

THALES' ECLIPSE

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References in ancient literature to celestial phenomena such as eclipses of the sun command special attention in our interpretation of the sources. Modern astronomical tables permit the precise calculation of observational circumstances—time, place, degree of totality—for all possible solar eclipses. When an ancient author associates a person or event with an eclipse of the sun, he presents the historian with the unusual opportunity of calculating an absolute date independent of the often controversial chronological traditions of antiquity. Indeed, such a report can sometimes provide a secure point of reference for the conversion of entire systems of relative chronology to absolute dates, as is the case with Thucydides' statement (2.28) that a solar eclipse, which we can calculate to have occurred on 3 August 431 B.C., took place during the first summer of the Peloponnesian War. In our enthusiasm for the absolute, however, we sometimes permit the promise of astronomical calculation to guarantee the details of a literary tradition that would otherwise be suspect. The famous solar eclipse associated with the name of Thales of Miletus is an excellent case in point.

Herodotus reports (1.74) that the Lydians and the Medes agreed to terms of friendship after more than five years of warfare as the result of a battle during the course of which day suddenly became night. The prodigy caused the combatants to cease hostilities and seek arbitration of their differences. Herodotus adds that Thales of Miletus had foretold this phenomenon to the Ionians, fixing for its season the very year in which it actually occurred.

Herodotus does not specifically say what caused day to become night or exactly where the battle took place. We need not doubt, however, that his phrase refers to a solar eclipse. The usual assumption that such a battle would have taken place in disputed territory near the Halys river is reasonable; but it makes little difference where in Asia Minor we place the battle, as far as the interpretation of the eclipse is concerned. Historians have long agreed on the solar eclipse of 28 May 585 B.C. as the one to which Herodotus refers. That eclipse is the only one in our modern, mathematically constructed tables of solar eclipses, within the broad limits of relative chronology afforded by Herodotus' narrative, that was total

in the vicinity of the Halys River (or elsewhere in Asia Minor) during the normal campaigning season.¹ This astronomical date is within a few weeks or months of the traditional date transmitted in our literary sources, dependent upon the second-century B.C. chronicle of Apollodorus (*FGrHist* 244 F 28), who synchronized the *floruit* of Thales with the eclipse in the Olympic-archon year that began during the summer of 585.² The astronomical calculations and the literary tradition seem to confirm each other so as to yield a secure, absolute date not only for the battle but also for Thales and the beginnings of Western astronomical science. Most discussion has consequently centered not on the credibility of the tradition itself, but on the question of what methods Thales used for his prediction.

As modern research in the history of ancient science and mathematics has advanced, confidence in Thales' ability to predict a solar eclipse has receded. Although he has not argued the specific case of Thales in detail, the monumental work of Otto Neugebauer has demonstrated that neither Thales, the Babylonians, nor anyone else had the means at this early date to predict such a phenomenon.³ Indeed, Herodotus' own version of the tale argues against its veracity. Herodotus states that Thales had predicted the year (οὔρον προθέμενος ἐνιαυτὸν τοῦτον) in which the phenomenon actually occurred. Even if Thales had been some three centuries ahead of his time with an inchoate theory of luni-solar cycles, such a theory would have permitted prediction to the very month or even the day of the occurrence. Willy Hartner has offered the most plausible explanation for Thales' feat and for Herodotus' peculiar phraseology in describing it. If he had discovered the cycle known as the Exeligmos and had access to a record of eclipses previously observed at Miletus, Thales would have been

¹ See especially J. K. Fotheringham, "Cleostratus," *JHS* 39 (1919) 164–85, and "A Solution of Ancient Eclipses of the Sun," *Royal Astronomical Society Monthly* 81 (1920) 104–26; cf. F. K. Ginzel, *Spezieller Kanon der Sonnen- und Mondfinsternisse* (Berlin 1899) 169–73. The standard charts and tables for this region remain those of Theodor Oppolzer, *Canon der Finsternisse* (Vienna 1887; Dover edition, *Canon of Eclipses*, New York 1962).

² The precise date in the fourth year of the forty-eighth Olympiad (585/84) comes to us from Pliny (*N.H.* 2.53): *apud Graecos autem inuestigauit primum omnium Thales Milesius olympiadis XLVIII anno quarto praedicto solis defectu qui Alyatte rege factus est urbis conditae CLXX*. Eusebius entered the eclipse in his chronicle, the extant manuscripts varying in the date between the 48th and 49th Olympiads (pp. 94–95 Schoene, 187 Karst, 101 Helm). Felix Jacoby demonstrated that Pliny preserves the correct date as established by Apollodorus and that Eusebius had originally entered his notice at the same year. Laurentius Lydus (*De ostentibus* 9) and Solinus (15.16) dated the eclipse to the 49th Olympiad, but this variant derives only from the fact that they used a different system in converting the date *ab urbe condita* in Pliny's source (presumably Nepos) to an Olympiad date. Apollodorus himself dated by reference to Athenian archons. See *Apollodorus Chronik* (Berlin 1902, New York 1973) 179 and *FGrHist* 244 F 28 Komm.

³ See especially *Exact Sciences in Antiquity* (Providence 1957) 141–42, *History of Mathematical Astronomy* (New York, Berlin, and Heidelberg 1975) 604.

led to predict the eclipse of 18 May 584 B.C. As it happened, that eclipse was of too small a magnitude at Miletus to have been noticed, and Thales was surprised when a nearly total eclipse occurred a year earlier on 28 May 585 B.C. Because of the problem of calendar irregularities, however, Thales had not predicted the very day of the eclipse he expected, but set the Olympic year 584–83 as the limit, Olympiad 49.1. Because local officials had omitted an intercalation or two, the unexpected eclipse occurred in the predicted year.⁴

Hartner's ingenious approach only serves to demonstrate how utterly fictional the story of Thales' prediction is. We must not only presuppose a fortuitous mistake in calendar regulation at the time of the eclipse, but also that no such previous errors had distorted the record of observed eclipses. Moreover, it is highly unlikely that a record of dated eclipses had been kept since the eighth century in a city where even the list of eponymous *stephanêphoroi* did not begin until 525.⁵ That Herodotus' report cannot be made to square with prediction based on cycles is in fact just what we should expect. The story would lose its point if any such method had been known.⁶

Such traditions are not easily abandoned. Many will perhaps continue to adopt the view expressed by G. S. Kirk that a long series of empirical observations was kept at Babylon for religious purposes and that "it is overwhelmingly probable that Thales' feat depended on his access to these Babylonian records."⁷ Those who accept the conclusion of Neugebauer that no such records existed will have to concede that Thales' feat derived from his success in the oral tradition and explain how that tradition came to take the form in which Herodotus reports it. The course of least retreat from a well-known tradition with significant chronological implications is to argue that, whether or not Thales predicted it, we nevertheless possess a reliable report of a total eclipse of the sun and a secure, astronomical date for the battle itself, which happened just as Herodotus reports it on the very day of the eclipse. The fact that the eclipse, precisely because it was unpredicted and unexpected, interrupted a battle and ended a war explains why this particular solar eclipse found its way into the historical record and assimilated the name of a famous scientist of the period.⁸ Such a view is reasonable and may be correct. Nevertheless, there are many other difficulties in the tradition as Herodotus reports it that the

⁴ Willy Hartner, "Eclipse Periods and Thales' Prediction of a Solar Eclipse," *Centaurus* 14 (1969) 60–71.

⁵ Cf. Felix Jacoby, *Atthis* (Oxford 1949) 180.

⁶ Cf. Robert R. Newton, *Ancient Astronomical Observations and the Accelerations of the Earth and Moon* (Baltimore 1970) 94–95.

⁷ G. S. Kirk and J. E. Raven, *The Presocratic Philosophers* (Cambridge 1960) 80.

⁸ This is the position that Professor Neugebauer would take, and I am grateful for his response to my inquiries on the question.

elimination of Thales' prediction does not resolve. On the contrary, the probability that the inclusion of Thales in the story is fictional focuses attention all the more on the other problems and suggests a more radical conclusion as to the genesis and veracity of the tradition.

In the first place, as has often been pointed out, the path of totality of the 28 May 585 eclipse did not pass over the presumed site of battle in central Anatolia until shortly before sundown, so that one may wonder whether the phenomenon would have made as deep an impression on the combatants as Herodotus' narrative requires.⁹ According to the charts and tables in the modern ephemerides, in central Turkey, near the Halys River, approximately 39' N, 35' E, the eclipse began about 5:30 p.m., reached a maximum magnitude of 0.97 (97% of totality) about 6:25, and ended about 7:20, some ten to fifteen minutes before sunset.¹⁰ The path of totality swept across Anatolia in a southeasterly direction, beginning about thirty minutes earlier on the coast near modern Ayvalik opposite the island of Lesbos and ending about forty-five minutes later at sunset in the vicinity of modern Abu Kamal on the Euphrates River at the border between Syria and Iraq, so that the battle may be placed anywhere in Anatolia with only minor variations in the local circumstances. The fact that the moment of totality, Herodotus' "night," occurred so near to the time of normal nightfall is not necessarily an insurmountable problem in itself. If we may assume that the battle took place as far west as Sardes, so that night turned back into day an hour or two before it became night again, that the skies were clear, and that no hills occluded the western horizon, the phenomenon might still be expected to have attracted notice. Nevertheless, such assumptions do not fit Herodotus' statements that day suddenly became night or that the phenomenon occurred just as the armies were engaging (*τῆς μάχης συνεστρώσεως*), the latter of which, at least, certainly implies totality considerably earlier in the day than 5:00 or 6:00 p.m. This anomaly has often been cited as a reason for denying that the eclipse of 28 May 585 is the right identification and for choosing instead some other eclipse, such as that of 19 May 557, which was total along the southern coast of Turkey about 5:00 p.m.¹¹ That identification hardly solves the problem, and it requires too extreme a modification in the chronology of the Lydian and Median kingdoms. No eclipse accords with the circumstances as well as that of 28 May 585, but the fit is far

⁹ See, for example, the comments of K. J. Beloch, *Griechische Geschichte* (Berlin 1926) I, 2, p. 354.

¹⁰ See Oppolzer (above, note 1) Nr. 1489 and Chart 30. I am grateful to A. D. Fiala, Astronomer at the United States Naval Observatory, for his kindness in verifying my reading of the tables and providing a precise description of local circumstances for the vicinity of Hattusa.

¹¹ See Beloch (above, note 9), for whom the drastic lowering of dates that this identification requires is of course just right.

from perfect. We should therefore entertain the other alternative—namely, that the facts are not as Herodotus reported them.

Second, Herodotus states that Cyaxares was the Median king who declared war on Alyattes of Lydia. His narrative implies that Cyaxares was still the king after the eclipse-battle five years later when his son Astyages married the daughter of Alyattes to secure the new bond of friendship between the two kingdoms. Elsewhere (1.103), Herodotus explicitly states that Cyaxares fought in the battle with the Lydians when day became night. Herodotus reports at the appropriate points in his narrative the number of years that each of the Median and Persian kings ruled until the time of Xerxes. These regnal lengths he understands as being consecutive, with no overlapping reigns. According to these figures, counted from the sixth year of Xerxes, which coincided with the archonship of Calliades (7.20; 8.51) in 480, Cyaxares died about 595, ten years before the only astronomical date that approximates the requirements of the eclipse-battle.¹² There is no independent evidence for the correct, historical date of Cyaxares' death and Astyages' accession to the Median throne. We infer from the Babylonian text known as the *Nabonidus Chronicle*, however, that Cyrus overthrew Astyages about 550, which would have been Cyrus' ninth or tenth year in Herodotus' lists.¹³ If we accept the thirty-five years that Herodotus reports (1.130) for Astyages and count them from 550, instead of from Herodotus' first year of Cyrus about 560 (which we explain as being the date of his accession in Persia, still a vassal to Astyages), we can lower the date of Cyaxares' death to 585, the year of the eclipse.¹⁴ This procedure does not entirely remove the difficulty, however; for it is partly the astronomical date of the eclipse-battle in question that leads us to adopt Herodotus' thirty-five years for Astyages and date his accession to 585. Furthermore, the combination of Herodotus with the Babylonian text is not without difficulties of its own. If Herodotus had used something like the *Nabonidus Chronicle* with the date that it implies for the fall of Astyages about twenty years before Cyrus' death, he would certainly have shortened Cyrus' years and lengthened the reign of Astyages, rather than allow the overlap that we impose upon him, since his concern was with the succession of empires in Upper Asia. We, on the other hand, would rather give Astyages a reign even shorter than Herodotus' thirty-five years, in order to place the eclipse-battle more securely within the reign of Cyaxares.

¹² See H. Strasburger, "Herodots Zeitrechnung," *Historia* 5 (1956) 129–51; W. den Boer, "Herodot und die 'Systeme' der Chronologie," *Mnemosyne* 20 (1967) 30–60.

¹³ S. Smith, *Babylonian Historical Texts* (London 1924) 98.

¹⁴ This was Eduard Meyer's solution to the problem, *Geschichte des Altertums* (Stuttgart 1884–1902) III, 140. For criticism of the methodology and full bibliography see Strasburger (above, note 12) 141–44.

We do not know the correct date of Cyaxares' death, and it is *petitio principii* to use an astronomical date for the eclipse-battle to fix it. By itself, the problem does not necessarily convict Herodotus of internal contradiction, since there is no direct connection between his report of the eclipse-battle and the possibly erroneous lists of regnal lengths that he uses. Nevertheless, the difficulty is compounded by the fact that the ancient tradition is not uniform on the name of the Median king at the time of the battle. Herodotus states unequivocally that Cyaxares was king and fought in the battle. Other authors, including Cicero (*De diuin.* 1.49.112), Eusebius (*Chron.* 2, p. 187 Karst, p. 101 Helm), and Solinus (15.16) say that Astyages was king. Eusebius and Solinus also report the date in the 580s. The precise date in 585/84 comes to us from Pliny (*N.H.* 2.53), who avoids the controversy by naming only the Lydian king (Alyattes) at the time. All these authors derived their information from the chronicle of Apollodorus through one medium or another. It was therefore he who introduced this fundamental disagreement with Herodotus.¹⁵ There are two possible explanations for Apollodorus' departure in this matter from the authority whom he usually followed for early Greek history. The first possibility is that Apollodorus knew the date in 585/84 for the eclipse from reliable sources independent of Herodotus, but followed Herodotus for Median chronology and therefore concluded that Astyages must have been king at the time of the eclipse. Alternatively, Apollodorus may have read in a source that he considered as authoritative as Herodotus that Astyages was king at the time of the Lydo-Median War, so that he sought to date the eclipse-battle accordingly. The first possibility is the one that seems, at least tacitly, to have been assumed in most discussions of the question, on the hypothesis that the astronomical calculations and the chronographic tradition support each other.¹⁶ Yet Apollodorus did not have the means to carry out an astronomical calculation, he could not have derived such a date from Herodotus, and he certainly found no hoary records at Miletus, where the list of eponymous *stephanêphoroi* did not begin until 525. A Babylonian record of a solar eclipse not visible in Babylon is equally impossible, as Neugebauer's work has shown. Lacking the means to predict an eclipse visible only in Turkey, the Babylonians would not have sent observers to watch for it. On the other hand, the discovery of a papyrus fragment making reference to a war between Astyages and Alyattes has enhanced the second possibility. The fragment (*P. Oxy.* 2506 fr. 98) is from a commentary on Alcaeus and refers to the

¹⁵ On Apollodorus as source, through Nepos, of Cicero, Pliny, and Solinus, see Felix Jacoby, *Apollodors Chronik* (above, note 2) 31–38.

¹⁶ See, for example, the comments of Fotheringham (*Astronomical Monthly*, above, note 1, p. 108): "Several ancient writers give the date of the eclipse, generally within a few years of -584. . . . It is impossible to say whether Cyaxares or Astyages was reigning on May 28 of that year, and there appears to be no longer any reason for calling the date in question."

poet's return a third time from exile in the context of a war between Astyages and Alyattes. We do not have the poem and cannot be sure whether the commentator's reference to the war derives from Alcaeus or is explanatory material from a later source. Alcaeus was a contemporary of the events in question, however, so that he may well have mentioned the Lydo-Median War, which had important consequences for the eastern Greeks. He may even have mentioned the eclipse, whether in the same poem or not, since the path of totality did cross Lesbos. However that may be, if it was Alcaeus who mentioned a war between Astyages and Alyattes, of which there is no trace in Herodotus, Apollodorus would have felt obliged to find some way of reconciling two such unimpeachable authorities. That he could do by supposing that Cyaxares' participation in the war was the last that was known of him and that he died very soon thereafter. The year of the eclipse-battle, occurring in summertime during the normal campaigning season, would accordingly have been the first year of Astyages for chronographic purposes. The date in 585/84 he derived by manipulating the text of Herodotus in the same way that modern scholars have done, counting the thirty-five years of Astyages from the year corresponding to 550, a date for the fall of Astyages he may well have known from the literary chronicles of Babylon through the medium of Berossus and Eratosthenes. The fact that Cyaxares died soon after the battle and that Herodotus misunderstood Persian chronology accounted for the apparent disagreement between Herodotus and Alcaeus.¹⁷

Thales' prediction is fictional. No actual eclipse meets the requirements of Herodotus' narrative. The one that fits best occurred very late in the day at the site of the presumed battle and several years after the death of Cyaxares by Herodotus' account. Ancient authorities disagreed on the name of the Median king at the time of the famous battle. The traditional date does not support the astronomical calculation, since it derives from chronographic invention rather than documentary evidence, so that it is not surprising that the two do not in fact quite agree. Considered separately, or even in the aggregate, these problems may not seem great enough to force abandonment of a well-known tradition. There is, however, one additional fact generally overlooked in discussions of the eclipse-battle that, when set beside the difficulties inherent in the tale, ought to undermine confidence completely. The reliability of literary eclipses is poor in general.¹⁸ In the case of Herodotus, although his credibility as an

¹⁷ See *The Oxyrhynchus Papyri* XXIX (London 1963) with comment by D. L. Page, and George Huxley, "A War Between Astyages and Alyattes," *GRBS* 6 (1965) 201–06. On Apollodorus' date for the eclipse, see Alden A. Mosshammer, *The Chronicle of Eusebius and Greek Chronographic Tradition* (Lewisburg and London 1979) 270–72.

¹⁸ See the excellent comments of Robert R. Newton (above, note 6) 43–47 on eclipse reports in general and 97–99 on Herodotus. Only Newton seems to have noticed the relevance

historian has rightly been restored in recent years, of his two other possible references to solar eclipses one is of doubtful content and the other is demonstrably fictional.

At 9.10.3, Herodotus says that Cleombrotus died shortly after bringing his troops back from the Isthmus, where they had been engaged in the building of the wall. He withdrew because the sun was darkened while he was sacrificing in hope of victory against the Persians. This phenomenon has generally been associated with the annular eclipse of 2 October 480 B.C. It is difficult to say whether or not this date accords with Herodotus' narrative. We cannot place the withdrawal before the Battle of Salamis, for Herodotus reports Cleombrotus and his troops as being there at the time of the battle (8.71). Perhaps work continued on the wall immediately after the battle, even as the Persians were retreating northward, so that a date in October of 480 for this withdrawal is possible. More likely, the reference is to the renewed activity at the Isthmus early in 479, in the context of which Herodotus reports the withdrawal, at a time when the sacrifice and prayers for victory might be more appropriate. In that case the date in October of 480 is too early.¹⁹

We do not have precise enough information about these events to decide whether or not the date fits the narrative. A far more serious problem is the fact that the eclipse of 2 October 480 is not likely to have been visible from the Isthmus. The path of totality swept across the Sahara nearly two thousand miles south of the Isthmus. F. K. Ginzel has calculated the degree of magnitude at the Isthmus to have been 7° , 32° , on a scale where 12° represents totality, at approximately 1:30 p.m. Ginzel has also determined that a partial eclipse, especially if it is unpredicted and one is not looking for it, will not be noticeable near the time of solar noon to the naked eye unless the magnitude of greatest phase is 9° or more. Historians have apparently assumed that since the penumbra of 2 October 480 crossed the Isthmus at mid-day, this phenomenon must have been the darkening that Cleombrotus observed. In fact, as Ginzel has argued, the nearer to noon that it occurs, the less likely is a partial eclipse to be observed.²⁰ Herodotus' *ἐμυρώθη* is compatible with other phenomena. The circumstances, both historical and astronomical, suggest that we should abandon the eclipse of 2 October 480 and regard this report as having been occasioned by some phenomenon other than a solar eclipse.

The other report contains a clear reference to a total eclipse of the sun, but the astronomical charts provide no candidate at the right date. Herodotus tells us (7.37) that just as Xerxes' army was beginning its

of Herodotus' erroneous synchronism of an eclipse with Xerxes' march to the reliability of his report on the eclipse-battle.

¹⁹ Cf. W. W. How and J. Wells, *Commentary on Herodotus* (Oxford 1912) 2, 290.

²⁰ F. K. Ginzel (above, note 1) 14, 175.

march from Sardes to Abydos, at the first approach of springtime and under cloudless skies, the sun abandoned his heavenly seat and disappeared (ὁ ἥλιος ἐκλιπὼν τὴν ἐκ τοῦ οὐρανοῦ ἔδρην ἀφανὴς ἦν), so that instead of day there was night. No solar eclipse, total or partial, was visible from Asia Minor in the spring of 480, the indisputable date of Xerxes' march, or at any other time between 488 and 478. The nearest possibilities are the annular eclipses of 1 September 488, which has the advantage that the path of greatest phase passed directly over Greece and Asia Minor early in the day, and of 17 February 478. The latter has the advantage of occurring closer to the correct date at what may be called early springtime in those climes.²¹

It is possible that no actual eclipse underlies this report at all. It seems likely, however, that a truly impressive natural phenomenon, such as the eclipse of 17 February 478 or 1 September 488, has been assimilated to the equally impressive marshalling of Xerxes' host for the purposes of a good story. If we must concede that Herodotus or, rather, his informants could either invent an eclipse or allow the sun to leave his course by several years in order to provide Xerxes with a celestial omen commensurate with his ambitions, then surely we must be prepared to admit at least as much flexibility in interpreting Herodotus' report of the fabulous eclipse-battle a century or more earlier. Instead of debating the geographical coordinates of the battle, the time of day, the degree of totality, and the name of the Median king, we should direct our attention to the characteristics of popular tradition, with its facility for assimilating disparate events, and to the Ionian Greeks from whom the tradition of the eclipse-battle derives.

The eclipse of 478 was a spectacular phenomenon for Greeks both of the mainland and Asia Minor. It made a lasting impression and ultimately came to be associated with the nearly contemporary march of Xerxes. Similarly, in the earlier case, the Greeks of the Ionian coast observed an eclipse of the sun, naturally supposed that it was a heavenly omen of some kind, and speculated as to what the phenomenon portended. About the same time, whether weeks or years, news began to circulate that the Lydians and the Medes after many years of warfare with potentially disastrous consequences for the eastern Greeks had entered upon a treaty of peace and alliance sealed by a dynastic marriage. The two events were soon combined in a tradition that made the eclipse visible on the field of battle and directly responsible for the cessation of hostilities.

Whether Thales ought to be connected directly with the eclipse at the time it was observed is another question. Certainly he did not predict it. The date of his *floruit* in 585 depends on the chronographic calculation for the eclipse. Demetrius of Phalerum (*FGrHist* 228 F 1 = Diog. Laert. 1.22)

²¹ See Oppolzer (above, note 1) Charts 29–32: Ginzel 175 and Chart 5.

dated him to 582/81, but this date derives from the epoch of the Seven Sages in synchronism with the first Pythiad and has nothing to do with the eclipse.²² Herodotus (1.75) also associates him with the war between Croesus and Cyrus nearly forty years later, a fact that suggests Thales may have been too young for any kind of scientific activity at the time of the Lydo-Median War. If Thales *was* already of mature years at the time of the eclipse, he may have made some comment or another about it. More likely, his general interest in such matters and his inclusion in the canon of the Seven Wise resulted in his eventual assimilation to the tradition about the eclipse and the battle. The tradition is certainly older than Herodotus, for Xenophanes and Heraclitus are said (Diog. Laert. 1.23) to have expressed admiration at Thales' astronomical feats. The story depicted him as having predicted the eclipse precisely because such prediction was impossible, both at the time of the eclipse and throughout the period that the story was being circulated. One prodigy (the eclipse) deserves another (the battle) and yet another (the prediction). The final version as we have it from Herodotus can best be understood as a literary assimilation of what were once entirely separate reports concerning the eclipse, the Lydo-Median War, and Thales' astronomical interests.

There is one possible clue in Herodotus' narrative as to why an association should have been made between the Lydo-Median War and an eclipse of the sun. Herodotus prefaces his account of the eclipse-battle with a brief summary of the war as a whole: "Since Alyattes would not surrender the Scythians to Cyaxares when he demanded them, there was war between the Lydians and the Medes for five years, during which time there were a number of victories on each side. During the war (ἐν δὲ καί) they engaged in a night-battle." The precise relationship of this *νυκτομαχίην* to the rest of the narrative is not clear, and at least one critic has urged its excision from the text.²³ Herodotus seems to be referring to a nighttime engagement supposed to have occurred during the previous five years of the war, since he uses the connective δέ (rather than γάρ) in proceeding to describe the eclipse-battle that happened in the sixth year. It is difficult to know what significance, if any, the *νυκτομαχίην* has for interpreting the rest of the narrative, and one would not want to press the point. Nevertheless, if the primitive tradition on the Lydo-Median War included a nighttime engagement, an unusual occurrence in itself, and if people also remembered a total eclipse of the sun having taken place

²² See Alden A. Mosshammer, "The Epoch of the Seven Sages," *CSCA* 9 (1976) 165–80.

²³ The modern editors cite Herodotus for this deletion. See especially the Budé edition of Legrand (Paris 1964), who suggests that the clause was originally a marginal gloss. Such textual surgery is rarely the right solution to a problem, and Hude is correct to retain the clause in the Oxford text (3rd edition, Oxford 1927).

about the same time as the war, an assimilation between the two becomes all the more intelligible.

In seeking to identify the eclipse underlying this report, we should continue to search in the astronomical tables for one that was total, or nearly so, in Asia Minor at a time within a decade or so of the overlapping reigns of Cyaxares and Alyattes, approximately 615–595 in the lists of Herodotus. Judging from the false synchronism between the eclipse of 488 or 478 and the expedition of Xerxes, we need no longer be concerned if the dates do not coincide exactly, nor need we be troubled about the appropriateness of local circumstances of visibility in the presumed region of Lydo-Median hostilities. The eclipse of 28 May 585 remains the most likely candidate. The path of totality swept directly over Lesbos and Sardes, and it was nearly total over Samos and Miletus approximately 5:00 p.m., or two hours before local sunset. For those looking westward from a coastal promontory the phenomenon would have been spectacular indeed. The eclipses of 30 September 610, 18 May 603, and 21 September 582 did not occlude the solar disc sufficiently along the Ionian coast to have given rise to this story. We do not know the correct dates of Cyaxares' reign, if indeed he was still king when the war ended, or whether Alcaeus' reference to a war between Astyages and Alyattes belongs to a continuation of the same conflict; but to identify the eclipse with that of 19 May 557, which was total at Miletus, seems too extreme. In any case, identification of the eclipse can yield only an approximate date for the Lydo-Median War, no better than we might otherwise infer. We cannot date the end of the war precisely to 585 any more than we would seek to date Xerxes' march to September 488, or February 478. There is little value in having a precise, astronomically calculated date, time, and place for a battle that did not happen.