subjected to the more acceptable one (admiration of Nero as Nero). But such balancing acts can easily be overturned; nothing but prior expectation prevents a reader from understanding "I admire Nero, but think we must be rid of Caesars." And the whole idea depends upon the accepted fiction that Lucan did, in fact, admire Nero; to a reader not willing to accept the fiction, the approach might seem rather to be "I say that I admire Nero; but in fact I believe that all Caesars should die." As the poem and Lucan's relations with Nero progressed, this meaning would come to make stronger claims.

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THE HOROSCOPE OF PROCLUS

Concerning the date when Proclus died there is no doubt.[1] Not that his biographer Marinus made things easy for the chronographer. Unwilling to date Proclus' death according to the institutions of the Christian empire, he tells us instead (*Vita Procli* 36) that it occurred in the 124th year from the reign [βασιλεία] of Julian; and it is not obvious that this means the beginning of Julian's effective rule in late 361 rather than his becoming Caesar in 355, or for that matter his death in 363.[2] The further statement that the year was that of the Athenian archonship of Nicagoras the younger is no help in the absence of an archon list for the period in question.[3] The day, according to Marinus, was April 17, and also the 17th of the Athenian month Mounichion. If the Athenian calendar in the fifth century still employed lunar months beginning approximately at new moon, we could limit consideration to years in which a conjunction took place about March 31 or April 1; but it is also possible that the Athenian and Roman months are here simply synchronized.[4]

The only thing that fixes the date with certainty is the report of two ominous events that Marinus audaciously connects with his master's death: a total eclipse that was seen in Athens a year before Proclus' death, with the sun in Capricorn close to the eastern horizon, and another eclipse that was forecast by the ἡμερογράφοι (compilers of astronomical almanacs) to occur the year after his death.[5] These eclipses can be identified securely as those of January 14, A.D. 484, and May 19, A.D. 486.[6] Hence Proclus died on April 17, A.D. 485, which would fall within the 124th Athenian

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1. I am indebted to T. D. Barnes for suggesting improvements to a draft of this article.
2. The phrase ἀπὸ τῆς βασιλείας would normally mean "from the beginning of the reign," as is clear from the precise chronological reckonings in Ptol., *Alm.* 3.7 (ed. Heiberg, 1:256). For βασιλεία as "accession year" see also *BGU* 646, line 12. Julian's official count of regnal years began in 355 (Bagnall and Worp 1978, 75). Neither Évrard 1960, 137–38 nor Neugebauer and van Hoesen 1959, 136 note this fact.
3. This is one of only five attestations of Athenian archons after 267; see Follet 1976, p. 9, n. 2.
4. Follet 1976, 361–62; Neugebauer and van Hoesen 1959, p. 136, n. 14.
5. To my knowledge the unique other mention of ἡμερογράφοι is Olympiodorus, *In Mete.*, ed. Stüve, 50, a corrupt passage that seems to refer to predicted dates of visibility of Mercury. The only known variety of astronomical table that could have included forecasts of eclipses and planetary phenomena is the so-called "ephemeris"; see Jones 1999, section 5.1; Neugebauer 1975, 2:1055–58; and Delambre 1817, 2:635–37. Eclipses were traditionally interpreted as omens pertaining to kings and kingdoms: see for example Hephaestio Thebanus 1. 21, ed. Pingree, 52–65.
6. Ginzel 1899, 222. The eclipses were first dated by Vincenzo Renieri in the second edition of his Tabulae Mediceae (Florence, 1647, *non vidi*).

TABLE 1: SUMMARY OF THE HOROSCOPE OF PROCLUS

Sun	Aries 16 26
Moon	Gemini 17 29
Saturn	Taurus 24 23
Jupiter	Taurus 24 41
Mars	Sagittarius 29 50
Venus	Pisces 23
Mercury	Aquarius 4 42
Ascendant	Aries 8 19
Midheaven	Capricorn 4 42
Ascending node	Scorpio 24 33
Conjunction	Aquarius 8 51

calendar year counting from midsummer, A.D. 361. It is gratifying to find that a conjunction of the sun and moon took place before sunrise on April 1, A.D. 485.[7]

The real difficulty arises with Proclus' birthdate. Marinus fails to give us an explicit date, but he writes (VP 3 and 26) that Proclus lived "all of seventy-five years" (ἔτεσιν ὅλοις πέντε καὶ ἑβδομήκοντα) and presents his birth horoscope (VP 35).[8] It is generally accepted that the horoscope was cast for February 8, A.D. 412, and thus Proclus' death ought to have occurred during his seventy-fourth year. The controversy over which datum—if either—is correct has been complicated by doubts concerning the accuracy and provenance of the horoscope itself.[9] The present article will show that the method of computation of the horoscope can be determined with certainty, and that this information points towards a plausible appraisal of the technical competence of the person who cast it and his credibility as an authority for Proclus' birthdate. It will also incidentally follow that Proclus was probably born one day earlier than the date previously supposed for the horoscope.

Like the numerous documentary horoscopes that have been discovered on papyrus, the horoscope of Proclus is merely a list of zodiacal longitudes (to the degree and minute) of the sun, moon, and five planets, the ascendant and midheaven, and the moon's ascending node calculated for the date in question, together with the longitude of the conjunction of the sun and moon that preceded the date.[10] Table 1 summarizes the horoscope.[11] Except in the case of Venus, where a numeral appears to have dropped out, the numerals are to be read as degrees and minutes.

Proclus' horoscope has been studied as an astronomical document by a succession of notable astronomers and scholars, including Vincenzo Renieri (a disciple of Galileo), Domenico Cassini, J. A. Fabricius, J. B. Delambre, and O. Neugebauer. Renieri and Cassini were separately consulted by Lucas Holstenius (Holste), who

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7. Goldstine 1973, 124.

8. For the meaning of ὅλα ("in all," not "completed") see Goulet 1982, 206. It is impossible to tell whether Marinus believes that Proclus died in the year before his seventy-fifth birthday or in the year after.

9. Évrard 1960 reviews the numerous earlier attempts to resolve the inconsistency.

10. Neugebauer and van Hoesen 1959; Baccani 1992.

11. For the text I have used Masullo 1985. This edition unfortunately suppresses information about the use of symbols and compendia in manuscripts of the horoscope, and mistakenly expands the compendium μ° for μοίρᾳ as μορίῳ. The notes of Boissonade 1814, 138–39 show that some manuscripts use very early forms of the symbols for the planets.

projected but never completed an edition of the *Vita Procli*. Renieri's letter of December 5, 1644 to Holstenius concerning the horoscope, and Cassini's report of 1652 remained unpublished until 1962, and appear to have had no influence on the later investigators.[12] Fabricius discussed the horoscope in the preface to his edition of 1700 (reprinted in 1703), while Delambre's remarks are briefly cited in the notes to the edition of Boissonade. Neugebauer included the horoscope of Proclus in the collection of Greek horoscopes that he produced with H. B. van Hoesen, and returned to it a decade and a half later in his *History of Ancient Mathematical Astronomy*.[13] For the most part, all the foregoing scholars made use of the same assumptions: that the textual accuracy of the horoscope as transmitted can be checked and corrected according to criteria of astronomical consistency; that the corrected astronomical positions can be shown to fit a single date within the range acceptable for Proclus' birth; and that the basis for the computations should be sought in the astronomical tables of Ptolemy.

There are two obvious internal inconsistencies in this list of positions. While the sun, the moon, Saturn, Jupiter, and Mars can in principle occupy any combination of positions in the zodiac, Venus and Mercury must lie within fixed limits of the sun's longitude, approximately 50° and 25° respectively. In the horoscope of Proclus, Mercury fails to satisfy this condition, since it is placed more than 70° west of the sun. Secondly, the number of degrees from the sun's longitude to the longitude of the preceding conjunction, counted westward, cannot be more than 31°, and ought to be roughly one twelfth of the number of degrees from the sun to the moon, counted eastward; whereas here the sun is impossibly more than 71° east of the conjunction and only 61° west of the moon.

Renieri resolved both difficulties at one stroke by emending the sun's zodiacal sign from Aries to Aquarius, and in this he has been followed by all subsequent investigators.[14] Renieri also found, using the tables of Ptolemy's *Almagest,* that a conjunction took place on January 29, A.D. 412, on which the sun's and moon's longitude according to the tables exactly matched the position recorded in the horoscope, Aquarius 8° 51'. Within the lunar month following this date, he established (using contemporary tables rather than Ptolemy's) that the positions of the sun, moon, and planets and the locations of the ascendant and midheaven best fitted February 8, approximately 3 hours before noon. The positions generally were in agreement within five degrees or so, except that Renieri computed Venus' position as Pisces 1° 59', which seemed unacceptably distant from the transmitted reading, Pisces 23°. He accordingly proposed emending Venus' longitude to Pisces 2° 3'.

Cassini's analysis followed similar lines to Renieri's, but went further.[15] While Renieri had been content to change the sun's zodiacal sign, Cassini saw that if ten days had elapsed from the conjunction to the birthdate, the sun must have progressed approximately 10° in that time, and so he corrected the sun's degrees as well from 16° to 18°. Secondly, he perceived that the position assigned to Venus might be read either as Pisces 23° or as Pisces 23' (i.e. 0° 23'), so that Venus could be

12. Mogenet 1962, 2:281–308.
13. Neugebauer and van Hoesen 1959, 135–36; Neugebauer 1975, 2:1032–34.
14. Mogenet 1962, 289–93.
15. Mogenet 1962, 297–308.

brought closer to its true position on February 8 without invoking Renieri's emenda-tion.[16] Thirdly, Cassini used the *Almagest* tables to compute the longitudes of the five planets at noon on February 7 and February 8, and showed that the positions for February 7 were in very close agreement with those in the horoscope. From this he conjectured that the person who cast the horoscope took the planetary positions from an ephemeris listing daily positions at noon rather than calculating them directly from Ptolemy's tables for 21 hours after noon of February 7, which was the birth mo-ment most closely fitting the horoscope's positions for the moon and the ascendant. He did not, however, attempt to explain why the recorded position of the moon is fully a degree too high to have been computed by Ptolemy's tables even for noon of February 8, let alone three hours earlier.

Fabricius did no more than to correct the sun's sign to Aquarius and to read Venus' position as Pisces 0° 23'. In his diagram of the horoscope, but not in his Greek text or Latin translation, Fabricius prints the sun's longitude as Aquarius 20° 26' (in-stead of 16° 26'), an alteration that he does not remark on and that may have been a mere oversight.[17] Although he asserted the same date as his predecessors, February 8, A.D. 412, Fabricius did not explain how the date was established or discuss the computation of the horoscope. Delambre merely confirmed Fabricius' results.

On the first occasion when Neugebauer investigated the horoscope of Proclus, he adopted Fabricius' date and the correction of the sun's longitude to Aquarius 20° 26', while retaining the reading of Venus' position as Pisces 23°. He compared the horo-scope with positions of the heavenly bodies calculated according to the modern tables of P. V. Neugebauer, finding discrepancies never exceeding 4° except for the sun and Venus. At this stage he does not seem to have attempted to reproduce the horoscope using ancient tables. Neugebauer's comments on the horoscope tended to favor it as a trustworthy source for Proclus' birthdate.

Neugebauer's later investigation addressed the question of the methods of compu-tation at length; unlike Renieri and Cassini, however, he assumed that the most likely candidate for the tables employed in casting the horoscope was not those of the *Al-magest* but rather Ptolemy's *Handy Tables* (which, following a modern scholarly tradition, he ascribed to Theon of Alexandria).[18] Neugebauer showed, first of all, that the relationship between the longitudes assigned in the horoscope to the ascendant and midheaven point exactly fits the tables of right and oblique ascensions in the *Handy Tables* if one uses the tables corresponding to the latitude of Rhodes (36°). This result was doubly significant, since it not only indicated that Ptolemy's tables had been used to compute this part, at least, of the horoscope, but also that the caster of the horoscope mistakenly assumed a latitude roughly appropriate for, say, Athens (where Proclus spent his later life) but not for Constantinople, his place of birth.[19]

The continuation of Neugebauer's analysis tended to suggest that this was not an isolated mistake, but that "we are dealing with a crude practitioner who did not mind inaccurate shortcuts." Thus taking the sun's longitude as Aquarius 16° 26' (i.e. now

16. One may suppose that the astronomical symbol for zero, a small circle or dot below a horizontal stroke, dropped out.
17. Fabricius 1703, pp. v–vi (discussion and diagram), and 72 (text and translation). I have not seen Fab-ricius 1700, of which this was a reprinting.
18. Neugebauer 1975, 2:969–71. Tihon 1985 has now shown that Theon made no significant revisions to Ptolemy's *Handy Tables*.
19. Cf. Neugebauer 1975, 2:1033: "This is perhaps permissible for an astrologer in Athens . . . ."

emending only the zodiacal sign of the datum in the text), Neugebauer found that one could derive the longitude of the ascendant in the horoscope using the *Handy Tables* (once more for the latitude of Rhodes) according to an easy but astronomically illegitimate procedure described by the astrologer Paulus Alexandrinus (chap. 29, ed. Boer, p. 80).[20] Again, he recomputed the positions of the five planets from the *Handy Tables* and failed to obtain the longitudes in the horoscope. He did, however, find that computation for noon of February 7 led to accurate agreement for one planet, Mars, and for the moon's ascending node. He was also able to reproduce the attested positions for Jupiter and Saturn but only by assuming a computational error, subtracting a certain intermediate quantity instead of adding it. Neugebauer was unable to derive the longitudes of the sun, moon, Venus, or Mercury, as they are given in the horoscope, and so judged that they were "very carelessly computed."

The latest discussion of the horoscope, by L. Siorvanes, takes Neugebauer's conclusions as its starting point.[21] Siorvanes argues that the horoscope should not be taken as a reliable witness to Proclus' birthdate, adducing the uncertainty about who cast it, the need for emendations to obtain astronomical consistency, the erroneous use of the latitude of Rhodes, and, most importantly, the crudeness of the methods of computation. He speculates that the horoscope may have been cast after Proclus' death and indeed originally computed for a date after his death, and then somehow extrapolated backwards to take account of the planets' motions in seventy-four years. I must admit I understand neither the motive for applying such a procedure, nor how it could be done in such a way as to obtain the particular mixture of agreement and disagreement with the *Handy Tables* that Neugebauer found.

The question may be put aside, however, because the calculations on which Neugebauer (and afterwards Siorvanes) based his unfavorable judgement of the competence of the horoscope are marred by errors, which Neugebauer unfortunately imputed to the ancient astrologer who cast the horoscope. The source of these errors can be traced precisely to Neugebauer's restatement in modern notation of the rules for calculating planetary longitudes by the *Handy Tables,* where by writing "$k_7 \geq 0$" instead of "$k_7 \leq 0$," he introduces a sign error into the computation of planetary positions for approximately half of all possible dates.[22] For the date of the horoscope of Proclus, Jupiter, Saturn, and Mercury happen to have been in the situation where Neugebauer's formula is incorrect, while Mars and Venus are not affected by the mistake. If one repeats the calculations correctly, one obtains the comparison with the transmitted horoscope shown in table 2.[23] Except for the sun and moon, all positions turn out to match within a tolerance of 2'. Deviations in this range are negligible because different practices of rounding intermediate arithmetical results can give rise to variations of at least this size when using the *Handy Tables*. The agreement cannot be accidental: the horoscope must have been cast using Ptolemy's tables (either the *Handy Tables* or those of the *Almagest*), and the date for which it was cast, so far as the planetary positions are concerned, was noon of February 7.

20. Neugebauer 1975, 2:1033 and 956.
21. Siorvanes 1996, 1–2 and 25–27.
22. Neugebauer 1975, 2:1003, equation 4.
23. I have used a computer program employing corrected transcriptions from the tables in the ninth-century codex, *Vat. gr.,* 1291. The only edition of the *Handy Tables* (not critical and often unreliable) is Halma 1822–25. My results are, within two or three minutes, identical with the positions that Cassini found using the *Almagest* tables, as is to be expected since both sets of tables reflect the same planetary theory.

TABLE 2: RECALCULATION OF THE HOROSCOPE

	Text	Handy Tables, noon, February 7, A.D. 412
Sun	Aries 16° 26'	Aquarius 17° 36'
Moon	Gemini 17° 29'	Gemini 4° 16'
Saturn	Taurus 24° 23'	Taurus 24° 22'
Jupiter	Taurus 24° 41'	Taurus 24° 41'
Mars	Sagittarius 29° 50'	Sagittarius 29° 52'
Venus	Pisces 23'	Pisces 0° 21'
Mercury	Aquarius 4° 42'	Aquarius 4° 42'
Node	Scorpio 24° 33'	Scorpio 24° 31'
Conjunction	Aquarius 8° 51'	Aquarius 8° 52'

I think it is much more likely that the reported longitudes of the sun and moon are simply corrupt than that they are the results of erroneous computation. There can be no doubt that the astrologer understood how to use Ptolemy's solar and lunar tables, because the determination of the preceding conjunction requires repeated calculations of solar and lunar longitudes in order to establish the moment when they coincided. What is more, if we take the solar longitude that the astrologer *should have* found (Aquarius 17° 36', plus or minus a couple of minutes), and subtract its right ascension from the right ascension of the midheaven (Capricorn 4° 42'), we obtain a time difference of 44° 58', or almost exactly three equinoctial hours of 15°, between the ostensible time of the horoscope and noon. This means that we can explain the reported ascendant and midheaven precisely without having to appeal to astronomically incorrect procedures. We hypothesize that the astrologer calculated the sun's position for noon of February 7 as, say, Aquarius 17° 38', then established the midheaven by an astronomically correct calculation, on the assumption that the moment of birth preceded noon by three hours, and determined the ascendant from the midheaven using the table of ascensions for the latitude of Rhodes. Thus the weight of evidence suggests that the astrologer calculated the solar position correctly, and that the longitude transmitted in the manuscripts of the *Vita Procli* has been hopelessly corrupted, probably by the accidental substitution of data from somewhere else.

It is also not surprising, nor evidence of great incompetence, that the astrologer computed the positions of the planets (and apparently the sun too) for noon of February 7 when the ascendant and midheaven indicate a time of birth three hours before noon. For most astrological applications, the progress of these six bodies during one day is small enough to neglect, and noon is the epoch time of Ptolemy's tables. Cassini's suggestion that the astrologer was using a set of ephemerides that gave precomputed positions at one day intervals would be attractive, were it not that the many examples of ephemerides now known from papyri turn out to be regularly computed for 6 P.M., not noon.[24] One would expect that the moon's position was

24. Jones 1999, section 5.1.

calculated for the precise time of the geniture, since the moon's daily progress—about 12° on the date in question—is large enough for its movement in a fraction of a day to matter. Unfortunately the longitude in the text is certainly false (it would correspond to a time more than one day after noon of February 7), and calculating by the *Handy Tables* or the *Almagest* for noon or three hours before noon on either February 7 or 8 does not yield a longitude from which the transmitted number can be obtained by a minor mistake of transcription. I conclude that this number too is corrupt beyond simple emendation, and that it should not be used as evidence for either the date or the precision of the horoscope. The traditional assignment of the horoscope to the morning of February 8 is based on the fact that the moon was closest to Gemini 17° 29' on that day; but if we disregard this untrustworthy datum, there is no good reason why the birthdate could not have been three hours before noon on February 7, so that the neglected three hours of planetary motion would have been truly negligible.

So far we may draw two conclusions: that the astrologer who cast the horoscope of Proclus was technically competent and knew his way around the intricacies of Ptolemy's tables, and that the horoscope was cast for a definite date, three hours before noon on either February 7 or 8, A.D. 412, and for a place near the latitude of Rhodes. There remain, however, three peculiarities about the horoscope in relation to its context in Marinus' *Vita Procli*. First, Marinus states clearly (*VP* 6) that Proclus was born in "Byzantium" (as he chooses to call Constantinople), whereas the horoscope assumes a latitude of 36°, which is more than seven degrees too far south according to Ptolemy's geographical table.[25] Secondly, Marinus twice states that Proclus lived seventy-five years, whereas if the date of the horoscope is correct, he died in his seventy-fourth year. Thirdly, Marinus does not preface the horoscope with the date to which it corresponds. Now if Marinus knew what this date was, it is odd that he omits to repeat it in either context where it might be expected, at the beginning of the *Vita* where he describes the circumstances of Proclus' birth or just before the horoscope, and doubly odd that his reckoning of the length of Proclus' life is false. Nor can the horoscope be a later interpolation derived from the biographical information in the *Vita,* since it assumes knowledge of a date that Marinus does not provide, and of a locality that Marinus contradicts.

These considerations lead to a hypothesis for the provenance of the horoscope. I submit that Marinus did not know exactly when Proclus was born, but he knew (*VP* 26) that Proclus' intellectual career had come to an end in his seventieth year, according to a prophecy, and that he had lived on into the fifth year after his loss of mental vigor—numbers that could in fact have been consistent with a birth in early 412 and a death in the middle of 485, but that seem to add up to seventy-five years. In addition, he found Proclus' horoscope among the philosopher's papers, and inserted it in his biography without realizing that a precise birthdate was latent in it. The horoscope would not have been Proclus' own work—we have no evidence that Proclus was conversant with computational astronomy or practical horoscopy,

25. Byzantium is given a latitude of 43° 5' in both Ptolemy's Geography (3.5) and the "table of noteworthy cities" in the *Handy Tables* (Honigmann 1929, 214—the reading of *Vat. gr.* 1291 transcribed on p. 196 has a scribal error in the minutes). This latitude, which is about 2° too far north, was traditional in Greek geography, apparently originating with Hipparchus; cf. Strabo 2.1.12, and Dicks 1960, 182–83. Tables of ascensions expressly computed for the "parallel through Byzantium" (i.e. 43° 5') were added to the *Handy Tables* in late antiquity, possibly by Stephanus of Alexandria in the early seventh century (Neugebauer 1975, 2:970 and 1024; Tihon 1992, 54).

although he knew a fair bit about astronomical theory—but was cast by a profes-
sional astrologer who mistakenly took a latitude of about 36° for granted. Is it too
speculative to suggest that it was procured in Proclus' youth at Xanthos in Lycia,
where Proclus' parents resided before and after their brief Constantinopolitan so-
journ (*VP* 6), and to which Ptolemy assigns a latitude of 36° 10'?[26]

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26. *Geog.* 5.3; "Table of Noteworthy Cities" in Honigmann 1929, 208 and 219. Variant readings for the
fraction (e.g. 36° 30') are transmitted in some manuscripts of both works.