reinforcing: cf., e.g., *Epist.* 71. 27 *mordetur, uritur, dolet; Epist.* 88. 29 *despicit, provocat, frangit* and *ure, caede, occide; Epist.* 88. 46 *circumstant, alunt, sustinent.* So here the first three verbs *minuuntur cadunt deteruntur* are roughly synonymous, and would be perfectly balanced by three roughly synonymous opposites but for *exhauriuntur,* which is amenable to convincingly simple emendation. By a remarkable coincidence Ernout found the right solution (*oriuntur*), but to the wrong problem. Read: "Mortalia minuuntur cadunt deteruntur, crescunt exoriuntur implentur."

At first sight, *deteruntur* and *implentur* appear not to offer the clearest of contrasts. This could well be due to Senecan *variatio:* cf. *Epist.* 74. 16 "quae cadere non possunt, ne decrescere quidem ac minui." Yet "wear down or away" (*OLD,* s.v. *detero* la) and "fill out, fatten (the body, etc.)" (*OLD,* s.v. *impleo* 3b) do make an apposite opposition, here especially if Seneca was primarily thinking of the animal and vegetable life specifically mentioned in the preceding section. As regards structure, a comparable example, with asyndeton separating the contrasting triads which are themselves asyndetic, is to be found at Cicero *Pro Caecina* 33 "cum . . . multitudinem hominum coegerit armarit instruxerit, homines inermos . . . reppulerit fugarit averterit." Seneca himself devises a pair of antithetical triads (with *variatio* of the enclosing antithesis) at *De otio* 5. 5 "suapte natura gravia descenderint, evolaverint levia an . . . altior aliqua vis legem singulis dixerit."

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THE HOROSCOPE OF THE FOUNDATION OF ROME

In *Romulus* 12, Plutarch gives some interesting information about the date of the foundation of Rome. He first says that Rome was founded a. d. XI Kal. Mai., or 21 April, at the festival of the Parilia. This is evidently an old tradition, for the Parilia was celebrated as the anniversary of the foundation of the city. He reports further that Romulus founded Rome on the thirtieth of the (lunar) month on the day of a solar eclipse believed to be the one seen by Antimachus the epic poet of Teos in Olympiad 6, 3. Since the Olympiad year begins in the summer, the two statements combine to give the date 21 April 753 B.C., although in fact no eclipse occurred on that date, nor was any solar eclipse visible at Rome within several years. Now, 21 April 753 B.C. is the date of the foundation of Rome associated with Varro's chronology from his *Antiquitates rerum humanarum,* but thus far Plutarch has made no mention of Varro and must be reporting independent traditions.

He then says that in the time of Varro there lived a man named Tarutius, or L. Tarutius Firmanus, a philosopher and "mathematician," that is, an astrologer, whom Varro asked to determine the day and hour of Romulus' birth. This Tarutius did by reversing normal astrological practice: he studied all the events of Romulus' life and the (mysterious) circumstances of his death, and he gave Varro three dates, of Romulus' conception, of his birth, and of the foundation of

Rome, all in months and days of the moveable Egyptian calendar commonly used for astronomical computation.[1]

Romulus' conception, he determined, occurred in Olympiad 2, 1 on 21 Choiak in the third hour during a total solar eclipse. This corresponds to 24 June 772 B.C. between 7:00 A.M. and 8:15 A.M., since days in the Egyptian calendar are counted from sunrise and since seasonal hours in late June, near the solstice, are about 1¼ equal hours in length at the latitude of Rome. Hence, if sunrise occurred at 4:30 A.M., as is about correct for the date, the third hour would begin at 7:00 A.M. and end at 8:15 A.M. In fact, at about 9:40 A.M. on this date at Rome a conjunction of the sun and moon took place very near the ascending node; but no eclipse could have been observed at Rome or anywhere else. It is the date of an ecliptic conjunction (Oppolzer 1022), in which occurred a barely grazing eclipse of the sun that could be seen, if at all, only in far northern latitudes, but was certainly not observed and recorded anywhere.[2] Evidently Tarutius could compute the date of a conjunction at which a solar eclipse was possible but could not determine whether an eclipse had actually been visible at a given location. The reason must be that he could not determine the parallax of the moon, which is essential to the computation of a solar eclipse, since the lunar parallax can reach as much as twice the diameter of the sun. Hence, he computed only the ecliptic conjunction and erroneously claimed that a solar eclipse, presumably a visible eclipse, had taken place.

How Tarutius determined the date and time of the conjunction and did so rather accurately—although perhaps luckily—is not certain. It is possible that he counted back in periods of 223 mean synodic months, a period of 6,585⅓ days, later called the "Saros," from an observed and recorded solar eclipse. This receives some support from Censorinus' statement (*De die natali* 21. 5) that Varro determined dates *defectus eorumque intervalla retro dinumerans.* Another, perhaps more likely, possibility is that he used tables of ecliptic syzygies, conjunctions and oppositions at which the moon is fairly close to a node so that an eclipse is possible. Such tabulations are regularly included in Babylonian lunar ephemerides and are also known from papyri.[3] The basis of lists of ecliptic syzygies is that solar eclipses can occur at intervals of six synodic months, sometimes of five synodic months, or, under exceptional circumstances, of one synodic month. These last, however, are barely noticeable, since the moon is near the limit of the eclipse zone, and can be seen only at extreme latitudes on opposite sides of the equator.[4] In fact, the eclipse of 24 June 772 B.C. is the

1. For a more extended discussion of Varro's chronology, including the subjects treated here, see A. T. Grafton and N. M. Swerdlow, "Technical Chronology and Astrological History in Varro, Censorinus, and Others," *CQ* 35 (1985): 454–65.

2. See F. K. Ginzel, *Finsterniss-Canon für das Untersuchungsgebiet der römischen Chronologie,* Sitz. preuss. Akad. d. Wiss. Berlin (1887), pp. 1122–23; Th. v. Oppolzer, *Canon der Finsternisse,* Denkschr. Akad. d. Wiss. Wien, Math.-naturwiss. Cl. 52 (1887).

3. See O. Neugebauer, *A History of Ancient Mathematical Astronomy* (Berlin–Heidelberg–New York, 1975), pp. 521–28; R. A. Parker and O. Neugebauer, "A Demotic Lunar Eclipse Text of the First Century B.C.," *PAPhS* 125 (1981): 312–27.

4. Eclipse intervals are demonstrated by Ptolemy in *Almagest* 6. 6; according to Pliny *HN* 2. 57, they were already known to Hipparchus. See G. J. Toomer, *Ptolemy's "Almagest"* (London and New York, 1984), pp. 287–94; Neugebauer, *History*, pp. 129–34. Pliny (2. 53) says that Hipparchus predicted the *cursus* (a translation of the Greek *dromos*) of the sun and moon for 600 years, and this rather vague

second of a pair, and was preceded by an equally insignificant eclipse on 26 May (Oppolzer 1021). In any case, it must be emphasized that no eclipse was observable, observed, or recorded, and all that Tarutius did, or could do, was compute the date of an ecliptic conjunction and then assume that an eclipse had really occurred.

Plutarch then says that Tarutius gave the birth of Romulus as 21 Thoth, obviously of the following year, at sunrise, and this corresponds to 24 March 771 B.C. at about 6:00 A.M., since the sun was a few days before the vernal equinox. How Tarutius arrived at this date is not difficult to discover. The birth on 21 Thoth follows the conception on 23 Choiak by 273 days, less about two hours, and 273 days is the canonical, astrologically determined value for a normal nine-month pregnancy. It is taken to equal ten *sidereal* months of 27⅓ days, giving a total of 273⅓ days, usually rounded to 273 days.[5] Tarutius' slight difference, placing the conception in the third hour and the birth at sunrise, may have something to do with more detailed procedures for determining the deviation (up to ±15 days) from the mean value of 273 days, or could be directed at finding a favorable ascendant, or could follow from some otherwise unattested tradition that Romulus was born at dawn. It is certain, however, that he began with the date and time of the conception, given by the presumed eclipse, and computed forward to the date and time of birth. Obviously, this is the reverse of the usual procedure.

Finally, Plutarch reports that Tarutius determined that the foundation of Rome took place on 9 Pharmouthi, presumably of Olympiad 6, 3, between the second and third hour: this would correspond to 4 October 754 B.C. at about 8:00 A.M., since the sun is very near the autumnal equinox, as we shall see. Plutarch's report has frequently been rejected as an error, since the date it provides does not correspond to the Parilia on 21 April; but it is not an error, for it is the correct date of the horoscope of the foundation of Rome cast by Tarutius.[6] The horoscope is not given by Plutarch, but appears in two different versions, one in Solinus' *Collectanea rerum memorabilium* 1. 18 and the Planudean recension of John Lydus' *De mensibus* 1. 14, and the other in the Barberini recension of Lydus. Both versions give the date as a. d. XI Kal. Mai., the Parilia; but this, along with a crude adjustment of the position of the sun to fit a date in the spring, is an error antedating Solinus (ca. A.D. 200), since Cicero, who criticizes the horoscope in *De divinatione* 2. 98, already associates it with the Parilia. However, the horoscope can be firmly dated to 4 October 754 B.C., that is, 9 Pharmouthi, as stated by Plutarch, in Olympiad 6, 3. Table 1 gives the

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statement, which occurs in the context of a discussion of eclipses, could refer to a list of ecliptic syzygies.

5. See O. Neugebauer, "Decem Tulerunt Fastidia Menses," *AJP* 84 (1963): 64–65 (repr. in O. Neugebauer, *Astronomy and History* [New York–Berlin–Heidelberg–Tokyo, 1983], pp. 358–59); Neugebauer, *History*, p. 1036. The interval of 273 days has been noted by G. F. Unger, "Romulusdata," *Jahrb. f. cl. Phil.* 135 (1887): 409–23.

6. To the best of our knowledge, the date for which the horoscope was cast has not previously been verified, and attempts to explain away 9 Pharmouthi have replaced the problematical with the incredible. An amusing example is provided by Unger, "Romulusdata," p. 414, who accepts the date 4 October 754 B.C., but explains it with the novel idea that the horoscope concerned the *conception* of Rome (carried out by Romulus in some unspecified manner).

TABLE 1

PLANET	S–P	B	MODERN
Saturn	♏	♎	♏ 4°
Jupiter	♐	♌	♐ 17°
Mars	♏	♎	♎ 17°
Venus	♏	♉	♏ 2°
Mercury	♏	♈	♍ 26°
Sun	♉	♉	♎ 3°
Moon	♎	♍	♎ 26°

positions in the horoscope from Solinus and the Planudean recension of Lydus, marked S–P, from the Barberini recension, marked B, and according to a modern computation for 4 October 754 B.C. 8:00 A.M. at Rome.[7]

Note that the agreement of S–P with the modern computation is excellent for Saturn, Jupiter, Venus, and the moon. This in itself is sufficient to date the horoscope since only 2–4 October 754 B.C., and no other dates within hundreds of years, can fit this configuration. Hence, Plutarch's 9 Pharmouthi of Olympiad 6, 3 is not an error, but is confirmed as the date of Tarutius' horoscope of the foundation of Rome. Mars is in error by about half a sign and Mercury by two signs. We have no explanation of these errors except to remark that they are of the sort commonly found in early horoscopes and may result from Tarutius' projecting back tables for his own time over a period of seven hundred years, which would in fact probably produce the greatest errors for Mars and Mercury. The error for the sun is, however, of considerable interest, for it appears to be the work of someone quite early who shifted the sun from Libra to Taurus to fit the date of the Parilia. But this, of course, creates the absurd situation that Mercury and Venus, which can never be more than one or two signs from the sun, are exactly opposite it in Scorpio. The change is thus very ignorant.[8] Perhaps the version of the horoscope in B was an attempt to remedy this, at some time after Lydus (sixth century), by moving Mercury and Venus plausibly close to the sun. However, the other changes make no sense to us, and the version in B

7. We have used the edition of Solinus by Th. Mommsen (Berlin, 1864), 9:13–19, and of Lydus by R. Wuensch (Leipzig, 1898), 8:5–14. The modern positions are from H. Hunger and R. Dvorak, *Ephemeriden von Sonne, Mond und hellen Planeten von -1000 bis -601*, Denkschr. österreich. Akad. d. Wiss. Wien, Phil.-hist. Kl. 155 (1981), which makes the dating of the horoscope straightforward. There is a further confirmation that the moon was in Libra by Cicero *Div.* 2. 98, who does not think very highly of "our friend" Tarutius' astrology.

8. This discrepancy has, of course, been frequently noted, but with the exception of Unger, "Romulusdata," pp. 412–14, the interpretation has been that Mercury and Venus are wrong and the sun correct—since the sun agrees more or less with the date of the Parilia—although it is certainly the other way around. Note that the dating of the horoscope to 4 October 754 B.C. would be virtually certain even without Plutarch's date of 9 Pharmouthi, and with it there can be no doubt at all. Neither version of the horoscope can fit 21 April 753 B.C., the traditional date of the foundation, at least not without drastic, and unwarranted, emendation. It is in any case difficult to know how Tarutius would have converted a date in the old Roman calendar, more than 700 years before the Julian reform, to the Egyptian calendar, as was evidently necessary for computing the positions of the planets.

is simply impossible, fitting no dates even remotely close to the foundation of Rome.

A possible confirmation that the horoscope originally had the sun in Libra is provided by Manilius 4. 773–77:

> Hesperiam sua Libra tenet, qua condita Roma
> orbis et imperium retinet discrimina rerum,
> lancibus et positas gentes tollitque premitque,
> qua genitus Caesar melius nunc condidit urbem
> et propriis frenat pendentem nutibus orbem.

There are some ambiguities in this passage, but it now appears that Tarutius' horoscope actually can serve to clarify them.[9] Manilius first says that Italy (Hesperia) is under Libra, which is simply standard astrological geography, assigning regions to particular signs, and has nothing to do with the position of the sun. He then says that Rome was founded under Libra and that the Caesar who has now better founded the city was born under Libra. The Caesar is Tiberius, in whose natal horoscope the moon is in Libra, as it likewise is in Tarutius' horoscope. But the statement that Rome was founded under Libra could as well refer to the position of the sun, and indeed Manilius' source for this was probably Tarutius' horoscope in its original form before it had been "adjusted" to fit the Parilia.

We can only guess at how Tarutius found the positions in the horoscope. The best possibility is that he used fairly crude tables, of the sort found in a number of papyri, that give either month-to-month positions of the planets or the dates of entries into each sign for some number of years.[10] Since each planet approximately repeats its series of positions or entries in a cycle of a couple of generations (e.g., 59 years for Saturn, 71 years for Jupiter), these cycles may be projected backward or forward for hundreds of years, although the accuracy, none too good to begin with, will deteriorate through each cycle. This could account for the errors in Mars and Mercury. Tarutius must have decided on the date through some kind of astrological consideration, looking for a configuration in the vicinity of the traditional date of the founding of Rome, say, within a year or so, that seemed appropriate to him.[11] We cannot explain his choice except for one interesting possibility. Note that in the modern computation the sun is at 3° of Libra, rather close to the autumnal equinox at 0° of Libra. It is possible that in Tarutius' tables, when projected back over seven hundred years to Olympiad 6, 3, the sun reached the equinox on 9 Pharmouthi, and it was this alone that motivated his choice. This would very simply explain the date of the horoscope, but it is only a guess, for the remarkable configuration of four planets and the ascendant in Scorpio may have been of still greater significance in determining the date.

9. On the passage itself, see A. E. Housman, ed., *Manilius IV*[2] (Cambridge, 1937), ad loc.

10. See Neugebauer, *History*, pp. 781–88.

11. There is an astrological analysis of the horoscope in A. Bouché-Leclercq, *L'astrologie grecque* (Paris, 1899), p. 369, but of the version from the Barberini recension of Lydus, which cannot be the correct horoscope. It is perhaps of astrological significance that in the original horoscope no fewer than four planets and, from the time of day, the ascendant are in Scorpio (but we are hardly qualified to speculate on what this could portend).

We may, in any case, conclude that all three dates established by Tarutius were astrologically determined. There appears to have been a tradition, antedating Varro, that Romulus founded Rome at the age of eighteen at the Parilia of Olympiad 6, 3 or thereabouts. When Varro asked Tarutius for more specific information, the latter based his answers strictly on celestial omens and astrology, which must have been the reason that Varro consulted him in the first place. He identified the conception of Romulus with an ecliptic conjunction of the sun and moon that he mistakenly believed to be a total eclipse of the sun, about eighteen years before the foundation of Rome. The birth of Romulus then followed the conception by about 273 days, that is, ten sidereal months, the mean length of a normal pregnancy according to standard astrological tradition. The date of the foundation itself was likewise determined astrologically, following from the significance of the configuration shown in the horoscope preserved in Solinus and the Planudean recension of Lydus, although the sun must originally have been in Libra, close to, if not exactly at, the autumnal equinox. Finally, it is possible that, according to the tables used by Tarutius, the sun was at the equinox on 9 Pharmouthi of Olympiad 6, 3, and that in itself may account for his choice of a date about six months earlier than the traditional foundation at the Parilia.

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