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# COUNTING THE PAST IN HERODOTUS' *HISTORIES*

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**Abstract:** This paper explores instances in Herodotus' *Histories* where the historian or his characters engage with very large numbers by counting vast collections of people or things, establishing the dimensions of huge objects and measuring long stretches of time. In these episodes, Herodotus explores how quantifying the material traces of the past can help reconstruct antiquity. This methodological point is most evident in his calculations in book 2, and this paper focuses in particular on his persistent reckoning in three interrelated Egyptian accounts: those of the nature of the Nile valley, of the construction of the pyramids and of the genealogy of the Theban priests. I argue that Herodotus' quantifying efforts, far from being only a rhetorical strategy to increase the narrator's credibility and authority, are an important, indeed crucial, part of his historical method.

**Keywords:** Herodotus, historical method, calculation, visualization, numbers

Why is Herodotus so fond of counts and calculations? He works out the dimensions of the Black Sea (4.85–86), calculates the size of Xerxes' army together with the amount of grain needed to sustain it (7.184–87) and converts 341 generations of Egyptian priests into 11,340 years (2.142–43); he also presents Solon's tally of the number of days (precisely 26,250) in an average human life (1.32) and reports on the Persian king's own census-taking methods (7.59.3–60.3).[1] 'Herodotus' number orgies', as Catherine Rubincam calls them, are a distinctive feature of the historian's authorial persona that sets him apart from other historians, and especially from his best-preserved near-contemporary Thucydides, who works out the numbers he cites much less frequently and diligently.[2] To explain Herodotus' interest in producing numbers scholars have invoked the idea that claiming to know the precise dimensions of something, let alone to have measured or calculated them oneself, is a rhetorical strategy designed to increase the narrator's apparent competence and credibility. Thus, in the most influential discussion of the subject to date, François Hartog portrays Herodotus as a surveyor whose measurements make the incredible and exotic seem real and, at the same time, endow him with a special sort of expertise comparable to that of the Pythia who knows 'the number of grains of sand and the measures of the sea' (Hdt. 1.47.3).[3] Building on Hartog, Aldo Corcella argues further that the historian's concern with meas-

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[1] All references to Herodotus are to Wilson's 2015 text. All translations are mine.

[2] The data for the use of numbers by the Greek historians have been tabulated by Rubincam (2003); she will explore the data systematically in a future monograph (I am grateful to her for sharing some of her unpublished data). For a comparison between Herodotus' and Thucydides' use of numbers in terms of 'rationality', see Keyser (2006) 336–48; Rubincam (2012), quote at 112 n.3.

[3] Hartog (1988) 234–37, 341–42 (quotation at 342). A much less complicated version of the same assumption about the rhetorical effect of the use of statistical details underlies D. Fehling's discussion ((1989) 216–39) exposing the numbers in the *Histories* as pure fabrication. At the other end of the positivistic spectrum, D. Lateiner believes that Herodotus is interested in attaining accuracy as much as possible ((1989) 32–33); *cf.* Rubincam (2003); (2008); Keyser (2006) 336. R. Bichler finds the role of numbers in the *Histories* largely symbolic ((2007) 76–79), but see Bichler (2013) 138 and n.31 below. In the context of a problematic reading of Herodotus' treatment of space and time as a rejection of cartographic representation, Purves (2010) 144–45 briefly considers the use of numbers in two passages: Solon's tally of the number of days in a man's life and Herodotus' calculation of the length of the Royal Road. Her argument is that the historian thereby counteracts the 'instantaneous effect of Croesus' and Aristagoras' marvelous displays' (in showing off a treasure and presenting a map, respectively) by embracing the 'hodological' and rejecting the 'cartographical' perspective (that is, the traveller's experience of space through time as opposed to the abstraction of a disembodied synoptic view: for the terms, see

urement and calculation, especially by means of analogy, is a powerful tool of translation which renders visible what is distant in time or space.[4] There seems to be little doubt that Herodotus' arithmetical fireworks are part of his polemic against those he perceives as his intellectual rivals.[5] Emphasizing the historian's concern with persuasiveness, however, naturally calls his veracity into question – even if his arithmetic can, for the most part, be defended,[6] it is harder to deny that his impulse toward numerical precision can be understood in the context of what Geoffrey Lloyd calls 'spurious exactness' in a discussion of the tendency of some branches of Greek science towards gratuitous overmathematization.[7]

But are the calculations in the *Histories* just for show? Could it be that, apart from their rhetorical value, Herodotus actually found numbers 'good to think with'?[8] I attempt to answer this question by focusing on the role numbers and number-reckoning play in specific narratives and arguments in the *Histories*. First, I use three reports of census-taking operations to make a few observations about how Herodotus talks about numbers both in the abstract and as embodied in material objects. I argue that he is especially interested in methods of counting and measuring – as opposed to merely citing numbers – as well as in ways of visualizing huge numbers. In the rest of the paper I explore three inter-related accounts characterized by persistent quantification to show how Herodotus' 'number orgies' allow him to construct arguments about the past.

## I. Visualizing multitudes: three ways of counting people

The *Histories*, as we are told in the first sentence, seek to highlight 'the great and the wonderful achievements of Greeks and foreigners'. It is therefore unsurprising that what is labelled 'wonderful' often turns out to be great in size or number[9] and that discussions of Herodotus' interest in quantification have tended to focus on cases where the historian offers numerical details while describing something explicitly labelled as a 'wonder'. Thus, Hartog's analysis of the 'joys' and 'power' of surveying, one of the main strategies of the narrator to elicit belief and to establish his authority, applies especially to Herodotus' quantification efforts in his accounts of wonders.[10] Yet it is not only the wonderful that the historian is eager to quantify – for he counts, measures and calculates all manner of revenue, troops, ships, distances and periods of time – nor is it only *qua* great that 'great wonders' seem wonderful to him.[11] In order to get a sense of Herodotus' interest

Janni (1984)). I disagree with her analysis (see also n.32 below), not least because Herodotus is interested in both perspectives: note, for example, the way numerical detail and diagram are combined in the discussion of Scythian geography (especially 4.99–101), on which, see Hartog (1988) 346–49; Gehrke (1998) 188–92.

[4] Corcella (1984) 31, 49–50, 70–71. Hartog (1999) further argues that σημαίνω, which belongs to the vocabulary of divination, preserves its mantic connotation when used in reference to measuring and counting (4.99, 5.54, 8.8, 8.21, 8.79), as well as when Herodotus uses it at 1.5.3 to indicate Croesus as 'the one who started unjust deeds against the Greeks'. The most recent restatement of the basic points of Hartog's argument is Priestley (2014) 99.

[5] See examples cited below; on Herodotus' polemical style of argumentation, see Thomas (2000) especially 213–48.

[6] Keyser (1986); Rubincam (2003).

[7] Lloyd (1987) 280–84, quote at 282; Herodotus is mentioned as an exponent of this tendency at 280, n.218. G.E.R. Lloyd's careful review of the epistemological background to this trend, highlighting both factors working in favour and factors working against the appeal to measurement in ancient science, should stop us from assuming automatically that quantification was inevitably or universally regarded as a sign of competence. Note also Herodotus' claim on at least one occasion to be refraining from citing numbers so as not to provoke incredulity (1.193.4).

[8] On the history of the expression, see Lloyd (1983) 8, n.7.

[9] Barth (1968) and Hunzinger (1995) offer the most useful analyses of the range of attributes of the diverse phenomena Herodotus treats as 'wonders' (θώματα, in his dialect).

[10] The emphasis on size may have been a conventional element in discourse about foreign places (Jacoby (1913) 331–32), but Hartog (1988) 234–37 exaggerates the overlap between 'wonders' and hugeness; for Hartog's discussion of 'the joys of surveying' as a 'sign of a certain power', see (1988) 342. *Cf.* the more nuanced analyses of Lloyd (1975) 141–47; Munson (2001) 234–42.

[11] So, for instance, the architecture of the city of Babylon (1.178–86) and the flooding of the Nile (2.19–27) are much more remarkable to Herodotus' mind than their huge size; *cf.* 3.12 where the discussion of 'the great wonder' of the piles of Persian and Egyptian skulls on

in numbers across a broader range of contexts, I consider three anecdotes about counting, one from an ethnographic context and two from the narrative sections of the *Histories*, where the rhetoric of wonder is not obviously at play.

We begin with the description of the so-called 'Scythian bowl', a truly gigantic bronze vessel, all but explicitly labelled as a wonder,[12] which Herodotus mentions in the context of his account of Scythia and its people:

> How numerous the Scythians are, I was not able to learn exactly [... ]. But this is what they showed me. There is a region between the Borysthenes and Hypanis rivers whose name is Exampaeus [...]. In this region is a bronze vessel, which is six times bigger than the crater dedicated by Pausanias, the son of Cleombrotus, at the entrance of the Black Sea. For those who have not yet seen this crater, I will explain it this way: the bowl of the Scythians easily contains 600 amphoras of liquid, and the bronze itself is six fingers thick. According to the locals the bowl was made out of arrowheads. The king, whose name was Ariantas, wishing to know the number of the Scythians, ordered each one to bring him an arrowhead, threatening with death anybody who did not. A huge amount of arrowheads was brought, and he decided to make a memorial out of them that he could leave behind. He made this bronze vessel, and set it up in the region called Exampaeus. This much I heard about the number of the Scythians. (4.81)

Since, for the purposes of the present argument, what matters is how and why Herodotus uses numbers in talking about unusual objects and phenomena, we can set aside the issue of whether Herodotus had seen anything like what he describes here or had perhaps only heard about it or, even, makes it up entirely.[13] Obviously, the historian quantifies the Scythian vessel both relatively and absolutely, that is, in relation to another, apparently famous, bronze crater, and with respect to the measuring units his audience would be familiar with. He is also – and not just ostensibly – interested in yet another, not quite calculable, dimension: the number of arrowheads contributed by the Scythian subjects of king Ariantas. The vessel thus serves as a visual measure for the population of the Scythians and, although Herodotus cannot cite an absolute figure, he seems to think that what he comes up with is not entirely unsatisfactory.[14] In other words, he is interested in the image as well as in the abstract idea, the giant object and the huge, if undefined, number.

That both the thing and the number behind it are what Herodotus finds intriguing is suggested by his mention of a similar census-monument later in book 4 when the Persian king Darius, passing through Thrace on his way to invade Scythia, has each of his soldiers place a single stone in a heap, leaving giant mounds in the army's wake (4.92). In this case the historian can – though he does not explicitly – cite the number that underlies this strange new landscape: '700,000 including the horsemen' (4.87.1). He has already provided this figure a few chapters earlier when he mentions the two bilingual stelae Darius set up on the Bosphorus listing 'all the nations he was leading'.[15] Like the Scythian bowl, Darius' army is measured twice: with a number and through its monumentalization.

the battlefield in Pelusium includes no quantification though one might well have expected to hear about the number of casualties or the size of the armies.

[12] Dewald (1993) 56 with n.1.

[13] The authenticity of the object is most passionately defended by Pritchett (1982) 245–55 who answers in particular Armayor (1978). More recent reviews of the problems in this passage are West (2000) and A. Corcella in Asheri et al. (2007) 640–41.

[14] On the possible meaning of this lack of precision, see Dewald (1993) 70; Munson (2001) 115.

[15] S. West's scepticism about Herodotus' use of the inscription as a source of information ((1985) 281–82) is echoed by Corcella in Asheri et al. (2007) 644. West's judgement, however, stands or falls together with her overall improbable argument about Herodotus' general lack of engagement with epigraphical evidence; against the latter view, see most recently the evidence for actual engagement in the case of the inscribed epigrams from the Temple of Ismenian Apollo in Thebes (5.59–61) in Papazarkadas (2014) 246–47; Thonemann (2016).

What was Herodotus' audience supposed to get out of such stories? It is striking that the historian offers several methods and examples of counting vast numbers of people without evaluating them in terms of their success, even though he is generally happy to point out errors when it comes to counting and reckoning, especially when committed by Greeks.[16] As I have already suggested, one reason for this is that Herodotus is intrigued by methods of dealing with very large numbers, both as abstractions and as objects; I would further argue that it is the relationship between the two that occupies him in particular. Thus, although the cauldron of the Scythian king does not yield an exact figure, it nevertheless provides a visual measure of the size of the Scythian population and of the king's power.[17] While he knows the number of Darius' troops in the Scythian campaign, Herodotus is interested in imagining it as a landscape of mounds made of individual stones; he is just as eager to reify abstractions as he is to abstract from the concrete and the material. Such conversions[18] from the abstract to the concrete, and from the intangible to the material, are essential to Herodotus' method of using the physical traces of the past as a way of reconstructing antiquity.

My final point about the interest Herodotus shows in converting from the abstract to the concrete in the royal census anecdotes of the *Histories* addresses an argument made by Matthew Christ in an influential 1994 article. On his reading, when Herodotean kings engage in inquiries similar to those the historian himself conducts, they appear as 'parodic imitators of the kind of inquiry [he] embraces' since they do it for the purposes of opprobrious self-aggrandizement, as opposed to Herodotus' 'purer interest in gaining knowledge'.[19] This contrast, according to Christ, is an important indication about Herodotus' historical method, specifically of his 'views of the intellectual and ethical principles that should, but often do not, govern human investigations'.[20] The evidence he adduces includes several passages about measurement and counting, two of which we have already considered, as well as the following anecdote about a census Xerxes conducts after crossing the Hellespont at the beginning of his invasion of Greece:

> Meanwhile Xerxes organized a count of his forces at Doriscus. How much exactly each part contributed to the total, I cannot say, for it is not reported by anyone. However, the total of the whole land army was shown to be 1,700,000. They counted them in the following way: they collected 10,000 men in one place and when they packed them together [συννάξαντες (Reiske for συνάξ-/συνάψ- in the mss)] as closely as possible, they drew a circle around them. Next, the 10,000 were sent away and a wall of stones was built along the circle reaching up to a man's navel. Once that was done, others were brought into the walled space until they counted everybody in this way. (7.59.3–60.3)[21]

On Christ's reading, the detailed description of the actual method is intended to invite reflection on Xerxes' despotic character.[22] I would argue that Herodotus' interest in Xerxes' census is due to the ingenious solution to the problem of counting 1,700,000 bodies; any criticism here (or in the

[16] See, for example, his critique of the Greek calendar system, which he contrasts unfavourably with the Egyptian one (2.4); as S. Benardete points out ((1999) 16–18), Herodotus thereby undermines the reputation for wisdom of Solon, who performs his elaborate calculation for Croesus based on the Greek calendar (1.32). Other instances include Herodotus' correction of the Ionians' idea about the number of continents (2.16) and of Aristagoras' calculation of the length of the journey from Sardis to Susa (5.52–24); two more instances are discussed below.

[17] Compare the ash-and-earth island of the blind pharaoh Anysis which, with its 10-stade diameter, is a measure, of sorts, of the loyalty of his subjects – whom he had asked to bring ash and earth together with his food over the course of his 50-year-long self-imposed exile (2.140).

[18] These conversions include (but are not limited to) the notion of 'translation' (see n.4, above) as used by Hartog (1988) and Corcella (1984) in discussing the conversions between different measuring units and the analogies with objects familiar to Herodotus' audience.

[19] Christ (1994) 178, 168; for 'the objectification and reification of value' as a feature of Persian kings of whom Herodotus is critical, see also Konstan (1987), quote at 62.

[20] Christ (1994) 168.

[21] See the exhaustive bibliography on this passage in Kelly (2003) 206–07, who understands the episode as a piece of Persian propaganda intended to scare the Greeks into submission.

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earlier two passages) is oblique at best and certainly not centre-stage. That there is a powerful moralizing streak to Herodotus' work has, of course, long been recognized by readers; what has received much less attention, however, is that in contexts where the historian discusses the problem of inquiry, directly or indirectly, he consistently focuses on evaluating it in terms of success in elucidating the unknown (τὸ ἀφανές).[23] The problem of envisioning big numbers and managing them correctly – when counting people, measuring distances and reckoning time – is an issue that the *Histories* repeatedly probes, by offering accounts of attempts with various degrees of success. And as we will see next, those whose failure at counting Herodotus exposes most directly happen to be not foreign kings, but Greeks.

**II. Visualizing power: metonymy and Herodotus' 'yardstick'**

So far I have focused on how Herodotus talks about numbers, suggesting that he is deliberately interested in exploring the relationship between abstract numbers and their physical manifestations; it now remains to be seen what use he finds in exploring the relationship between abstraction and reification. An answer was suggested more than 50 years ago by Henry Immerwahr in an analysis of the semantic range in Herodotus and Thucydides of the word ἔργον ('achievement', 'deed', whether monumental or intangible). Immerwahr observes that Herodotus sees a metonymical relationship between the building projects of rulers and their power, and concludes that he treats monuments as 'a yardstick for measuring, quite literally, greatness'.[24] Immerwahr contrasts this attitude with the relative neglect of material ἔργα by Thucydides and especially with that historian's famous critique of the idea that the physical remains of the present can represent the power realities of the past in a straightforward manner.[25] Immerwahr concludes: 'This passage [Thuc. 1.10] specifically contrasts perception of the eye with intellectual understanding, and on the whole, Thucydides thinks little of the visible as a criterion for knowledge.'[26]

While I think that the metonymical relationship between monuments and (the power of) their makers, as described by Immerwahr, goes some way in explaining Herodotus' fascination with measurements and calculations, the roles of 'the perception of the eye' and 'intellectual understanding' (as contrasted by Immerwahr) in cases where Herodotus applies his 'yardstick' to the tangible or the visible require further attention. Let us consider what I think is the most explicit demonstration on Herodotus' part of the metonymical logic and of the proper use of the 'yardstick' in dealing with the traces of the past. The passage concerns the pyramid built by the pharaoh Mycerinus which some Greeks erroneously claim was built by the prostitute Rhodopis.

[22] Christ (1994) 172–75 draws attention to the coercive means employed by the kings, especially the 'packing' of the soldiers inside the enclosure (7.60.2); he compares the threat of death to Ariantas' subjects (4.81.5) and the 'order' by Darius to heap the stones even as he already knows the grand total; *cf*. Konstan (1987) 64–65. By contrast, Christ argues, Herodotus identifies closely with Psammetichus' misguided attempt to measure the depth of the springs of the Nile since that king appears to be guided simply by curiosity. Psammetichus thought he had established that the so-called 'double springs' of the Nile near Elephantine are bottomless by dropping a sounding line, thousands of cubits in length, that could not reach the bottom (2.28). In Herodotus' opinion (ὡς ἐμὲ κατανοέειν) this was insufficient proof: the experiment demonstrated (ἀπέφαινε) that there are powerful whirlpools in that spot preventing the sounding line from reaching the bottom (2.28.5).

[23] As Christ (1994) 200 puts it, Herodotean *historiē* is 'not only an inquiry itself, but also an investigation of inquiry'. On the problem of τὸ ἀφανές in Herodotus, see Corcella (1984) especially chapter 2; I plan to pursue the topic of the relationship between Herodotus' moralizing agenda and his concern with the methodology of inquiry in more detail elsewhere.

[24] Immerwahr (1960) 265.

[25] Thuc. 1.10. The commonly held opinion that Herodotus is, if not the target, then at least a prime candidate for Thucydides' criticism, is based on the assumption that Herodotus is as straightforward and uncomplicated in dealing with the material traces of the past as those Thucydides imagines would foolishly infer from the humble ruins of Sparta that the state was never a power to be reckoned with; important in establishing this orthodoxy have been Hornblower (1991) 33–35 and Hedrick (1993).

[26] Immerwahr (1960) 280–81.

> [Mycerinus] also left a pyramid, but one much smaller than that of his father. Each side of its square base is 20 feet short of three plethra … Other Greeks say that it was built by Rhodopis, the prostitute, but they are wrong. It seems to me that they speak without knowing who Rhodopis was or they would not otherwise attribute to her the construction of a pyramid which must have cost thousands of talents, so to speak. Moreover, she lived during the time of Amasis, not Mycerinus … (2.134.1–2)

> So, this is how Rhodopis gained her freedom. She stayed in Egypt and was so alluring that she made a fortune – that is, a fortune for a Rhodopis, but not enough to build such a pyramid. Indeed, anyone who wishes can still see even today what a tenth of her earnings amounts to, so there is no need to ascribe huge wealth to her. She wanted to leave in Greece a memorial of herself by making something that no one else had thought of making and dedicating in a sanctuary, and she wished to dedicate that in Delphi as her monument. So with a tenth of her money she had many iron spits made that were big enough to roast oxen, as many as that money could pay for, and she sent them to Delphi … (135.2–4)

Herodotus' refutation of the Greeks' erroneous attribution is based on a chronological point (Rhodopis lived too recently) and, above all, on the argument that a prostitute, however talented, could not have made enough money to build the third-largest pyramid in Egypt.[27] Just how much money she made can be deduced from her dedication of a tenth of her wealth at Delphi. See it or imagine it, then multiply it by ten, and then think of that pyramid, he seems to be saying, in a direct accusation of incompetent reckoning against his fellow Greeks. But what is most noteworthy in his argument is not only his interest in the potential of monuments to visualize abstractions that are hard for 'intellectual understanding' alone to comprehend, but the way observation and logical inference (ὄψις and γνώμη, to use his own terms) work together in debunking a chronologically and numerically inadequate attempt to reconstruct the past. As we will see in the following section, far from privileging the visible and the tangible in a literal-minded fashion, at its most ambitious Herodotus' *historiē* shows him as an observer with particularly sophisticated powers of inference.

**III. Visualizing deep time: pyramids and natural history**

In the rest of this paper I attempt to show what heuristic value mathematical metonymies such as the ones we have been considering hold for the historian. I do this by focusing on a close reading of two sections of book 2 where Herodotus measures, counts and calculates obsessively: his description of the Egyptian pyramids and his account of the nature of the Egyptian land. I make two related suggestions, first that there are fundamental similarities between the historian's epistemological approaches to the pyramid of Cheops and to the geology of Egypt, and, second, that these similarities reveal an important aspect of Herodotus' historical method with respect to the use of numbers and the material traces of the past.

We begin with the description of Cheops' pyramid and its causeway. After informing us that Cheops was a terrible tyrant who forced all the Egyptians to work for him, Herodotus focuses on the great building projects the people were involved in:

> They worked in teams of 100,000 men for three months at a time. The Egyptians said that it took ten years of hard labour to build the causeway along which they hauled the stone blocks, and that it was not a lesser achievement than the construction of the pyramid itself (ἔργον ἐὸν οὐ πολλῷ τεῳ ἔλασσον τῆς πυραμίδος). I think so too because the length of the causeway is five stades, its width is ten fathoms, and its height is eight fathoms at the highest point … The pyramid itself took 20 years to build. Each of its sides is eight plethra long, its base being a square, and its height is the same. It is made of polished and well-fitted stone blocks, none of which is less than 30 feet long. (2.124.3–5)

[27] *Cf.* Kurke (1999) 220–27.

Herodotus then describes the method of lifting the stone blocks and reports the value of the purgatives, onion and garlic, consumed by the builders of the pyramid. The focus overall seems to be on the relationship between the size of the structures and the time periods over which they were erected, as well as on the manpower, materials and expenses used up. The point I would highlight is that his estimate that the construction of the causeway, which is many times smaller than Cheops' pyramid, is not 'a much lesser achievement' than the pyramid makes sense only if one considers the measurements he provides for the two structures in combination with the time in which they were completed (ten and 20 years, respectively).

Herodotus' accounts of all the Egyptian pyramids share a similar focus on measurement as well as on the process and length of construction. I suggest that this same double focus on quantification and process is also the key to his account of the nature of the Egyptian land, to which we now turn.

Herodotus mentions that his Egyptian informants have told him that during the reign of the first pharaoh, Min, Lower Egypt was a marsh, and that nothing projected above the water north of lake Moeris (see fig. 1). At this point the historian comments confidently:

> Even someone – a man of intelligence, at any rate – who has not already heard about it, but just uses his eyes, can easily see (δῆλα γὰρ δὴ καὶ μὴ προακούσαντι, ἰδόντι δέ, ὅστις γε σύνεσιν ἔχει) both that the Egypt to which the Greeks sail is new land, which the Egyptians have gained as a gift of the river, and that the land upstream from this lake [Moeris] for a distance of a three-day sail (about which the priests told me no such thing) is also of the same kind. (2.5.1)

This is an ambitious and provocative statement, the first of many forceful assertions of originality punctuating Herodotus' discussion of the geology of the Nile valley. He offers as argumentation his account of the 'nature' (φύσις, 2.5.2) of the Egyptian land. He opens with the observation that at a distance of a day's sail away from the Egyptian coast there is mud at a depth of 11 fathoms, a fact he takes to show the extent of the alluvial deposits northwards. He continues with a calculation of the dimensions of the territory from the coast to Elephantine[28] and a survey of its relief and shape (the key numbers he produces are reflected in fig. 1).

Next he presents a careful demonstration of the gradual growth of the Egyptian land northward as a result of the continuous process of silting. He presents many pieces of evidence, but I will focus on his two most elaborate points. First, to give a more adequate idea of the gulf he claims once existed instead of Lower Egypt he proposes an analogy with the 'Arabian gulf' (i.e. the Red Sea), whose dimensions he quotes, perhaps as an indication that they are roughly comparable to those of Lower Egypt. He hypothesizes that this gulf too would be silted up in less than 10,000 years if the Nile were to flow into it. He concludes his hypothetical analogy triumphantly:

> How then, in all the time which has been spent before my birth (ἐν τῷ προαναισιμωμένῳ χρόνῳ πρότερον ἢ ἐμὲ γενέσθαι), would not a gulf even bigger than this one have been silted up by a river so big and productive (ἐργατικοῦ)? (2.11.4)

Although Herodotus does not say so explicitly, there is an assumption here that a calculation of the pace of silting is possible.[29] This must be at least part of the reason that Herodotus works out the dimensions of Egypt so carefully. This calculation and this assumption are what allow him to formulate his double hypothesis that 10,000 years would be enough for the Nile to silt up the Red Sea, but that 'in all the time which has been spent before [his] birth' an even bigger basin could have been filled (how many years that period includes, Herodotus calculates a little bit later; see below). The salient point as far as this paper's argument is concerned is that all the numbers

[28] On this calculation, see Keyser (1986).

[29] Corcella (1984) 62–63.

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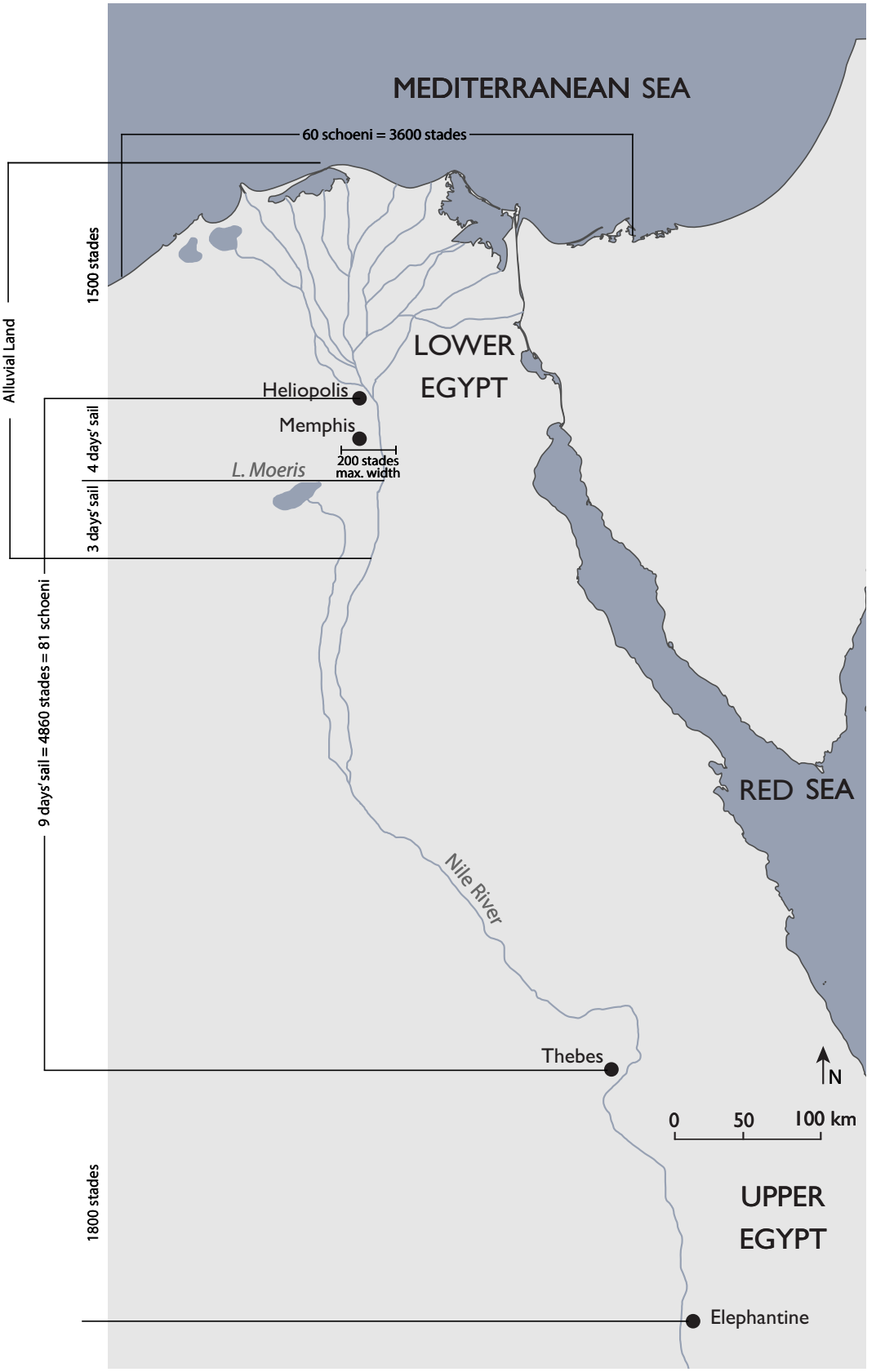


Fig. 1. Map of Egypt showing the distances provided by Herodotus (map by J. Wallrodt).

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related to the dimensions of Egypt and of the Red Sea point to an interest in correlating the size of the alluvial part of Egypt with the time it took for it to emerge from the water. Just as Herodotus is curious about the resources and materials used up in the construction of the pyramids, he is thinking about the thousands of years used up in the accretion of the Egyptian land. Note 'the time that has been spent': time is a resource being 'spent' in the creation of the Egyptian land.[30]

Herodotus also employs calculation correlating time and space in the course of another argument proving the alluvial origin of Lower Egypt. According to his informants, during the reign of the pharaoh Moeris, less than 900 years before the historian's own time, the Nile needed to rise 9 cubits in its annual flood to water the land north of Memphis. Herodotus connects this piece of information with the claim that in his own day the water rises 15–16 cubits to overflow the riverbanks. On this basis, he draws a conclusion that, if the increase in the height of the riverbanks continues 'at the same pace' (i.e. 7–8 cubits per 900 years), the Nile will no longer be able to water the fields of the Egyptians, especially in the Delta (2.13.2). He obviously overlooks the fact that the riverbed itself will rise together with the banks, but what is important to the present argument is his logic overall. Again, it is based on the assumption that natural processes like silting develop at a calculable pace, which makes possible predictions about future consequences – predictions such as that about the fate of the Red Sea in 10,000 years, should the Nile divert its course into it.

In the final section of his account of the nature of Egypt, Herodotus uses his reconstruction of the history of the land to refute yet another Greek opinion – the idea that Egypt consists of the Nile Delta alone. The most remarkable element here is his imaginary reconstruction of the gradual movement of the people of Egypt northward together with their ever-growing alluvial country.

> But I think that the Egyptians did not come into existence together with the Delta – which the Ionians call Egypt – but that they have always existed, as long as there have been human beings, and that as their land grew northward many of them stayed behind, but many also gradually moved downstream. (2.15.3)

Herodotus here coordinates geological and historical time, as well as natural and human history. He uses the geomorphology of the Egyptian land as a measure for the chronological depth of the history of its people – of all of human history, in fact, since he assumes that the Egyptians are the oldest human race.[31] The dimensions of Lower Egypt are a spatial representation – a visualization – of the antiquity of the Egyptian people, and the geography of the Nile valley serves as its timeline.[32] Herodotus' account of the nature of Egypt is essentially an exercise in conversion: between geological and historical time, between geography and history, between the material and the abstract.

[30] Compare the use of the same verb in the description of another construction project that blurs the distinction between natural and artificial processes: the construction of the Babylonian city walls out of mud-brick and bitumen produced by the local landscape (1.179).

[31] On this point and, in general, on the importance of the theme of Egypt's antiquity in the *Histories*, see P. Vannicelli's study of Herodotus' reconstruction of early Egyptian history as the beginning of world history (2001); *cf*. Brown (1965) 66; most recently, Bichler (2013) 138.

[32] That space and time coincide along the Nile as far as Herodotus is concerned is confirmed by Vannicelli's observation ((2001) 218 with n.11) that Herodotus' use of lake Moeris (instead of Memphis) as a border-marker in the development of the land of Egypt corresponds to the importance of the reign of the pharaoh Moeris as a chronological marker in Herodotus' reconstruction of Egyptian history. Vannicelli's suggestion about the key role of Moeris – the lake and the pharaoh – in Herodotus' chronological calculations can be reinforced by the fact that the historian himself calls attention to the coincidence between the length of the perimeter of the manmade (as he thinks) lake and the length of the Egyptian coast east to west (2.149.1); in addition, a metrological excursus appears both in Herodotus' calculation of the extent of Egypt's Mediterranean coast (2.6.2–3) and in his account of lake Moeris (2.149.3). See further Purves (2010) 130 for Herodotus' description of Egypt as 'a topography in motion', though I disagree with the premise that his method is 'unavailable to the cartographer' because 'language, unlike illustration, is equipped to describe evolution through time'.

Finally, that the elaborate calculations Herodotus performs in Egypt play an important role in his conception of what is involved in writing history is clear from the relationship of his quantitative efforts to his famous critique of Hecataeus, his predecessor four generations earlier (2.142–43). As Herodotus tells it, Hecataeus thought that 16 generations separated him from the gods, that is, he could count back his ancestors and get to a divine one at a distance of a mere 16 generations. He performed this genealogical feat for the priests at Thebes, who, in response, counted back 341 generations of hereditary priests in an uninterrupted succession since the time of Min.[33] Not only that, but the priests could also document their story: for Herodotus tells us they did the same thing for him, pointing to 345 wooden statues of priests. These 345 generations from the first pharaoh Min to Herodotus' time are in a very real sense documented by the extent of the alluvial land of Egypt – from the sea to lake Moeris, some seven days of sailing upstream (and, according to Herodotus, a further three days south beyond the lake as well; 2.5.1, quoted above). Just as Ariantas' giant bronze cauldron represents the number of his Scythian subjects, the extent of the alluvial part of the Nile valley represents the depth of human time – ten days of sailing up from the coast, or 5,280 stades, represent 345 human generations (that is almost 11,500 years).

Altogether then, Herodotus' approach to the geology of Egypt can be construed as a critique of both Hecataeus' periegetic and genealogical work, we might say of Hecataean geography and history. Herodotus' account of Egyptian geology integrates both elements: information about landscape and distances between cities (i.e. geography) as well as an investigation into the origin of the land (that is, history, including natural history, or περὶ φύσιος ἱστορίη). The details concerning various distances and landscape features serve the purpose of his investigation into the nature (φύσις, 2.5.2) of Egypt and are themselves part of the explanations of the natural processes the historian offers. And, the crucial point, the natural processes related to the geology of the Nile valley are, in turn, part of the narrative of Egyptian history and of the narrative of all human events. Measuring, reckoning and envisioning numbers correctly turns out to be an essential tool for the construction of this narrative. Proficient arithmetic and competent natural history amount to authoritative history.

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[33] Whether Herodotus represents Hecataeus' words faithfully has been a much-discussed issue; important discussions include West (1991); Dewald (2002); Moyer (2002). However, for the purposes of elucidating Herodotus' thinking about how to write history, we have to take seriously his understanding of Hecataeus' logic as he represents it.

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