeration. The coast by Trog-

ἐστίν· εἴρηται δὲ ἐπὶ πλέον. τὸ δὲ κατὰ τὴν Τρωγλοδυτικήν, ὅπερ ἐστὶν ἐν δεξιᾷ ἀποπλέουσιν ἀπὸ Ἡρώων πόλεως, μέχρι μὲν Πτολεμαΐδος καὶ τῆς τῶν ἐλεφάντων θήρας, ἐννακισχίλιοι πρὸς μεσημβρίαν στάδιοι καὶ μικρὸν ἐπὶ τὴν ἕω· ἐντεῦθεν δὲ μέχρι τῶν στενῶν, ὡς τετρακισχίλιοι καὶ πεντακόσιοι πρὸς τὴν ἕω μᾶλλον. Ὁποιεῖ δὲ ἄπρα τὰ στενὰ πρὸς τὴν Αἰθιοπίαν, Δειρὴ καλουμένη, καὶ πολίχνιον ὁμώνυμον αὐτῇ· κατοικοῦσι δὲ Ἰχθυοφάγοι. καί φασιν ἐνταῦθα στήλην εἶναι Σεσώστριος τοῦ Αἰγυπτίου, μηνύουσαν ἱεροῖς γράμμασι τὴν διάβασιν αὐτοῦ. φαίνεται γὰρ τὴν Αἰθιοπίδα καὶ τὴν Τρωγλοδυτικὴν πρῶτος καταστρεψάμενος οὗτος, εἶτα διαβὰς εἰς τὴν Ἀραβίαν, κἀντεῦθεν τὴν Ἀσίαν ἐπελθὼν τὴν συμπᾶσαν· διὸ δὴ πολλαχοῦ Σεσώστριος χάρακες προσαγορεύονται, καὶ ἀφιδρύματά ἐστιν Αἰγυπτίων θεῶν ἱερῶν. τὰ δὲ κατὰ Δειρὴν στενὰ συνάγεται εἰς σταδίους ἑξήκοντα· οὐ μὴν ταῦτα γε καλεῖται νυνὶ στενά, ἀλλὰ προσπλεύσασιν ἀπωτέρω, καθὰ τὸ μὲν διαρμά ἐστι τὸ μεταξὺ τῶν ἠπείρων διακοσίων που σταδίων, ἐξ δὲ νῆσοι συνεχεῖς ἀλλήλαις τὸ διάρμα ἐκπληροῦσαι στενοὺς τελέως διάπλους ἀπολείπουσι, δι' ὧν σχεδίαις τὰ φορτία νομίζουσι δεῦρο κἀκεῖσε, καὶ λέγουσι ταῦτα στενά. μετὰ δὲ τὰς νήσους ὁ ἑξῆς πλοῦς ἐστιν ἐγκολπίζουσι παρὰ τὴν σμυρνοφόρον ἐπὶ τὴν μεσημβρίαν ἅμα καὶ τὴν ἕω μέχρι πρὸς τὴν τὸ κινναμωμον φέρουσαν, ὅσον πεντακισχιλίων

lodytica, which is on the right to voyagers from Hero-
opolis, as far as Ptolemais and the elephant-hunting coun-
try, measures nine thousand stades slightly east of south.
From there to the straits is about four thousand five hun-
dred, in a more easterly direction. The straits are formed
in the direction of Ethiopia by a cape called Deire and a
town of the same name inhabited by Fish-Eaters. It is said
that there is there a pillar of Sesostris the Egyptian,
describing his passage in hieroglyphics. He appears to
have been the first conqueror of Ethiopia and Troglodytica,
then to have crossed into Arabia, and from there to have
overrun all Asia. For this reason, naturally, in many
places are what are called "camps" of Sesostris, and copies
of temples of Egyptian gods. The straits at Deire narrow
to a width of sixty stades; though now, as a matter of
fact, these are not called the straits, but farther on the
voyage in, where the crossing between the continents is
some two hundred stades, and there are six islands close
together, filling up the crossing and leaving very narrow
passages: through these cargoes are carried in different
directions on rafts, and these are called the straits.
After these islands the voyage onwards, following the
coastal inlets along the myrrh-bearing country towards the
south and east right to the cinnamon-bearing country, is
about five thousand stades. Beyond this point it is said

σταδίων· κέρα δὲ ταύτης οὐδενα ἁφῖχθαί φασι μέχρι νῦν. πόλεις δ'ἐν μὲν τῇ παραλίᾳ μὴ πολλὰς εἶναι, κατὰ δὲ τὴν μεσόγαιαν πολλὰς οἰκουμένας καλῶς. τὰ μὲν δὴ τοῦ 'Ερατοσθένους περὶ τῆς 'Αραβίας τοιαῦτα.

216: Strabo 2. 785 f:

φησὶ δὴ τοῦ 'Αραβίου κόλπου πρὸς τὴν ἑσπέραν ἐνναποσίους ἢ χιλίους σταδίους διέχειν τὸν Νεῖλον, παραλλήσιον ὄντα κατὰ τὸ σχῆμα τῷ γράμματι τῷ N κειμένῳ ἀνάπαλιν· ῥυεὶς γάρ, φησίν, ἀπὸ Μερόης ἐπὶ τὰς ἄρκτους ὡς διςχιλίους καὶ ἑπτακοσίους σταδίους, πάλιν ἀναστρέφει πρὸς μεσημβρίαν καὶ τὴν χειμερινὴν δύσιν ὡς τρισχιλίους καὶ ἑπτακοσίους σταδίους, καὶ σχεδὸν ἀντάρας τοῖς κατὰ Μερόην τόποις καὶ εἰς τὴν Λιβύην πολὺ προπεσῶν καὶ τὴν ἑτέραν ἐπιστροφὴν ποιησάμενος πρὸς τὰς ἄρκτους φέρεται πεντακισχιλίους μὲν καὶ τριακοσίους σταδίους ἐπὶ τὸν μέγαν καταράκτην μικρὸν παρεπιστρέφων πρὸς τὴν ἕω, χιλίους δὲ καὶ διακοσίους τοὺς ἐπὶ τὸν ἐλάττωντὸν κατὰ Συήνην, πεντακισχιλίους δὲ ἄλλους καὶ τριακοσίους ἐπὶ τὴν θάλατταν. ἐμβάλλουσι δ'εἰς αὐτὸν δύο ποταμοί, φερόμενοι μὲν ἔκ τινων λιμνῶν ἀπὸ τῆς ἕω, περιλαμβάνοντες δὲ νῆσον εὐμεγέθη τὴν Μερόην· ὧν ὁ μὲν 'Ασταβόρας καλεῖται κατὰ τὸ πρὸς ἕω πλευρόν, ἕτερος δ''Αστάπους· οἱ δ' 'Αστασόβαν καλοῦσι, τὸν δ''Αστάπουν ἄλλον εἶναι, ῥεοντα ἔκ τινων λιμνῶν ἀπὸ μεσημβρίας, καὶ σχεδὸν τὸ κατ'εὐ-

that no one has yet gone. It is also said that there are not many cities on the coast, but that inland there are many well established. Such are the remarks of Eratosthenes about Arabia.

216.

He says that the Nile is nine hundred or a thousand stades away from the Arabian Gulf towards the west, and that it is similar in shape to a letter N the wrong way round. Flowing northwards from Meroe about two thousand seven hundred stades, it then turns back toward the south and the winter sunset for about three thousand seven hundred stades. After almost coming opposite to the district of Meroe and after advancing far into Libya it makes its second turn, towards the north, and is carried along five thousand three hundred stades to the great cataract, turning aside a little towards the east. It then flows twelve hundred to the smaller cataract, at Syene, and five thousand three hundred more to the sea.

Two rivers flow into it from certain lakes to the east, enclosing Meroe, an island of considerable size. One of the rivers, which flows on the eastern side, is called Astaboras, and the other Astapus. Some call the latter Astasobas, and say that the Astapus is another river, flowing from certain lakes to the south, which forms most of the straight part of the main body of the Nile.

θεῖαν σῶμα τοῦ Νείλου. τοῦτον ποιεῖν τὴν δὲ πλήρωσιν αὐτοῦ τοὺς θερινοὺς ὄμβρους παρασκευάζειν. ὑπερ δὲ τὰς συμβολὰς τοῦ Ἀσταβόρα καὶ τοῦ Νείλου σταδίοις ἑπτακοσίοις Μερόην εἶναι πόλιν ὁμώνυμον τῇ νήσῳ· ἄλλην δ'εἶναι νῆσον ὑπὲρ τῆς Μερόης, ἣν ἔχουσιν οἱ Αἰγυπτίων φυγάδες οἱ ἀποστάντες ἐπὶ Ψαμμιτίχου, καλοῦνται δὲ Σεμβρῖται, ὡς ἂν ἐπήλυδες· βασιλεύονται δὲ ὑπὸ γυναικός, ὑπακούουσι δὲ τῶν ἐν Μερόῃ. τὰ δὲ κατωτέρω ἑκατέρωθεν Μερόης, παρὰ μὲν τὸν Νεῖλον πρὸς τὴν Ἐρυθρὰν Μεγάβαροι καὶ Βλέμμυες, Αἰθιόπων ὑπακούοντες, Αἰγυπτίοις δ'ὅμοροι· παρὰ θάλατταν δὲ Τρωγλοδύται· διεστᾶσι δὲ εἰς δέκα ἢ δώδεκα ἡμερῶν ὁδὸν οἱ κατὰ τὴν Μερόην Τρωγλωδύται τοῦ Νείλου. ἐξ ἀριστερῶν δὲ τῆς ῥύσεως τοῦ Νείλου Νοῦβαι κατοικοῦσιν ἐν τῇ Λιβύῃ, μέγα ἔθνος, ἀπὸ τῆς Μερόης ἀρξάμενοι μέχρι τῶν ἀγκώνων, οὐχ ὑποταττόμενοι τοῖς Αἰθίοψι, αλλ'ἰδίᾳ κατὰ πλείους βασιλείας εἰλημμένοι. τῆς δ'Αἰγύπτου τὸ παρὰ τὴν θάλατταν ἐστιν ἀπὸ τοῦ Πηλουσιακοῦ στόματος πρὸς τὸ Κανωβικὸν στάδιοι χίλιοι τριακόσιοι. Ἐρατοσθένης μὲν οὖν οὕτως.

217: Strabo C. 824 f:

Ἔστι δὲ ὀρθογωνίου τριγώνου τὸ σχῆμα, ὡς ἂν τις ἐν ἐπιπέδῳ νοήσειε, βάσιν μὲν ἔχον τὴν καθ'ἡμᾶς παραλίαν τὴν ἀπὸ τῆς Αἰγύπτου καὶ Νείλου μέχρι Μαυρου-

Nile as far as Ethiopia and produced by me to the Ocean; while the hypotenuse is the whole ocean-coast between Ethiopia and Maurusia. Now the part at the vertex of the figure I have described, falling as it does already more or less under the torrid zone, I have to describe from surmise owing to its inaccessibility. Consequently I cannot even give the maximum breadth of the country. I have, however, said thus much in what I have already written: that from Alexandria to Meroe, the Ethiopian capital, is about ten thousand stades to the south, and from there in a straight line to the boundary of the torrid zone and the inhabited world is another three thousand. The same distance, amounting to thirteen or fourteen thousand stades, should be set down as the maximum breadth of Libya, and its length is a little less than double the breadth.

218.

Eratosthenes estimates the distance from Cyrene to Alexandria by land at 525 miles.

219.

Eratosthenes says the circuit of the Great Syrtis is five thousand stades and its width eighteen hundred, from the Hesperides to Automala and the boundary between Cyrenaica and the rest of Libya hereabouts.

220: Plin. V # 41:

Clarissima est Meninx, longitudine XXV M passuum, latitudine XXII, ab Eratosthene Lotophagitis appellata.

221: Strabo, C. 170:

ἔνιοι δὲ Στήλας ὑπέλαβον τὴν Κάλπην καὶ τὴν Ἀβίλυκα, τὸ ἀντικείμενον ὄρος ἐκ τῆς Λιβύης, ὃ φησιν Ἐρατοσθένης, ἐν τῷ Μεταγωνίῳ, Νομαδικῷ ἔθνει, ἱδρῦσθαι· . . . . . καὶ Δικαίαρχος δὲ καὶ Ἐρατοσθένης καὶ Πολύβιος καὶ οἱ πλεῖστοι τῶν Ἑλλήνων περὶ τὸν πορθμὸν ἀποφαίνουσι τὰς Στήλας.

222: Strabo, C. 829:

Ἀρτεμίδωρος δ'' Ἐρατοσθένει μὲν ἀντιλέγει, διότι Λίξον τινά φησι πόλιν περὶ τὰ ἄκρα τῆς Μαυρουσίας τὰ ἑσπέρια ἀντὶ Λυγγός· Φοινικικὰς δὲ πόλεις κατεσκαμμένας παμπόλλας τινάς, ὧν οὐδὲν ἰδεῖν ἐστιν ἴχνος· ἐν δὲ τοῖς ἑσπερίοις Αἰθίοψι, τοὺς ἀέρας πλατεῖς φήσας, ταῖς τε ὀρθριναῖς ὥραις καὶ ταῖς δειλιναῖς παχεῖς καὶ ἀχλυώδεις εἶναι τοὺς ἀέρας.

223: Strabo C. 47:

πεπίστευκε δὲ καὶ περὶ τῶν ἔξω στηλῶν Ἡρακλείων πολλοῖς μυθώδεσι, Κέρνην τε νῆσον καὶ ἄλλους τόπους ὀνομάζων τοὺς μηδαμοῦ νυνὶ δεικνυμένους, ...

220.

The best known is Meninx, called by Eratosthenes "Lotophagitis". It is 25 miles long and 22 broad.

221.

Some have supposed that the Pillars are Calpe and Abilyx, the mountain which lies opposite in Libya. Eratosthenes says that it is situated in Metagonium,, the home of a nomadic tribe. . . . .Dicaearchus, Eratosthenes, and most of the Greeks place the Pillars in the neighborhood of the Straits.

222.

Artemidorus contradicts Eratosthenes when he mentions as "Lixus", instead of "Lynx", a certain city about the western boundaries of Maurusia, and when he describes as Phoenician a large number of cities now destroyed, of which it is impossible to see any trace: also because, after calling the atmosphere "flat", he says that among the western Ethiopians the air is thick and misty both in the early hours and in the evening.

223.

He believes also in many mythical stories about the parts outside the Pillars of Heracles: he names the island of Cerne and other places which can nowhere be pointed out nowadays.

224: Strabo C. 513 f:

φησὶ δ''Ερατοσθένης τοὺς 'Αραχωτοὺς καὶ Μασσαγέτας τοῖς Βακτρίοις παρατεῖσθαι πρὸς δύσιν παρὰ τὸν 'Ωξον, καὶ Σάκας μὲν καὶ Σογδιανοὺς τοῖς ὅλοις ἐδάφεσιν ἀντικεῖσθαι τῇ 'Ινδικῇ, Βακτρίους δ'ἐπ'ὀλίγου· τὸ γὰρ πλέον τῷ Παροπαμισῷ παρατεῖσθαι· διείργειν δὲ Σάκας μὲν καὶ Σογδιανοὺς τὸς 'Ιαξάρτην, καὶ Σογδιανοὺς δὲ καὶ Βακτριανοὺς τὸν 'Ωξον, μεταξὺ δὲ 'Υρκανῶν καὶ 'Αρίων Ταπύρους οἰκεῖν· κύκλῳ δὲ περὶ τὴν θάλατταν μετὰ τοὺς 'Υρκανοὺς 'Αμάρδους τε καὶ 'Αναριάκας καὶ Καδουσίους καὶ Οὐιτίους, τάχα δὲ καὶ ἑτέρους μέχρι Σκυθῶν, ἐπὶ θάτερα δὲ μέρη τῶν 'Υρκανῶν Δέρβικας, τοὺς δὲ Καδουσίους συμψαύειν Μήδων καὶ Ματιανῶν ὑπὸ τὸν Παραχοάθραν.

Τὰ δὲ διαστήματα οὕτω λέγει· ἀπὸ μὲν τοῦ Κασπίου ἐπὶ τὸν Κῦρον ὡς χιλίους ὀκτακοσίους σταδίους, ἔνθεν δ'ἐπὶ Κασπίας πύλας πεντακισχιλίους ἑξακοσίους, εἶτ'εἰς 'Αλεξάνδρειαν τὴν ἐν 'Αρίοις ἑξακισχιλίους τετρακοσίους, εἶτ'εἰς Βάκτραν τὴν πόλιν, ἣ καὶ Ζαριάσπα καλεῖται, τρισχιλίους ὀκτακοσίους ἑβδομήκοντα, εἶτ'ἐπὶ τὸν 'Ιαξάρτην ποταμόν, ἐφ'ὃν 'Αλέξανδρος ἦκεν, ὡς πεντακισχιλίους· ὁμοῦ δισχίλιοι δισμύριοι ἑξακόσιοι ἑβδομήκοντα.

225: Strabo C. 509:

Φησὶ δὲ καὶ εὔπλουν εἶναι (καὶ οὗτος καὶ 'Ερατοσθένης παρὰ Πατροκλέους λαβὼν) καὶ πολλὰ τῶν 'Ινδικῶν

224.

According to Eratosthenes the Arachoti and Massagetae are next to the Bactrii along the Oxus to the west, the Sacae and Sogdiani lie opposite to India with their whole ground, but the Bactriani to only a small extent: for the most part they lie along the Paropamisus. The Sacae and Sogdiani are divided by the Jaxartes, the Sogdiani and Bactriani by the Oxus, while between the Hyrcani and Arii dwell the Tapyri. Round the seaboard in order, after the Hyrcani, are the Amardi, the Anariaces, the Cadusii, the Albani, the Caspii, the Vitii, and perhaps others as far as the Scythae. On the other side of the Hyrcani are the Derbices, and the Cadusii are in contact with the Medi and the Matiani below the Parachoathras.

The distances he gives as follows: from Mt. Caspius to the (mouth of the) Cyrus about eighteen hundred stades, from there to the Caspian Gates five thousand six hundred, then to Alexandria of the Arii six thousand four hundred, to the city of Bactra, also called Zariaspa, three thousand eight hundred and seventy, and to the River Jaxartes, to which Alexander marched, about five thousand. The total is twenty-two thousand six hundred and seventy.

225.

He (Aristobulus) says also that it (the Oxus) is navigable, a point which both he and Eratosthenes take

φορτίων κατάγειν εἰς τὴν Ὑρκανίαν θάλατταν, ἐντεῦθεν δ'εἰς τὴν Ἀλβανίαν περαιοῦσθαι, καὶ διὰ τοῦ Κύρου καὶ τῶν ἐξῆς τόπων εἰς τὸν Εὔξεινον καταφέρεσθαι.

226: Strabo, C. 507:

(ἔστι δ'ὁ κόλπος) ἀνέχων ἐκ τοῦ ὠκεανοῦ πρὸς μεσημβρίαν κατ'ἀρχὰς μὲν ἱκανῶς στενός, ἐνδοτέρω δὲ πλατύνεται προιών, καὶ μάλιστα κατὰ τὸν μυχὸν ἐπὶ σταδίους που καὶ πεντακισχιλίους· ὁ δ'εἴσπλους μέχρι τοῦ μυχοῦ μικρῷ πλειόνων ἂν εἴη, συνάπτων πως ἤδη τῇ ἀοικήτῳ. φησὶ δ''Ερατοσθένης, τὸν ὑπὸ τῶν Ἑλλήνων γνώριμον περίπλουν τῆς θαλάττης ταύτης, τὸν μὲν παρὰ τοὺς Ἀλβάνους καὶ τοὺς Καδουσίους εἶναι πεντακισχιλίων καὶ τετρακοσίων, τὸν δὲ παρὰ τὸν Ἀναριακῶν καὶ Μάρδων καὶ Ὑρκανῶν μέχρι τοῦ στόματος τοῦ Ὤξου ποταμοῦ τετρακισχιλίων καὶ ὀκτακοσίων. ἔνθεν δ'ἐπὶ τοῦ Ἰαξάρτου δισχιλίων τετρακοσίων.

227: Schol. Ap. Rhod. II. 1247:

τὰ δὲ καλούμενα Καυκάσια Ἐρατοσθένης φησὶ πλησίον εἶναι τῆς Κασπιανῆς θαλάσσης.

228: Strabo, C. 497:

φησὶ δ''Ερατοσθένης ὑπὸ τῶν ἐπιχωρίων καλεῖσθαι Κάσπιον τὸν Καύκασον, ἴσως ἀπὸ τῶν Κασπίων παρονομασθέντα.

from Patrocles, and that it takes much Indian merchandise to the Hyrcanian sea. From there the merchandise is taken over into Albania, and taken down to the Euxine by way of the Cyrus and the adjoining districts.

226.

(The Caspian is a gulf) projecting southwards from the Ocean. At the entrance it is rather narrow, but further in it broadens out as it proceeds: this is especially so at its inmost part, where it measures about five thousand stades. The voyage in to the inmost part may be a little more, verging as it does on the uninhabited zone. According to Eratosthenes, the voyage round this sea so far as it is known to the Greeks is five thousand four hundred stades along the Albanian and Caspian coasts and four thousand eight hundred past the territory of the Anariaces, the Mardi, and the Hyrcani to the mouth of the River Oxus. From there to the Jaxartes is two thousand four hundred.

227.

Eratosthenes states that what is called the Caucasian range is near the Caspian Sea.

228.

Eratosthenes says that the Caucasus is called Caspius by the natives. Probably it takes this name from the Caspii.

229: Strabo C. 91:

φησὶν εἶναι καὶ κατ' Ἐρατοσθένη τὸν αὐτὸν μεσημβρινὸν τόν τε διὰ τοῦ Καναβικοῦ στόματος καὶ τὸν διὰ Κανέων, διέχειν δὲ τοῦτον τοῦ διὰ Θαψάκου ἑξακισχιλίους τριακοσίους σταδίους, τὰς δὲ Κυανέας τοῦ Κασπίου ὄρους ἑξακισχιλίους ἑξακοσίους, ὃ κεῖται κατὰ τὴν ὑπέρθεσιν τὴν ἐπὶ τὸ Κάσπιον πέλαγος ἐκ Κολχίδος, ὥστε παρὰ τριακοσίους σταδίους τὸ ἴσον εἶναι διάστημα ἀπὸ τοῦ διὰ Κυανέων μεσημβρινοῦ ἐπί τε Θάψακον καὶ ἐπὶ τὸ Κάσπιον· τρόπον δή τινα ἐπὶ τοῦ αὐτοῦ μεσημβρινοῦ κεῖσθαι τήν τε Θάψακον καὶ τὸ Κάσπιον. τούτῳ δ' ἀκολουθεῖν τὸ ἀφεστάναι ἴσον τὰς Κασπίους πύλας Θαψάκου τε καὶ τοῦ Κασπίου· τοῦ δὲ Κασπίου πολὺ ἐλάττους ἀφεστάναι τῶν μυρίων, ὅσους φησὶν ἀφεστάναι Ἐρατοσθένης τῆς Θαψάκου· τῆς Θαψάκου ἄρα πολὺ ἐλάττους ἢ μυρίους ἀφεστάναι τοὺς ἐπ' εὐθείας· κυκλοφορίαν ἄρα εἶναι τοὺς μυρίους, οὓς λογίζεται ἐκεῖνος ἐπ' εὐθείας ἀπὸ Κασπίων πυλῶν εἰς Θάψακον . . . . .

230: Schol. Ap. Rhod. II, 399:

ὁ δὲ Φᾶσις φέρεται μὲν ἀπὸ τῶν Ἀρμενίας ὀρῶν, ὡς φησιν Ἐρατοσθένης· ἐκβίδωσι δὲ εἰς Κόλχους κατὰ θάλασσαν.

229.

Hipparchus says that even according to Eratosthenes the meridian through the mouth of Canopus and that through the Cyanean Rocks are the same. This meridian is six thousand three hundred stades from that through Thapsacus, while the Cyanean Rocks are six thousand six hundred from Mount Caspius, which lies by the pass from Colchis to the Caspian Sea: thus the distance from the meridian through the Cyanean Rocks to Thapsacus is within three hundred stades of that to Mount Caspius, and both Thapsacus and Mount Caspius are practically on the same meridian. It follows from this that the Caspian Gates are the same distance from both Thapsacus and Mount Caspius. In fact, however, they are much less from Mount Caspius than ten thousand, which is the distance Eratosthenes gives from Thapsacus, and therefore they are much less from Thapsacus in a straight line. Thus the measurement of ten thousand must be a winding route, though Eratosthenes gives it as the straight line from the Caspian Gates to Thapsacus. . . . .

230.

The Phasis, according to Eratosthenes, comes down from the mountains of Armenia. It runs into the sea at Colchis.

231: Schol. Ap. Rhod. IV. 131:

Τιτηνίδος αἴης. Τοῦ Τιτῆνος ποταμοῦ, ἀφ' οὗ καὶ ἡ χώρα Τιτήνις κέκληται, μνημονεύει Ἐρατοσθένης ἐν Γεωγραφίᾳ.

232: Strabo, C. 529:

Ποταμοὶ δὲ πλείους μέν εἰσιν ἐν τῇ χώρᾳ, γνωριμώτατοι δὲ Φᾶσις μὲν καὶ Λύκος εἰς τὴν Ποντικὴν ἐκπίπτοντες θάλατταν (Ἐρατοσθένης δ' ἀντὶ τοῦ Λύκου τίθησι Θερμώδοντα οὐκ εὖ), ...

233: Plin. VI # 3:

Mensuram Ponti a Bosporo ad Maeotium lacum quidam fecere XIV XXXVIII MD passuum, Eratosthenes C M minorem.

234: Strabo C. 74:

ὁ δ' Ἐρατοσθένης καὶ τοὐπίγραμμα προφέρεται τὸ ἐν τῷ Ἀσκληπιείῳ τῷ Παντικαπαιέων ἐπὶ τῇ βαγείσῃ χαλκῇ· ὑδρίᾳ διὰ τὸν πάγον·

εἴ τις ἄρ' ἀνθρώπων μὴ πείθεται οἷα παρ' ἡμῖν
γίγνεται, εἰς τήνδε γνώτω ἰδὼν ὑδρίαν·
ἣν οὐχ ὡς ἀνάθημα θεοῦ καλόν, ἀλλ' ἐπιδεῖγμα
χειμῶνος μεγάλου θῆχ' ἱερεὺς Στρατίος.

235: Strabo C. 91:

διόπερ πρῶτον μὲν ἐκείνου τὸ ἀπὸ τοῦ στόματος ἐπὶ Φᾶσιν εἰπόντος σταδίων δικτακισχιλίων, καὶ προσθέντος

231.

Land of Titenis: Eratosthenes mentions in his "Geography" the river Titen, from which the country Titenis also takes its name.

232.

There is a number of rivers in the country. The best known are the Phasis and the Lycus, which flow into the Pontic Sea. Eratosthenes substitutes, wrongly, the Thermodon for the Lycus.

233.

According to some authorities the length of the Pontus from the Bosphorus to Lake Maeotis is 1,438½ miles. Eratosthenes makes 100 less.

234.

Eratosthenes also refers to the epigram in the temple of Asclepius at Panticapaeum, inscribed on the bronze water-jar burst by the frost:

"If any man does not believe what kinds of things happen among us, let him look at this water-jar and learn. The priest Stratius offered it, not as a fair offering to a god, but as an example of a great winter."

235.

Thus, Eratosthenes first stated that the distance from the mouth (of the Euxine) to Phasis was eight

τοὺς εἰς Διοσκουριάδα ἐνθένδε ἑξακοσίους, τὴν δ'ἀπὸ Διοσκουριάδος εἰς τὸ Κάσιον ὑπέρθεσιν ἡμερῶν πέντε, ἥτις κατ'αὐτὸν Ἵππαρχον εἰκάζεται λέγεσθαι ὅσον χιλίων σταδίων, ὥστε τὴν σύμπασαν κατ''Ερατοσθένη κεφαλαιοῦσθαι ἑνακισχιλίων ἑξακοσίων.

236: Amm. Marc. XXII 8: 10:

Omnis autem eius (Ponti Euxini) velut insularis circuitus littorea navigatio viginti tribus dimensa milibus stadiorum, ut Eratosthenes adfirmat et Hecataeus et Ptolomaeus, aliique huiusmodi cognitionum minutissimi scrutatores, in speciem Scythici arcus nervo coagmentati geographiae totius adsensione formatur.

237: Schol. Eurip. Med., 2:

τὰς δὲ Συμπληγάδας ὁ Σιμωνίδης συνομάδας φησίν. Ἐρατοσθένης δὲ ἐν γεωγραφουμένοις φησὶ τὸν πλοῦν στενὸν εἶναι καὶ σκολιόν, δι'οὗ φαντάζεσθαι τοὺς πλέοντας τὴν ἀπόκλεισιν τῶν πετρῶν.

238: Plin. V # 127:

Ex Asia interiisse gentis tradit Eratosthenes Solymorum, Lelegum, Bebrycum, Colycantiorum, Tripsedorum.

239: Steph Byz. v. Γάγγρα:

- Ἐρατοσθένης δὲ σύδετέρως τὰ Γάγγρα φησί.

thousand stades, and added to this the six hundred from there to Dioscurias, and five days' journey for the pass from Dioscurias to Mount Caspius, which is estimated according to Hipparchus at about a thousand stades, so that according to Eratosthenes the sum total is nine thousand.

236.

The coasting voyage round the whole (Euxine Sea), like the circumference of an island, measures twenty-three thousand stades. This is definitely stated by Eratosthenes, Hecataeus, Ptolemy, andother careful inquirers into this kind of statistics. All geographers agree that it is shaped like a strung Scythian bow.

237.

Simonides calls the Symplegades "Synormades". Eratosthenes in his geographical work says that the passage is narrow and crooked, and that for this reason voyagers imagined that the rocks closed in.

238.

Eratosthenes says that the following races have died out in Asia: the Solymi, Leleges, Bebryces, Colycantii, and Tripsedi.

239.

Eratosthenes uses the name "Gangra" in the neuter.

240: Steph. Byz. v. Ἄμαξα:

Ἄμαξα χωρίον Βιθυνίας ὡς Ἐρατοσθένης.

241: Steph. Byz. v. Ταρσός:

-Ἐρατοσθένης δὲ Ταρσὸν διὰ τὸ πρότερον τῶν ναπῶν φθειρομένων ἐν τῷ παραπάζειν, τούτους πρώτους συναγαγόντας τερσᾶναι, καὶ εἰς τὸν χειμῶνα ἀποθέσθαι τὴν τροφήν. . . . . ὁ πολίτης Ταρσεύς, ὡς Ἀλικαρνασσεύς. Ἐρατοσθένης δὲ καὶ Ταρσηνόν φησι.

242: Steph. Byz. Αἰθόπιον:

χωρίον Λυδίας παρὰ Ὕλλῳ, πλησίον τοῦ Εὐρίπου, ἀφ'οὗ ἡ Ἄρτεμις Αἰθοπία . . . . . οἱ δὲ ὅτι ἡ αὐτή ἐστι τῇ Ἑκάτῃ, ἥτις ἀεὶ δᾷδας κατέχει, ὡς Ἐρατοσθένης.

243: Schol. Lycophr. 440:

Μάγαρσος δὲ πόλις Κιλικίας . . . . . μέμνηται δὲ αὐτοῦ καὶ Ἐρατοσθένης· πέντε δέ φησιν εἰς Κύπρον ἀπενεχθῆναι, Τεῦκρον, Ἀγαπήνορα, Ἀναμαντα, Πράξανδρον καὶ Κηφέα.

244: Strabo, C. 684:

οὐδὲ ὁ Ἐρατοσθένης ἔῦ· αἰτιώμενος γὰρ τοῦτον οὐκ ἀπ'ἄρκτων φησὶν εἶναι τὴν Ἱεροκηπίαν, ἀλλ'ἀπὸ νότου· . . . . . φησὶ δ''Ἐρατοσθένης τὸ παλαιὸν ὁλομα-

240.

Amaxa, according to Eratosthenes, is a place in Bithynia.

241.

-Eratosthenes says that Tarsus received its name from the fact that, in former times, when fruits used to be lost through overripeness, these were the first people to dry them (tersainein) and store them for winter food. . . . . An inhabitant is called"Tarseus" on the analogy of "Halicarnasseus", but Eratosthenes also uses the form "Tarsenus".

242.

Aethopion: A place in Lydia, beside Hyllus and near Euripus, from which is named Aethopian Artemis. . . . . Some say that she is the same as Hecate, who always holds torches: this is the explanation of Eratosthenes.

243.

Magarsus is a city of Cilicia. . . . . Eratosthenes also mentions it. He says that five men went away to Cyprus: Teucer, Agapenor, Acamas, Praxander, and Cepheus.

244.

Eratosthenes is not right, either. When he rebukes Damastes, he says Hierocepia is not in the north (of Cyprus), but in the south. . . . . Eratosthenes says that

νούντων τῶν πεδίων, ὥστε κατέχεσθαι δρυμοῖς καὶ μὴ γεωργεῖσθαι, μικρὰ μὲν ἐπωφελεῖν πρὸς τοῦτο τὰ μέταλλα, δενδροτομούντων πρὸς τὴν καῦσιν τοῦ χαλκοῦ καὶ τοῦ ἀργύρου, προσγενέσθαι δὲ καὶ τὴν ναυπηγίαν τῶν στολῶν, ἤδη πλεομένης ἀδεῶς τῆς θαλάττης καὶ μετὰ δυνάμεων· ὡς δ'οὐκ ἐξενίκων, ἐπιτρέψαι τοῖς βουλομένοις καὶ δυναμένοις ἐπικόπτειν καὶ ἔχειν ἰδιόκτητον καὶ ἀτελῆ τὴν διακαθαρθεῖσαν γῆν.

245: Aelian. hist. anim. VII, 48:

ἴδιον δὴ τῶν ζώων καὶ ἡ μνήμη· καὶ συνῳδὸν τοῖς προειρημένοις, καὶ ἐς τὸ αὐτὸ δ'ἐστὶν (εὕδοντος ἐν τῇ Σάμῳ ἐπὶ τοῦ νεκηνότος Διονύσου νομίζοιτο ἂν καὶ τὸ φωλιὸν εἰδέναι). καὶ τοῦτο ἀκουέτω Ἐρατοσθένους τε καὶ Εὐφορίωνος καὶ ἄλλων περιηγουμένων αὐτό.

246: Strabo C. 108:

Προπεπτωκυίας δὲ τῆς Εὐρώπης ἄκραις πλείοσι, ... , ἐκεῖνος μὲν γὰρ τρεῖς ἔφη, τὴν ἐπὶ τὰς Στήλας καθήκουσαν, ἐφ'ἧς ἡ Ἰβηρία, καὶ τὴν ἐπὶ τὸν Ποσειδῶνα, ἐφ' ἧς ἡ Ἰταλία, καὶ τρίτην τὴν κατὰ Μαλέας, ἐφ'ἧς τὰ μεταξὺ τοῦ Ἀδρίου καὶ τοῦ Εὐξείνου πάντ'ἔθνη καὶ τοῦ Παναίδος.

247: Plin., III # 75:

Eratosthenes autem inter ostium oceani et Sar-

formerly the plains were full of forests, so that they were covered with woods and not cultivated. The mines helped a little in this respect, as they cut down trees to smelt copper and silver, and ship-building for fleets was also practised when the sea was fearlessly navigated and in force. When they did not succeed in conquering (forests), permission was given to any who could and would to cut them down and have as private property, free of taxes, the land which was cleared.

245.

Memory then is a characteristic of animals too. Agreeing with what has just been said (the story of Androcles) and leading to the same conclusion is (the story of the "Gaping Dionysus" at Samos. . .) This may be found in Eratosthenes and Euphorion, as well as others who describe it.

246.

Europe projects with a number of promontories. . . . . Eratosthenes gave them as three: that which comes down to the Pillars, containing Iberia, that at the (Sicilian) Strait, containing Italy, and third, that at Malea, containing all the peoples between the Adriatic, the Euxine, and the Tanais.

247.

Eratosthenes gives the name "Sardinian" to the

diniam quidquid est Sardoum, inde ad Siciliam Tyrrenum, ab hac Cretam usque Siculum, ab ea Creticum.

248: Strabo C. 47:

τοιγάρτοι τὸν μὲν Ἰσσικὸν κόλπον ἐπίστευσεν ἐωθινώτατον τῆς καθ'ἡμᾶς θαλάττης σημεῖον, τοῦ κατὰ Διοσκουριάδα τὴν ἐν τῷ τοῦ Πόντου μυχῷ σχεδόν τι καὶ τρισχιλίοις σταδίοις ἐωθινωτέρου ὄντος καὶ κατ' αὐτὸν ἐκ τοῦ σταδιασμοῦ οὗ φησι.

249: Strabo C. 475:

Ἐρατοσθένης δ'ἀπὸ μὲν τῆς Κυρηναίας ἐπὶ τὸ Κριοῦ μέτωπον δυεῖν ἡμερῶν καὶ νυκτῶν πλοῦς, ἀπὸ δὲ Κιμάρου (ἐπὶ Ταίναρον) εἰσὶ στάδιοι ἑπτακόσιοι (μεταξὺ δὲ Κύθηρα), ἀπὸ δὲ τοῦ Σαρωνίου πρὸς Αἴγυπτον τεττάρων ἡμερῶν καὶ νυκτῶν πλοῦς, οἱ δὲ τριῶν φασι· σταδίων δ'εἶναι τοῦτόν τινες πεντακισχιλίων εἰρήκασιν, οἱ δὲ ἔτι ἐλαττόνων. Ἐρατοσθένης δ'ἀπὸ μὲν τῆς Κυρηναίας μέχρι Κρίου μετώπου δισχιλίους φησίν, ἔνθεν δ'εἰς Πελοπόννησον ἐλάττους.

250: Schol. Ap. Rhod. IV 284:

τὸν Ἴστρον. . . . Ἐρατοσθένης δὲ ἐν τρίτῳ Γεωγραφικῶν ἐξ ἐρήμων τόπων ῥεῖν, περιβάλλειν δὲ νῆσον Πεύκην.

stretch from the entrance to the Ocean (Gibraltar) as far as Sardinia; from there to Sicily he calls "Tyrrhenian"; thence to Crete, "Sicilian", and from there onwards "Cretan".

248.

Thus he believed that the Gulf of Issus was the most easterly point of our sea, whereas the point by Dioscurias in the corner of the Pontus is some three thousand stades further east even according to Eratosthenes himself, by the itinerary he gives.

249.

According to Eratosthenes, the voyage from Cyrenaica to Ram's Forehead takes two days and nights, while from Cimarus (to Taenarum) it is seven hundred stades, with Cythera lying between. From Samonium to Egypt the voyage takes four days and nights, or, according to other authorities, three. Some say that this is five thousand stades, others even less. Eratosthenes says that from Cyrenaica to Ram's Forehead is two thousand, and from there to the Peloponnese less.

250.

The Ister. . . . . Eratosthenes in the third book of his "Geography" says that it flows from desert parts, and that it washes round the island of peuce.

251: Strabo C. 28:

ἐπιστροφὴν γὰρ λαμβάνει πρὸς νότον ἀκρωτηριάζουσα ἡ Θρᾴκη, καθ'ἃ συνάπτει τῇ Μακεδονίᾳ . . . . οὐκ ἐνόησε δὲ τοῦτο Ἐρατοσθένης, ὑπερνόησε δ'ὁμῶς. αὐτὸς γοῦν ἐξηγεῖται τὴν ἐπιστροφήν, ἣν λέγω, τῆς χώρας.

252: Steph Byz., v. Ἴχναι:

Ἴχναι, πόλις Μακεδονίας . . . . . Ἐρατοσθένης δὲ Ἄχνας αὐτήν φησι.

253: Schol. (Venet. Lips. Wassen) Il. α', 594:

Ἐρατοσθένης δὲ (φησὶ Σίντιας προσαγορευθῆναι), ἐπεὶ γόητες ὄντες εὗρον δηλητήρια φάρμακα.

254: Strabo, C. 106:

Ἐξῆς δὲ τὰ τοῦ Ἐρατοσθένους ἐπανορθοῖ, τὰ μὲν εὖ, τὰ δὲ χεῖρον λέγων ἢ ἐκεῖνος. ἐξ Ἰθάκης μὲν γὰρ εἰς Κορκύραν τριακοσίους εἰπόντος, πλείους φησὶν εἶναι τῶν ἐννακοσίων· ἐξ Ἐπιδάμνου δὲ εἰς Θεσσαλονίκειαν ἐννακοσίους ἀποδόντος, πλείους τῶν δισχιλίων φησί· ταῦτα μὲν εὖ.

255: Schol. Od. Mediolan. γ' 188:

Νεοπτόλεμος . . . . . πορθήσας τὴν Μολοσσίαν, ἐξ Ἀνδρομάχης ἴσχει Μόλοσσον, ἀφ'οὗ καὶ τὸ γένος ἐστὶ

251.

Thrace, near where it joins Macedonia, takes a turn to the south and juts out into a promontory. . . . . Eratosthenes did not know this for certain, but he nevertheless suspected it. At least, he describes the turn of the land I mean.

252.

Ichnae: a city in Macedonia. . . . Eratosthenes calls it Achnae.

253.

Eratosthenes (says that they are called "Sinties") because they are sorcerers and discovered harmful drugs.

254.

(Polybius) goes on to correct the statements of Eratosthenes. Sometimes he does so well, but sometimes his views are inferior to those of Eratosthenes. For example, where the latter says that it is three hundred stades from Ithaca to Corcyra, Polybius says it is more than nine hundred; and where Eratosthenes gives the distance from Epidamnus to Thessalonica as nine hundred, he says it is more than two thousand. These corrections are right.

255.

After sacking Molossia, Neoptolemus had a son Molossus by Andromache, from whom originates the line of

τῶν ἐν Μολοσσίᾳ βασιλέων, ὡς ἱστορεῖ Ἐρατοσθένης.

256: Steph. Byz.:

Αὐταριᾶται, ἔθνος Θεσπρωτικόν. Χάραξ ἐβδόμῃ χρονικῶν, καὶ Φαβωρῖνος ἐν παντοδαπαῖς, καὶ Ἐρατοσθένης.

257: Isidorus Etymolog. IX. 2. 76:

Eratosthenes autem dicit, dictos Myrmidones a Myrmidono duce, Iovis et Eurymedusae filio.

258: Steph. Byz., v. Ἀγραῖοι:

ἔστι καὶ ἕτερον ἔθνος πλησίον Ἀκαρνάνων. . . . . λέγονται δὲ καὶ Ἀγραεῖς, ὡς Ἐρατοσθένης.

259: Vit. Arat. Petav. Uran. p. 269 A:

ἀλλ' ἀπὸ τῶν ἐν τῇ Ἀττικῇ (Ἀθηνῶν) οἱ πολῖται Ἀθηναῖοι, ἀπὸ δὲ τῶν ἐν Εὐβοίᾳ Ἀθηνῆται λέγονται, ὥσπερ Ἐρατοσθένης φησὶν ἐν τῷ πρώτῳ γεωγραφουμένων.

260: Eustath. ad Il. β, 612, p. 302, 29:

καὶ ὅτι Ἐρατοσθένης παρὰ Ἀρκάσι φησὶ φελλόν, μέσον τι πρίνου καὶ δρυός, ὃ ἔνιοι θηλύπρινον καλεῖν.

the kings of Molossia. This is related by Eratosthenes.

256.

Autariatae: A tribe of Thesprotia: Charax in the seventh book of "Chronology", Favorinus in "Miscellany", and Eratosthenes.

257.

Eratosthenes, however, says that the Myrmidons were called after their leader Myrmidonus, son of Jupiter and Eurymedusa.

258.

There is also another tribe of Acarnanians, close by. . . . . They are also, according to Eratosthenes, called"Agraeis".

259.

The citizens of Athens in Attica are called "Athenians", but those of Athens in Euboea are called "Athenetans", as Eratosthenes says in the first book of his geographical work.

260.

Also Eratosthenes says that in Arcadia is found the cork-tree, halfway between the holm-oak and the oak, called by some the "female holm-oak".

261: Strabo, C. 389:

Ἐρατοσθένης δέ φησι περὶ Φενεὸν μὲν τὸν Ἀ-
νίαν καλούμενον ποταμὸν λιμνάζειν τὰ πρὸ τῆς πόλεως,
καταδύεσθαι δ'εἰς τινας ἠθμούς, οὓς καλεῖσθαι ζέρεθρα·
τούτων δ'ἐμφραχθέντων, ἔσθ'ὅτε ὑπερχεῖσθαι τὸ ὕδωρ
εἰς τὰ πεδία, πάλιν δ'ἀναστομουμένων ἄθρουν ἐκ τῶν
πεδίων ἐκπεσὸν εἰς τὸν Λάδωνα καὶ τὸν Ἀλφειὸν ἐμβάλλειν,
ὥστε καὶ τῆς Ὀλυμπίας κλυσθῆναί ποτε τὴν περὶ τὸ
ἱερὸν γῆν, τὴν δὲ λίμνην συσταλῆναι· τὸν Ἐρασῖνον
δὲ περὶ Στύμφαλον ῥέοντα, ὑποδύντα ὑπὸ τὸ ὄρος, ἐν
τῇ Ἀργείᾳ πάλιν ἀναφανῆναι· διὸ δὴ καὶ Ἰφικράτη,
πολιορκοῦντα τὸν Στύμφαλον καὶ μηδὲν περαίνοντα,
ἐπιχειρῆσαι τὴν κατάδυσιν ἀποφράξαι, σπόγγους
προσαμένον πολλούς, παύσασθαι δὲ διοσημίας
γενομένης.

262: "Scymn.", 405, f:

ἐξῆς δὲ μεγάλη χερρόνησος Ὑλλικὴ
πρὸς τὴν Πελοπόννησόν τι ἐξισουμένη·
πόλεις δ'ἐν αὐτῇ φασι πέντε καὶ δέκα
Ὕλλους κατοικεῖν, ὄντας Ἕλληνας γένει·
τὸν Ἡρακλέους γὰρ Ὕλλον οἰκιστὴν λαβεῖν,
ἐκβαρβαρωθῆναι δὲ τούτους τῷ χρόνῳ
τοῖς ἔθεσιν ἱστοροῦσι τοῖς τῶν πλησίον,
ὡς φασι Τίμαιός τε κἀρατοσθένης.

261.

According to Eratosthenes, in the neighbourhood of Pheneus the river called Anias forms a lake in front of the city and then sinks into some openings called "zerethra". Sometimes when these are blocked up, the water overflows into the plains, and when they open again, all the water from the plains descends and flows into the Ladon and the Alpheus. In this way once even the ground round the temple at Olympia was flooded, and the lake was reduced. Likewise the Erasinus, which flows near Stymphalus, sinks under the mountain and reappears in the district of Argolis. It was because of this that Iphicrates, when he was besieging Stymphalus and making no headway, obtained a large number of sponges and tried to block up the descent: he desisted, however, when a thunder-storm took place.

262.

Next is the great Yllian peninsula, similar in size to the Peloponnese. Men say that there the Yllians dwell in fifteen cities, and that they are Greeks by race; for they had Hyllus, the companion of Heracles, as their founder, but are related to have lost their civilization through the customs of their neighbors. That is what Timaeus and Eratosthenes say.

263: Steph. Byz. v. Δυρράχιον:

Ἐρατοσθένης γ΄Γεωγραφουμένων· Ἔχόμενοι οἰκοῦσι Ταυλάντιοι. πόλις δὲ Ἑλληνὶς Ἐπίδαμνος ἐπὶ χερρονήσου τῆς καλουμένης Δυρραχίου. ποταμοὶ δὲ Δρίλων καὶ Ἄωος, περὶ οὓς οἱ Κάδμου καὶ Ἁρμονίας τάφοι δείκνυνται.

264: Schol. Ap. Rhod. IV 1215:

Τοὺς δὲ Νεσταίους Σκύλαξ ἔθνος Ἰλλυρικὸν φησιν. Ἐρατοσθένης δὲ ἐν γ΄ Γεωγραφουμένων, Μετὰ Ἰλλυρικούς, φησί, Νεσταῖοι, καθ'οὓς Φάρος νῆσος, Φαρίων ἀποικία.

265: Strabo C. 47:

τοῦ τε Ἀδρίου καὶ τὰ ἀρκτικὰ καὶ τὰ ἕσχατα διεξιὼν οὐδενὸς ἀπέχεται μυθώδους.

266: Strabo C. 93:

ὁ δὲ καὶ τὴν Ῥώμην τιθεὶς ἐπὶ ταὐτοῦ μεσημβρινοῦ τὴν τοσοῦτον καὶ Καρχηδόνος, δυσμικωτέραν, ὑπερβολὴν οὐκ ἀπολείπει τῆς τῶν τόπων ἀπειρίας καὶ τούτων καὶ τῶν ἐφεξῆς πρὸς δύσιν μέχρι Στηλῶν.

267: Strabo C. 23:

ἐν τούτῳ τῷ κόλπῳ, τῷ ὑπὸ Ἐρατοσθένους λεχθέντι Κυμαίῳ, ὃν ποιοῦσιν αἱ Σειρηνοῦσσαι, . . .

263.

Eratosthenes, "Geography" 3: Next live the Taulantians. There is a Greek city called Epidamnus on the peninsula called Dyrrhachium. There are rivers called Drilo and Aoüs, near which the tombs of Cadmus and Harmonia are pointed out.

264.

Scylax calls the Nestaeans an Illyrian tribe. Eratosthenes, however, in "Geography" 3, says: "After the Illyrians come the Nestaeans, and alongside them the island of Pharos, a colony of the Pharians".

265.

In discussing the furthest northern parts of the Adriatic there is nothing fabulous which he rejects.

266.

He, however, when he places Rome, which is so much further west than Carthage, on the same meridian, leaves no room for greater ignorance both of these localities and of those in succession westwards as far as the Pillars.

267.

In this gulf, called that of Cumae by Eratosthenes and formed by the Sirenussae. . . . .

268: Strabo, C. 224:

οὔτ'οὖν Ἐρατοσθένης ὀρθῶς ὁ φήσας μὴ καθορᾶσθαι μήτε τὴν Κύρνον ἐκ τῆς Ἠπείρου μήτε τὴν Σαρδόνα, ...

269: Steph. Byz. v. Ταυρίσκοι:

Ταύρισκοι, ἔθνος περὶ τὰ Ἄλπεια ὄρη. . . . . Ἐρατοσθένης Τερίσκους αὐτούς φησι διὰ τὸ ε.

270: Caes. Bell. Gall. VI. 24:

--circa Hercyniam silvam, quam Eratosthení et quibusdam Graecis fama notam fuisse video, quam illi Orcyniam adpellánt.

271: Strabo, C. 104:

τὸν δ''Ἐρατοσθένη διαπορήσαντα, εἰ χρὴ πιστεύειν τούτοις, ὅμως περί τε τῆς Βρεττανικῆς πεπιστευκέναι καὶ τῶν κατὰ Γάδειρα καὶ τὴν Ἰβηρίαν.

272: Strabo, C. 106:

ἀπὸ δὲ Μασσαλίας ἐπὶ Στήλας λέγοντος ἐπτακισχιλίους, ἀπὸ δὲ Πυρήνης ἑξακισχιλίους, αὐτὸς λέγει χεῖρον πλείους ἢ ἐννακισχιλίους τοὺς ἀπὸ Μασσαλίας, ἀπὸ δὲ Πυρήνης μικρὸν ἐλάττους ἢ ὀκτακισχιλίους· ἐγγυτέρω γὰρ τῆς ἀληθείας ἐκεῖνος εἴρηκεν.

268.

Eratosthenes, then, is not right when he says that neither Cyrnus nor Sardo can be seen from the mainland.

269.

Tauriscans: a tribe in the vicinity of the Alps. . . . . Eratosthenes calls them "Teriscans" with an epsilon.

270.

. . . . . round about the Hercynian forest, which I notice was known by repute to Eratosthenes and to some (other) Greeks: they call it "Orcynian".

271.

Though Eratosthenes was at a loss whether these stories should be believed, yet he did believe in those (of Pytheas) about Britain and the parts about Cadiz and Spain.

272.

Where (Eratosthenes) says that it is seven thousand stades from Massilia to the Pillars, and six thousand from Pyrene, (Polybius) himself says, more wrongly, that the distance from Massilia is over nine thousand and that from Pyrene a little less than eight thousand. The estimates of Eratosthenes are nearer to the truth.

273: Strabo, C. 159:

Ἐρατοσθένης δὲ καὶ ναύσταθμον ἔχειν φησὶν αὐτὴν (Ταρρακῶνα).

274: Steph. Byz. v. Γάδειρα:

-Ἐρατοσθένης δὲ ἡ Γάδειρά φησι θηλυκῶς.

275: Strabo, C. 148:

καὶ Ἐρατοσθένης δὲ τὴν συνεχῆ τῇ Κάλπῃ Ταρτησσίδα καλεῖσθαί φησι, καὶ Ἐρύθειαν νῆσον εὐδαίμονα. πρὸς ὃν Ἀρτεμίδωρος ἀντιλέγων καὶ ταῦτα ψευδῶς λέγεσθαί φησι ὑπ'αὐτοῦ, καθάπερ καὶ τὸ ἀπὸ Γαδείρων ἐπὶ τὸ Ἱερὸν ἀκρωτήριον διάστημα ἀπέχειν ἡμερῶν πέντε πλοῦν, οὐ πλειόνων ὄντων ἢ χιλίων καὶ ἑπτακοσίων σταδίων, καὶ τὸ τὰς ἀμπώτεις μέχρι δεῦρο περατοῦσθαι ἀντὶ τοῦ κύκλῳ περὶ πᾶσαν τὴν οἰκουμένην συμβαίνειν, καὶ τὸ τὰ προσαρκτικὰ μέρη τῆς Ἰβηρίας εὐπαροδώτερα εἶναι πρὸς τὴν Κελτικὴν ἢ κατὰ τὸν ὠκεανὸν πλέουσι, καὶ ὅσα δὴ ἄλλα εἴρηκε Πυθέᾳ πιστεύσας, δι'ἀλαζονείαν.

276: Strabo, C. 107:

πάλιν δὲ τοῦτο μὲν ὀρθῶς ἀποφαίνεται, ὅτι ἀγνοεῖ τὰ Ἰβηρικὰ ὁ Ἐρατοσθένης, καὶ διότι περὶ αὐτῆς ἔσθ'ὅπου τὰ μαχόμενα ἀποφαίνεται· ὅ γε μέχρι Γαδείρων ὑπὸ Γαλατῶν περιοικεῖσθαι φήσας τὰ ἔξωθεν αὐτῆς, εἴ γε τὰ πρὸς δύσιν τῆς Εὐρώπης

273.

Eratosthenes says that Tarrasco has also a road for ships.

274.

Eratosthenes uses "Gadeira" in the feminine.

275.

Eratosthenes also says that the land adjoining Calpe is called Tartessis, and that Erythea is called Happy Island. Artemidorus contradicts him and says that what he says is untrue, like his statements that the distance from Gadeira to the Sacred Cape is five days' voyage, whereas it is not more than seventeen hundred stades; that the limit of the tides is here, whereas they join up all round the inhabited world; that the coasting voyage to Celtica provides an easier passage than the ocean voyage; and, indeed, because of the impostures of Pytheas, he discredits all the other statements Eratosthenes makes on his authority.

276.

On the other hand he shows correctly that Eratosthenes is ignorant about Iberia, if only because in some places he makes inconsistent statements about it. At least, after saying that its outer parts round to Gadeira are inhabited by Gauls, (if in fact they occupy the

μέχρι Γαδείρων ἔχουσιν ἐκεῖνοι, τούτων ἐκλαθόμενος κατὰ τὴν τῆς Ἰβηρίας περίοδον τῶν Γαλατῶν οὐδαμοῦ μέμνηται.

277: Strabo, C. 195:

Ὀσίσμιοι δ'εἰσίν, οὓς Ὀστιμίους ὀνομάζει Πυθέας, ἐπί τινος προπεπτωκυίας ἱκανῶς ἄκρας εἰς τὸν ὠκεανὸν οἰκοῦντες, οὐκ ἐπὶ τοσοῦτον δέ, ἐφ'ὅσον ἐκεῖνός φησι καὶ οἱ πιστεύσαντες ἐκείνῳ.

278: Diod. Sic V, 22:

τῆς γὰρ Πρεττανικῆς κατὰ τὸ ἀκρωτήριον τὸ καλούμενον Βελέριον οἱ κατοικοῦντες φιλόξενοι τε διαφερόντως εἰσὶ καὶ διὰ τὴν τῶν ξένων ἐμπόρων ἐπιμιξίαν ἐξημερωμένοι τὰς ἀγωγάς. οὗτοι τὸν κασσίτερον κατασκευάζουσι φιλοτέχνως ἐργαζόμενοι τὴν φέρουσαν αὐτὸν γῆν. αὕτη δὲ πετρώδης οὖσα διαφυὰς ἔχει γεώδεις, ἐν αἷς τὸν κόρον κατεργαζόμενοι καὶ τήξαντες καθαιροῦσιν. ἀποτυποῦντες δ'εἰς ἀστραγάλων ῥυθμοὺς νομίζουσιν εἶς τινα νῆσον προκειμένην μὲν τῆς Πρεττανικῆς, ὀνομαζομένην δὲ Ἶκτιν, κατὰ γὰρ τὰς ἀμπώτεις ἀναξηραινομένου τοῦ μεταξὺ τόπου ταῖς ἁμάξαις εἰς ταύτην κομίζουσι διαψιλῆ τὸν κασσίτερον. ἴδιον δέ τι συμβαίνει περὶ τὰς πλησίον νήσους τὰς μεταξὺ κειμένας τῆς τε Εὐρώπης καὶ τῆς Πρεττανικῆς· κατὰ μὲν γὰρ τὰς πλημμυρίδας τοῦ μεταξὺ πόρου πλημμυρουμένου νῆσοι φαίνονται, κατὰ δὲ τὰς ἀμ-

westward parts of Europe as far as Gadeira) he forgets all about this and mentions Gauls nowhere in his survey of Iberia.

277.

There the Osismii, whom Pytheas calls the Ostimii, live on a cape which projects a considerable distance into the ocean, but not so far as he and those who rely on him say.

278.

The inhabitants of Britain by the promontory called Belerium are not only remarkably friendly to strangers but, through their intercourse with foreign merchants, civilized in their manners. They produce tin, skilfully working the earth which bears it. This earth is rock-like, but contains earthy channels along which they cut their way. They smelt the ore, refine it, and cast the tin into the shape of knuckle-bones. They then convey it on to an island lying in front of Britain, named Ictis: the intervening channel becomes dry at low tide, and they convey the tin in large quantities in carts. (It is a peculiar thing that happens with the inlying islands between Europe and Britain: when the intervening channel fills up at high tide they become islands, but when the sea flows away at low tide and leaves

πώτεις ἀπορρεούσης τῆς θαλάττης καὶ πολὺν ἕλκον ἀναξηραινούσης, θεωροῦνται χερρονῆσοι. ἐντεῦθεν δ'οἱ ἔμποροι παρὰ τῶν ἐγχωρίων ὠνοῦνται καὶ διακομίζουσιν εἰς τὴν Γαλατίαν. τὸ δὲ τελευταῖον πέζῃ διὰ τῆς Γαλατίας πορευθέντες ἡμέρας ὡς τριάκοντα κατάγουσιν ἐπὶ τῶν ἵππων τἀφορτία πρὸς τὴν ἐκβολὴν τοῦ Ῥοδανοῦ ποταμοῦ.

279: Diod. Sic. V, 21:

αὕτη γὰρ τῷ σχήματι τρίγωνος οὖσα παραπλησίως τῇ Σικελίᾳ τὰς πλευρὰς οὐκ ἰσοπλεύρους ἔχει. παρεκτεινούσης δὲ αὐτῆς παρὰ τὴν Εὐρώπην λοξῆς, τὸ μὲν ἐλάχιστον ἀπὸ τῆς ἠπείρου διεστηκὸς ἀκρωτήριον, ὃ καλοῦσι Κάντιον, φασὶν ἀπέχειν ἀπὸ τῆς γῆς σταδίους ὡς ἑκατόν, καθ'ὃν τόπον ἡ θάλασσα ποιεῖται τὸν ἔκπλουν, τὸ δ'ἕτερον ἀκρωτήριον τὸ καλούμενον Βελέριον ἀπέχειν λέγεται τῆς ἠπείρου πλοῦν ἡμερῶν τεττάρων, τὸ δ'ὑπολειπόμενον ἀνήκειν μὲν ἱστοροῦσιν εἰς τὸ πέλαγος, ὀνομάζεσθαι, δ'"Ορκαν. τῶν δὲ πλευρῶν τὴν μὲν ἐλαχίστην εἶναι σταδίων ἑπτακισχιλίων πεντακοσίων, παρήκουσαν παρὰ τὴν Εὐρώπην, τὴν δὲ δευτέραν τὴν ἀπὸ τοῦ πορθμοῦ πρὸς τὴν κορυφὴν ἀνήκουσαν σταδίων μυρίων πεντακισχιλίων, τὴν δὲ λοιπὴν σταδίων δισμυρίων, ὥστε τὴν ξᾶσαν εἶναι τῆς νήσου περίφορον σταδίων τετρακισμυρίων δισχιλίων πεντακοσίων. κατοικεῖν δέ φασι τὴν Βρεττανικὴν αὐτόχθονα γένη καὶ τὸν παλαιὸν βίον ταῖς ἀγωγαῖς διατηροῦντα. ἅρμασι μὲν γὰρ κατὰ τοὺς πολέμους χρῶνται, καθάπερ οἱ παλαιοὶ τῶν Ἑλλήνων ἥρωες ἐν τῷ Τρωικῷ πολέμῳ κεχρῆσθαι παραδέδονται,

a wide channel dry, they are seen to be peninsulas.) The merchants buy the tin from the inhabitants and transport it from here to Gaul. Finally, after travelling by land through Gaul about thirty days, they bring their cargoes on horses to the mouth of the river Rhodanus.

279.

This island, like Sicily, is in shape triangular with unequal sides. It stretches sideways alongside the coast of Europe, the least distant point from the continent being the promontory known as Cantium, which is said to be about one hundred stades from the mainland: this is where the sea flows(into the Ocean). The second corner, named Belerium, is said to be four days' sail from the continent, while the other, according to the authorities, projects out to sea and is named Orca. The shortest side, alongside Europe, is seven thousand five hundred stades long; the second, from the Straits to the cape which projects, is fifteen thousand; and the last is twenty thousand. Thus the total perimeter of the island is forty-two thousand five hundred stades. Britain is said to be inhabited by indigenous tribes, who practise an old-fashioned manner of life in their pursuits. For example, they employ chariots in warfare, as tradition has it that the Greek heroes of old did in the Trojan War. They occupy cheap

καὶ τὰς οἰκήσεις εὐτελεῖς ἔχουσιν, ἐκ τῶν καλάμων ἢ ξύλων κατὰ τὸ πλεῖστον συγκειμένας· τήν τε συναγωγὴν τῶν σιτικῶν καρπῶν ποιοῦνται τοὺς στάχυς αὐτοὺς ἀποτέμνοντες καὶ θησαυρίζοντες εἰς τὰς καταστέγους οἰκήσεις· ἐκ δὲ τούτων τοὺς παλαιοὺς στάχυς καθ' ἡμέραν τίλλειν, καὶ κατεργαζόμενους ἔχειν τὴν τροφήν· τοῖς δ' ἤθεσιν ἁπλοῦς εἶναι καὶ πολὺ κεχωρισμένους τῆς τῶν νῦν ἀνθρώπων ἀγχινοίας καὶ πονηρίας. τάς τε διαίτας εὐτελεῖς ἔχειν καὶ τῆς ἐκ τοῦ πλούτου γεννωμένης τρυφῆς πολὺ διαλλάττοντας. εἶναι δὲ καὶ πολυάνθρωπον τὴν νῆσον, καὶ τὴν τοῦ ἀέρος ἕξειν διάθεσιν παντελῶς κατεψυγμένην, ὡς ἂν ὑπ' αὐτὴν τὴν ἄρκτον κειμένην. Βασιλεῖς δὲ καὶ δυνάστας πόλλους ἔχειν, καὶ πρὸς ἀλλήλους κατὰ τὸ πλεῖστον εἰρηνικῶς διακεῖσθαι.

280: Plin. H. N. II, 99:

Octogenis cubitis supra Britanniam intumescere aestus Pytheas Massiliensis auctor est.

281: Strabo, C. 201:

εἰσὶ δὲ καὶ ἄλλαι περὶ τὴν Βρεττανικὴν νῆσοι μικραί· μεγάλη δ' ἡ Ἰέρνη πρὸς ἄρκτον αὐτῇ παραβεβλημένη, πρόμηκες μᾶλλον πλάτος ἔχουσα. περὶ ἧς οὐδὲν ἔχομεν λέγειν σαφές, πλὴν ὅτι ἀγριώτεροι τῶν τῶν Βρεττανῶν ὑπάρχουσιν οἱ κατοικοῦντες αὐτήν, ἀνθρωποφάγοι τε ὄντες καὶ πολυφάγοι, τούς τε πατέρας τελευτήσαντας κατεσθίειν ἐν καλῷ τιθέμενοι καὶ φανερῶς μίσ-

dwellings, for the most part constructed of reeds or timber. They harvest their grain by cutting off just the ears alone, storing them in covered buildings. From these they select the old ears day by day, and , preparing them as required, use them for food. They are simple in their habits, and far removed from the small-minded wickedness of today. Their ways of living are cheap, and they have nothing to do with the luxury resulting from wealth. The island too is thickly populated, though the disposition of the climate is very cold, as might be expected in a land situated right under the Bear. They have many kings and princes, who for the most part are peacefully disposed towards each other.

280.

On the authority of Pytheas of Massilia the tides above Britain swell to a height of eighty cubits.

281.

There are also other islands, small ones, around Britain, while Ierne is a large island lying alongside it to the north, whose breadth is greater than its length. I can give no certain information about it except that its inhabitants are more uncivilized than the Britons. They are not only gluttons, but cannibals, and consider it right to eat their fathers when they die and openly to have inter-

γεσθαι ταῖς τε ἄλλαις γυναιξὶ καὶ μητράσι καὶ ἀδελφαῖς· καὶ ταῦτα δ'οὕτω λέγομεν, ὡς οὐκ ἔχοντες ἀξιοπίστους μάρτυρας.

282: Strabo, 2, 201:

πρὸς μέντοι τὰ οὐράνια καὶ τὴν μαθηματικὴν θεωρίαν ἂν ἱκανῶς δόξειε κεχρῆσθαι τοῖς πράγμασι, τοῖς τῇ κατεψυγμένῃ ζώνῃ πλησιάζουσι τὸ τῶν καρπῶν εἶναι τῶν ἡμέρων καὶ ζῴων τῶν μὲν ἀφορίαν παντελῆ, τῶν δὲ σπάνιν, πέγχρῳ δὲ καὶ ἄλλοις λαχάνοις καὶ καρποῖς καὶ ῥίζαις τρέφεσθαι· καρ'οἷς δὲ σῖτος καὶ μέλι γίγνεται, καὶ τὸ πόμα ἐντεῦθεν ἔχειν· τὸν δὲ σῖτον, ἐπειδὴ τοὺς ἡλίους οὐχ ἔχουσι καθαρούς, ἐν οἴκοις μεγάλοις κόπτουσι, συγκομισθέντων δεῦρο τῶν σταχύων· αἱ γὰρ ἄλως ἄχρηστοι γίνονται διὰ τὸ ἀνήλιον καὶ τοὺς ὄμβρους.

283: Gemin. Rhod., El. Astr., VI:

τοῖς δ'ἔτι βορειοστέροις οἰκοῦσι τῆς Προποντίδος ἡ μεγίστη ἡμέρα γίνεται ὡρῶν ἰσημερινῶν ις', καὶ τοῖς ἔτι βορειοτέροις ιζ'καὶ ιη'ὡρῶν ἡ μεγίστη ἡμέρα γίνεται. ἐπὶ δὲ τοὺς τόπους τούτους δοκεῖ καὶ Πυθέας ὁ Μασσιλιώτης παρεῖναι. φησὶ γοῦν ἐν τοῖς περὶ τοῦ ὠκεανοῦ πεπραγματευμένοις αὐτῷ, ὅτι 'Εδείκνυον ἡμῖν οἱ βάρβαροι ὅπου ὁ ἥλιος κοιμᾶται. συνέβαινε γὰρ περὶ τούτους τοὺς

course with their mothers and sisters as well as other women. I give this information for what it is worth: I have no trustworthy witness for it.

282.

All the same, if we have regard to the heavenly phenomena and mathematical principles he (Pytheas) would seem to have made good yse of the facts. He says that the people who live close to the frigid zone have a scarcity of some cultivated crops and of animals, and of others a complete lack: they live on millet and other plants, on fruits and roots. Those people who have grain and honey make their drink from them as well. As they have no clear sunshine, they thrash their grain in large buildings where they first collect the ears, for threshing-floors are useless because of the lack of sunshine and rain.

283.

The people who live even further north than the Propontis have a longest day consisting of 16 hours, and those further north still have longest days of 17 and 18 hours. It seems that Pytheas of Massalia visited these districts in person. At least, he says in his work on the Ocean: "The natives kept showing us where the sun goes to rest." For it happened that the night became extremely

τόπους τὴν μὲν νύκτα παντελῶς μικρὰν γενέσθαι, ὡρῶν οἷς μὲν δύο, οἷς δὲ τριῶν ὥστε μετὰ τὴν δύσιν μικροῦ διαλείμματος γινομένου ἐπανατέλλειν εὐθέως τὸν ἥλιον.

284: Strabo, C. 104:

προσιστορήσαντος δὲ καὶ τὰ περὶ τῆς Θούλης καὶ τῶν τόπων ἐκείνων, ἐν οἷς οὔτε γῇ κατ'αὐτὴν ὑπῆρχεν ἔτι, οὔτε θάλαττα, οὔτ'ἀήρ, ἀλλὰ σύγκριμά τι ἐκ τούτων πλεύμονι θαλαττίῳ ἐοικός, ἐν ᾧ φησι τὴν γῆν καὶ τὴν θάλατταν αἰωρεῖσθαι καὶ τὰ σύμπαντα, καὶ τοῦτον ὡς ἂν δεσμὸν εἶναι τῶν ὅλων, μήτε πορευτὸν μήτε πλώτον ὑπάρχοντα. τὸ μὲν οὖν τῷ πλεύμονι ἐοικὸς αὐτὸς ἑωρακέναι, τἆλλα δὲ λέγειν ἐξ ἀκοῆς. ταῦτα μὲν τὰ Πυθέου.

285: Plin. H. N. XXXVII, 11:

Pytheas Guionibus Germanicae genti accoli aestuarium Oceani, Metuonidis nomine, spatio stadiorum sex milium; ab hoc diei navigatione abesse insulam Abalum: illo per ver fluctibus advehi, et esse concreti maris purgamentum. incolas pro ligno ad ignem uti eo, proximisque Teutonis vendere. Huic et Timaeus credidit sed insulam Basiliam vocavit.

short about these districts, in some places lasting two hours, in others three, so that when a short interval had elapsed after its setting the sun rose again.

284.

He goes on to relate further about Thule and those districts where, he says, there was no longer earth, or sea, or air, but a compound of all three like a jelly-fish; in this mixture earth and sea and everything are suspended, it binds all things together, and it is impossible to walk or sail in it. The stuff like a jelly-fish he says that he has seen himself, but that the rest he is relating from hearsay. So much for the stories of Pytheas.

285.

Pytheas says that an arm of the Ocean, named (Mentonomon?) is inhabited by a tribe of Germany, the Guiones; that it measures six thousand stades, and that a day's sail from here is the island of Abalus. (Amber) is brought there by the waves throughout the spring, and it is the scum of the Frozen Sea. The inhabitants use it for fire instead of wood, and sell it to the neighbouring Teutons. Timaeus also believed this, but called the island Basilia.

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