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Urania and the celestial sphere. Marble, I century CE, from Villa Adriana, Tivoli. Pio Clementino Museum, Vatican Museums. Photo by Jastrow—Wikimedia Commons

Leonardo Magini

Stars, Myths and Rituals in Etruscan Rome

Foreword by Germaine Aujac

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ISSN 2199-3882 ISSN 2199-3890 (electronic)
ISBN 978-3-319-07265-4 ISBN 978-3-319-07266-1 (eBook)
DOI 10.1007/978-3-319-07266-1

Library of Congress Control Number: 2014942629

Springer Cham Heidelberg New York Dordrecht London

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Printed on acid-free paper

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For Alessandro

*Nessuna umana investigazione
si puo' dimandare vera scienza,
s'essa non passa per le matematiche
dimostrazioni.
(No human investigation can be called
true science without going through
the mathematical tests.)*

Leonardo da Vinci

Foreword

Etrusco-Roman Astronomy is a brilliant summation of Leonardo Magini's prior works. Since his earliest endeavours (*Le Feste di Venere*, 1996, *Astronomy and Calendar in Ancient Rome*, 2001), not to mention his works on the Etruscan language (*La Parola degli Etruschi*, 1987 and *L'Etrusco, lingua dall'Oriente Indoeuropeo*, 2007), all of his research has amply demonstrated the author's interest in the origins of Roman civilization, and just how much Roman civilization owes to the culture of its Etruscan neighbours.

Magini draws on an impressive number of Latin and Greek texts which, though indubitably hailing from later periods, nevertheless make up a well-consolidated body of opinion. He collates astronomical notions and data on religious feast days to highlight the importance of the revised calendar traditionally ascribed to the legendary king Numa Pompilius, who is generally assumed to have been the heir to the founder of Rome. Whereas the year in use under Romulus had but 10 lunar months—a characteristic that soon put it out of kilter with the Sun's motion—Numa corrected this error not just by adding a further two lunar months, but by establishing a cycle of three times 8 years which, using different numbers of intercalated days, almost wholly restored the year's concordance with the solar year.

The cycle attributed to Numa is an extremely close fit to the motion of the major objects in the sky—the Sun, the Moon and Venus—and could be used to predict eclipses of the Sun and Moon. In other words, it was a worthy successor to the cycle of Saros, a fact that itself points to a Mesopotamian influence. Did not the Greek historian Herodotus say that the Etruscans were descended from immigrants who originated in Lydia?

Even relative neophytes to astronomical issues will be fascinated by the relationship that the author establishes and proves between the passage of the year as marked by the Numan cycle, and the cadence of the many religious celebrations that set apart the *fasti* (festive days, and the only days when the courts were in session in Ancient Rome) from normal days (when people had to work, and justice could not be dispensed). Every feast day offers up an “explanation” to the passage of the heavenly bodies.

Among the merits of this groundbreaking work is its clear demonstration of the extraordinary astronomical knowledge contained within the Roman religious calendar, which was established at Rome's very beginnings. Though by no means certain, it is certainly legitimate to presume that this knowledge was strongly influenced by Etruscan knowledge, and, before them, by the science of the Chaldeans. The author's lines of enquiry should be considered as an initial proof, to be confirmed by additional research.

Germaine Aujac

Preface: A Letter

To my friends, Professors Franco Aspesi, Gioachino Chiarini and Mario Negri¹

Distinguished professors and dear friends,

As you have followed my research into the astronomical underpinnings of the Numan calendar right from the start, I send you a monograph that I have written to address multiple objectives.

First of all, the essay brings together the fruits of several years' study, as illustrated in my books *Le Feste di Venere* and *Astronomy and Calendar in Ancient Rome*,² supported by the indispensable writings of authors of antiquity and astronomical calculations. This essay also draws on fresh calculations and analyses to build on my previous work and illustrates more recent developments, including a new approach here and there. Last but not least, the essay opens up a number of avenues for further research which—I am the first to admit—a sense of satiety with the work I have undertaken thus far leads me to believe will be for someone else to pursue. I am only too happy to sketch out these avenues so that fresh blood may consolidate and advance research into the now burgeoning discipline of Etrusco-Roman astronomy.

I would, however, like to take this opportunity to make a few remarks regarding the point at which, I believe, we have arrived.

First, the sum of astronomical and astrological knowledge held by the anonymous inventor of the Numan calendar is codified in the temporal rhythms of the year's festivities, fitted into an appropriate system of intercalation.

Second, the rhythm of these cadences, associated with reading and interpreting the myths and rites associated with the festivities, allows us to track backwards to real astral movements.

¹ This letter, written in 2003 for the first edition of *Astronomia etrusco-romana* (*Etrusco-Roman astronomy*), was also sent to Vittorio Castellani, who passed away in 2006.

² See, respectively, Magini 1996 and Magini 2001.

Third, the astronomical knowledge thus codified includes: the motion of Venus; the periodicity of solar and lunar eclipses; the revolution of the line of lunar nodes; the passage of nodes from the Points of Aries and Libra, and the effect that this has on the motion of the Moon; the revolution of the line of apsides; and the relation between the synodical and sidereal periods of the superior planets. I touch only briefly on areas where certainty remains elusive: the rhythm of the motion of the superior planets, particularly Jupiter and Saturn, and the position of zero degrees Aries. Lastly, work still needs to be done to clarify the astronomical significance of the nundinal letters, the true significance of the days of Agonalia (March 17, May 21, December 11 and January 9), and of the opening of the *mundus* (August 24, October 5 and November 8).

Fourth, we know without a shadow of doubt that there was an astrological tradition in Rome, among other things, because of the protection afforded to women—the guarantors of the continuity of the species—by the two most “feminine” of celestial bodies since the proto-history of astrology: the Moon and Venus. This tradition is further evident in the bonds between the public exchequer and the Temple of Saturn from 497 BCE (at the very latest) onwards.

Fifth, last, and most important of all, the very rhythm of public and private life during the time of the Roman Kingdom was regulated by the motion of celestial bodies. Public life was ruled by the *Vestalia*, the *Regifugium* and the *interrex*, and by the *October Equus*, the *Fordicidia* and the *Parilia*.³ Private life was wholly ruled by the celestial bodies. Conception, the seventh month of pregnancy, preparation for birth, birth itself, namegiving, all of the rites of passage associated with puberty, marriage and conception anew, all of which are notable life landmarks—particularly in the lives of women—were cadenced by celestial movements and the rhythm of their associated festivities: *Matralia* and *Carmentalia*, *Matronalia* and *Liberalia*, *Tigillum sororium* and *Anna Perenna*, *Veneralia* and, once again, *Matralia*.⁴ Indeed, the circularity of human life on Earth reflects the circularity of the motion of the celestial bodies in the heavens.

Having established these foundations, our enquiry must shift to their origins. An initial hypothesis is that these foundations descend directly from the prehistory of the Roman people. Such a hypothesis, however, flies in the face of the entire weight of tradition, which has it that King Numa was responsible for establishing the calendar, intercalation,⁵ and a great many of the feast days. There is also the matter of explaining why no other ancient Italian population, despite significant similarities in many respects, was able during the same period of time to achieve a similar level of astronomical and calendar knowledge. Indeed, how could it have been possible in historical times for the Romans to “misplace” the origins of a

³ See Magini 2001, pp. 59–67 and 93–104; these topics are covered, respectively, in Chaps. 16 and 17.

⁴ See Magini 1996, *passim*; in this book, the topic is covered in Chaps. 10 and 11.

⁵ Brought in *sacrorum causa*, “for religious feast days”; see Valerius Antias, fr. 5 Peter apud Macrobius, *Saturnalia*, 1.13.20.

cultural and intellectual heritage acquired through endless years of research and complex mental processes, ever since prehistoric times?

An alternative hypothesis would lead us to a source from outside the Roman sphere. Possible solutions may be found in similarities between the *Regifugium-interrex-Vestalia* and the *sar pui*, the “substitution of the king” ritual from Ancient Babylon, where the same landmarks in astronomical knowledge were attained a number of centuries earlier. If this association proves to be correct, the question arises as to how this knowledge and its vast store of rituals and conceptions managed to reach Rome, leapfrogging the Greek world.

It is my personal belief that the answer lies elsewhere. I believe that the answer is to be found in the Etruscan origin of the names of the great many festivities associated with astronomical timings. The Etruscans had the *Nonae*, the name *Ides*, the *nundinae*, the *clavus annalis*, and—this is the clincher—the Capitoline triad of Jupiter, Juno and Minerva. This is where we should seek the “barbarian superior to Pythagoras” who, according to Plutarch, put the finishing touches to educating the Roman king. And yet this adds a further layer of complexity, for Pythagoras himself is complex enough: known as “Tyrrhenian” by birth and upbringing, Pythagoras studied geometry, mathematics and astronomy in Egypt and Mesopotamia, before reputedly teaching so much to Numa—though not, it turns out, the calendar to which the king would lend his name.⁶

The picture only becomes much clearer if we accept that the Etruscans hailed from the Orient—from Lydia, as Herodotus claims. This would appear to be confirmed by “the sale of Sardians”, that is to say, the Etruscans whom Romulus captured at Veio.⁷ First, the Mesopotamian/Anatolian area had achieved a whole sequence of scientific achievements and an elaborate worldview that was the culmination of at least two millennia of development. Thereafter, over what can in no way be described as a brief period of time, an educated and cultured élite belonging to a population living on the fringes of this area acquired these notions of astronomy and astrology, along with a worldview that gave them a rounded meaning. Finally, as events unfolded, this population—including its élite—travelled to Italy, defeated Rome, and as conquerors imposed a calendar that, far from being “agricultural/pastoral” as has long been claimed, was based on a surprisingly sophisticated accretion of astronomical

⁶ On the barbarian, see Plutarch, *Life of Numa*, 1.

On the birth and upbringing of Pythagoras, see Aristoxenus of Tarentum, fr. 1, in F. H. G., p. 272; Diogenes Laertius, 8.1; Neanthes of Cyzicus, fr. 30, in F. G. H. 3, p. 10 (the Tyrrhenians/Pelasgians of Samos and Lemnos, to whom these three authors refer, are the Eastern branch of the Tyrrhenians/Etruscans; these branches were united not just by language but by their iron technology).

On his education, Plutarch, *Conviviales Quaestiones* 8.727B; on P.’s knowledge, Giamblicus, *Vita Pythagorae*; on relations between P. and Numa, Plutarch, *Numa*, passim.

⁷ Herodotus, *Histories*, 1.94.

On the “Sardians for sale”, Plutarch, *Romanae Quaestiones*, 53; Sardis was the capital of the kingdom of Lydia.

knowledge. This knowledge was initially held by the élite; given its complexity, it was impossible to pass it down through the ensuing centuries.

Pursuit of this line of enquiry—which today would be validated by examination of “the genetic data of the populations in potential areas of origin”, to quote Cavalli-Sforza⁸—would also explain the sudden step change in the Roman calendar, from the mysterious, cobbled-together 304-day Romulean Calendar (unless behind this astronomically meaningless number lies a 61-day interval between significant astronomical phenomena, but then what phenomena would they be?)⁹ to the complex and sophisticated calendar adopted by the following generation (i.e. Numa’s generation), which was light years ahead of the preceding simple—and basic—lunar calendar.

I believe that the same path was followed by other customs, beliefs and ideas regarding the relationship between men and divinities or, more specifically, the life of man and celestial messages. I refer to haruspicy: divination through the examination of sheep livers, the various parts of which represented parts of the heavens ruled by the planets and constellations, each of which in turn represented a divine being; I refer to brontosopic calendars, in which every day of the year corresponded to a particular sign belonging to a particular god; and I refer to the “the curse of the number nineteen”. Indeed, in Ancient Babylon, where every single month was 30 days long, the number 49 was bad luck: “The week of weeks was determined by the 49th day after every new Moon—in a 30-day month, that meant that it ran from the 19th day of the following month. Hemerologists considered this nineteenth day to be an *umu limnu*, an inauspicious day... The Babylonians avoided the ill-omened 19th, and even went so far as to write the number as XX.I.Ial, i.e. 20 minus 1.”¹⁰

This credence may have resurfaced in Etruria;¹¹ I say “may have”—with the stress on its uncertainty—because as with almost everything to do with Etruria, studies in the field, most especially in Italy, have suffered from the calamitous impact that ideology is capable of having on science. The credence, however, certainly does reappear in Ancient Rome, in the form of *undeviginti*, literally “one-away-from-twenty”, despite the fact that Rome had no need for such counting tricks, given that it had no residual trace either of the concepts of a “week of weeks”, nor of 30-day months...

Above all, I believe it impossible to attribute such a path of transmission—from the East to Etruria and on to Rome—to a fashion for “orientalizing”. Fashion and

⁸ Cavalli Sforza 2000, p. 705.

⁹ A putative answer is presented in Chaps. 26 and 27.

¹⁰ On haruspicy, see Nougayrol 1955, pp. 509 and following; also, see Nougayrol 1982, p. 9, no. 7, and pp. 104 and 107; Bottéro 1982, pp. 73–214.

On brontosopic calendars, see Joannes Lydus, *de ostentis*, passim; Bottéro 1982, pp. 108–11; Pettinato 1998, pp. 196–8.

On the “curse of the number 19”, see Schiaparelli 1997–1998, Vol. I, p. 299.

¹¹ Caffarello 1975, p. 110; with reference to Trombetti, Pallottino and Pfiffig, though in such cases *repetita not iuvant*.

Fig. 1 “Orientalizing” patera. Gilded silver, 19.4 cm in diameter, seventh century BCE, Cerveteri, Regolini-Galassi tomb—Vatican Museum, Rome. Courtesy Vatican Museum

bragging have little use for Calendars; Calendars are not Assyrian paterae (Fig. 1) or Urartean cauldrons, as is evident from two thousand years of European calendar history. Fashion cannot explain why people have studied, observed and recorded the movements and rhythms of the stars to try and understand future events; why the planet Venus was considered to be the representative of a feminine divinity of evening love—Ishtar in Mesopotamia and Venus in Rome, and a divine protector of morning warfare—Ishtar once again, plus Mater Matuta; and, with regard to celestial bodies in general—fixed stars and planets, the Moon and the Sun—considering them as heaven’s corollaries to the gods, an expression of their desires which it is our lot to interpret.

It could hardly have been turbocharged Villanovans (turbocharged by what, pray tell?)—and I say this in open dispute with the triumphant curators of exhibitions in Bologna and Venice¹²—who came up with the idea of a direct and binding relationship between the macro-cosmos and the micro-cosmos, between

¹² *Principi etruschi tra Mediterraneo ed Europa*, conceived and curated by G. Bartoloni, F. Delpino, C. Morigi Govi, and G. Sassatelli, Museo Civico Archeologico, Bologna, October 2000—April 2001. *Gli Etruschi*, curated by M. Torelli, Palazzo Grassi, Venice, November 2000—April 2001.

the motion of the celestial bodies across the sky and the life of men on this Earth. If, as Seneca writes in historical times,

This is the difference between us Romans and the Etruscans [...]: We believe that lightning is caused by clouds colliding, whereas they believe that clouds collide in order to create lightning. Since they attribute everything to gods, they are led to believe not that events have a meaning because they have happened, but that they happen in order to express a meaning,¹³

it is clear that these approaches are so very distant that not even the preceding millennium, with its mingling of Roman and Etruscan peoples and cultures, was able to generate a common conception of the world.

Where we may find such a common conception, however—in my opinion, though perhaps not in yours—is in the way that Seneca depicts the Etruscans, and the way that the Babylonians are portrayed in the “Diviners’ Manual”:

- (23) [...] their good and their evil portents are in harmony (i.e. confirming each other).
- (24) the signs in the sky just as those on the Earth give us signals [...]
- (37) [...] their good and evil portents
- (38) are in harmony. The signs on Earth just as those in the sky give us signals.
- (39) sky and Earth both produce portents:
- (40) though appearing separately, they are not separate (because) sky and Earth are related.
- (41) a sign that portends evil in the sky is (also) evil on Earth,
- (42) one that portends evil on Earth is evil in the sky [...]
- (53) [...] in summa 25 tablets with signs (occurring) in the sky and on Earth
- (54) whose good and evil portents are in harmony (?)
- (55) you will find in them every sign that has occurred in the sky
- (56) (and) has been observed on Earth [...]¹⁴

There is no need for me to repeat here words pronounced by others—far more eloquently than I could possibly manage—regarding the pre-scientific value (in the sense of preparatory to a scientific approach) of a mental outlook of this nature: Pannekoek (a historian of science) and Bottéro¹⁵ (a historian of civilization) have expounded upon this in exemplary and illuminating fashion.

What I would like to do, however, is offer some observations on Bottéro’s comment: “The Greeks were not born into a world of Primates, in a kind of barren, cultural vacuum; borrowing an expression uttered by an Ancient Greek on a

¹³ Seneca, *Naturales Quaestiones*, 2.32.2: *Hoc inter nos et Tuscos [...] interest: nos putamus, quia nubes collisae sunt, fulmina emitti; ipsi existimant nubes collidi, ut fulmina emittantur. Nam cum omnia ad deum referant, in ea opinione sunt tanquam non, quia facta sunt, significant, sed quia significatura sunt, fiant.*

¹⁴ Oppenheim 1974, pp. 197–211.

¹⁵ Pannekoek 1989, pp. 36–81; Bottéro 1982, pp. 187–211.

different topic, what they did was ‘they transformed’ what they learned ‘into something more beautiful’. The things that they thus transformed were ‘borrowed from the Barbarians’, especially, notes the author, from the Ancient Mesopotamians (*Epinomides*, 987e-988a and 987a).”

I believe that, similarly, the Etruscans were not born into a world of Primates; a world in which the only civilized people were rich but uncultured gentlemen from the East, from whom they could import luxury items, while from the poor but wise Greeks they were able to plunder—more than learn—everything else. The Etruscans too had their sum of knowledge, their own *weltanschauung*, which they attempted to bequeath to the Romans, albeit with limited success. Much of what we are able to reconstruct, such as the Etruscan calendar, survived its creators but in the process lost almost all of its meaning for the people who continued to use it. If my reconstruction is correct, the label of “Roman” rather than “Etrusco-Roman” astronomy would be an umpteenth abuse of power, of history being written by the winner.

I fear that I may have strayed from my own sphere of competence; I shall rein myself back in. Indeed, I wish to take up the thread from where and how I began, from the “planned coincidence” that first led me to undertake a whole series of minor calculations on the calendar, and to note that in the Numan calendar 71 days elapse between the *Veneralia* and the *Matralia*. This process led me to read (frankly absurd) books such as Graves’ *The White Goddess*. I may never have finished reading that book, but I recall perfectly the day when I bought it, opened it, turned to the index, and looked under Venus to find Venus (planet). The first reference, on page 293 of my Italian edition, says: “72 [...] is also linked to the Goddess astronomically, by the 72-day season during which her planet Venus moves successively from maximum eastern elongation to inferior conjunction (its closest approach to Earth) and thence to maximum west elongation.”¹⁶ This was what first triggered my research 7 or 8 years ago. Ever since then, I have been unsure quite where my sphere of competence begins and ends.

One thing I do know, however, is that I haven’t invented a bean of all this. All of my reconstructions are based on well-known, if not to say renowned, documents. I have based my theses on nothing new—nothing that hasn’t already been known and been studied for at least two thousand years. I believe that I am the first person—to my knowledge, at least—to prove the existence of a wealth of scientific knowledge in the classical sources I have used and interpreted, merely by investigating the anthropological, mythical and religious data that they contain. All of this was revealed through an investigation of the astronomical underpinnings of the Numan calendar.

One further thought springs to mind. Why was it that Mesopotamian astronomy was “discovered” a century or more before Roman astronomy? Was it simply because of the long-held credence that the Romans knew nothing of astronomy? Can conventional thinking really have had such a negative influence?

¹⁶ Graves 1992.

Mesopotamian astronomy was “discovered” because scholars were open-minded, notwithstanding only minimal previous evidence of the Chaldeans’ astronomical knowledge. We may legitimately wonder how open-minded scholars have been regarding Ancient Rome, and how much they have been influenced—as modern-day scholars of the Etruscans continue to be, at least in Italy—by a preconceived ideological approach.

It remains for me to thank you warmly for taking the time to read this work, in the hope that it proves to be interesting and enlightening.

Torrimpietra, March 2002–2014

Leonardo Magini

Contents

1	The Beginning of Astronomical Time and the <i>Feriae Martis</i>	1
2	The Numan Year, the Romulean Year and the <i>Feriale Antiquissimum</i>	5
3	The Names of Etruscan and Roman Months	9
4	The Numan Cycle.	15
5	The Numan Year and Cycle, and the Motion of the Moon	19
6	The Numan Cycle and the Movements of the Sun, the Moon and Venus	23
7	The Solar New Year on March 8 or 9	25
8	The Movements of the Moon and Venus and the Language of Myth	27
9	The Motion of Venus	33
10	The Movements of Venus (and the Moon), Female Fertility, and the Feast Days of <i>Veneralia</i> and <i>Matralia</i>	45
11	The Length of Pregnancy, the Solar New Year, and the Feasts of <i>Matronalia</i> and <i>Liberalia</i>	53
12	The Solstice Feasts: <i>Fors Fortuna</i> and <i>Saturnalia</i>.	59

13	Solar Eclipses, Lunar Eclipses and the Cycle of Saros	65
14	The Saros Cycle and the Feast Days of <i>Feriae Martis</i> and <i>Anna Perenna</i>	73
15	The Frequency of Solar and Lunar Eclipses and the Festivities of the Numan Year	77
16	Roman and Mesopotamian Eclipses: The Feast Days of the <i>Regifugium</i> and <i>Vestalia</i>	91
17	The Revolution of the Line of Nodes and the Feast Days of <i>October Equus</i>, <i>Fordicidia</i> and <i>Parilia</i>	95
18	The Ascendant Node at the First Point of Aries and the Festival of <i>Summanus</i>.	99
19	The Revolution of the Line of Apsides, and the Feast of <i>Compitalia</i>	103
20	Composition of the Revolutions of the Lines of Nodes and of Apsides	109
21	The Numan Cycle as a Reference Framework for Celestial Motion	111
22	The Movements of the Superior Planets and the <i>Ancilia</i>, the “Sacred Shields”	117
23	The Heavens of the Fixed Stars and Their Custodian, <i>Ianus</i>	123
24	From the <i>Robigalia</i> on April 25 to the Entrance of the Sun in Aries for the Festivity of <i>Anna Perenna</i> on March 15	131
25	From the Entrance of the Sun in Aries to Its Entrance in Pisces for the <i>Terminalia</i> on February 23, together with the Vespertine Rise of Arcturus.	135
26	The Vespertine Rising of Arcturus for the <i>Terminalia</i> on February 23 and the Relationship between the Romulean and Numan Calendars	141

27	Reform of the Romulean Year and the Transition to the Numan Year.	145
28	(Inevitable) Conclusion: <i>Per Aspera Ad Astra</i>	151
	Post Scriptum: A Number of Observations, with Hindsight.	153
	Bibliography	175
	Index	179

Figures

Fig. 1.1	Mars and Rhea Silvia	2
Fig. 2.1	The month of April	6
Fig. 8.1	<i>Fortuna</i> /Tyche	28
Fig. 8.2	The three Graces, or <i>Fortuna</i> and her handmaidens	28
Fig. 8.3	The moon waxing and waning over an entire lunation.	29
Fig. 8.4	The planet Venus as the evening star, <i>Vesper</i>	29
Fig. 8.5	Venus <i>Callipyge</i> posing as <i>Fortuna Respiciens</i>	30
Fig. 8.6	The apparent motion of Venus between November 1957 and April 1958	31
Fig. 9.1	The motion of Venus around the Sun viewed from the Earth	34
Fig. 9.2	The motion of Venus around the Sun viewed from the Earth	34
Fig. 9.3	A series of 12 subsequent intervals of Venus's appearance . . .	36
Fig. 9.4	Two subsequent intervals of Venus's appearance as the evening star, 8 years apart	38
Fig. 9.5	The Venus pentagram	38
Fig. 9.6	The Venus pentagram in an ideographic Script.	39
Fig. 9.7	The Venus pentagram next to a nude female divinity	39
Fig. 9.8	The Venus pentagram on a Minoan seal	39
Fig. 9.9	The Venus pentagram on an hydria.	40
Fig. 9.10	The Venus pentagram in a matrimonial setting (?)	40
Fig. 9.11	Venus pentagram in a bellicose setting	40
Fig. 9.12	The Venus pentagram on a jewel	41
Fig. 9.13	The Venus pentagram on an askos	41
Fig. 9.14	The Venus pentagram and a gold myrtle wreath.	41
Fig. 9.15	The Venus pentagram on an Chian jar neck.	42
Fig. 9.16	The Venus pentagram on a Roman Hellenistic coin	42

Fig. 10.1	The nuptials of Heracles and Hebe	46
Fig. 10.2	The Secundus and Projecta wedding casket	48
Fig. 10.3	The twin temples of <i>Fortuna</i> and <i>Mater Matuta</i> : a Republican era reconstruction	49
Fig. 10.4	<i>Mater Matuta</i>	50
Fig. 13.1	Solar and Lunar eclipses—from Johannes de Sacrobosco (John of Holywood), <i>Sphaera Mundi</i> , Venice 1490	65
Fig. 13.2	Solar eclipse.	66
Fig. 13.3	Phases of the solar eclipse that occurred on 24 October 1995, photographed by G. Vanin	66
Fig. 13.4	Lunar eclipse	67
Fig. 13.5	Phases of the total lunar eclipse that occurred on 17 October 1986, photographed by C. Zanandrea	67
Fig. 13.6	The lunar nodes	68
Fig. 13.7	When no eclipse takes place.	68
Fig. 13.8	The retrograde revolution of the lunar nodes along the ecliptic	68
Fig. 13.9	The so-called “Saros-Canon”, a Babylonian tablet dating from the third century BCE	70
Fig. 13.10	Subsequent lunar eclipses visible from North Europe, predicted between the years 1538 and 1570—from Petrus Apianus (Peter Bienewitz), <i>Cosmographia</i> , Paris 1551	71
Fig. 13.11	Four lunar eclipses one cycle of Saros apart from one another—8 February 1506, 19 February 1524, 1 March 1542 and 12 March 1560—as shown today on the NASA web site.	72
Fig. 16.1	A schematic reconstruction of Central Ancient Rome	94
Fig. 17.1	The Head and Tail of the Dragon in a “modern” representation—from Albumasar, <i>de magnis coniunctionibus</i> , Augusta Vindelicorum, 1489	96
Fig. 17.2	The Moon’s Nodes, i.e. the Head and Tail of the Dragon—from Athanasius Kircher, <i>Ars Magna Lucis et Umbrae</i> , Amsterdam 1671	96
Fig. 18.1	The Earth’s motion around the Sun.	100
Fig. 18.2	The lunar nodes and their passage from the Points of Aries and Libra.	100
Fig. 18.3	The Moon’s standstills.	101
Fig. 19.1	The Moon at perigee and apogee	104
Fig. 19.2	The Moon’s orbit around the Earth, the line of apsides and the Black Moon	104
Fig. 21.1	Example of the periodical return of a superior planet to the same position with respect to the Sun and the fixed stars.	114

Fig. 22.1	The <i>ancilia</i> that the Salii carried in their processions	120
Fig. 22.2	The hippopede	121
Fig. 23.1	The “great conjunction” of Saturn and Jupiter—from Johannes Kepler, <i>De Stella Nova in Pede</i> <i>Serpentarii</i> , 1604	124
Fig. 23.2	The Mesopotamian cosmological vision in biblical interpretation	127
Fig. 23.3	The oldest known Roman coin, fourth century BCE	130
Fig. 25.1	<i>Arcturus</i> , the “guardian of the (Great) Bear”, and <i>Ursa Major</i> —from Andrea Cellarius, <i>Atlas Coelestis seu Harmonia Macrocosmica</i> , 1660.	137
Fig. 25.2	The <i>disciplina etrusca</i> , the division of heavenly space, the vespertine rising of <i>Arcturus</i> on 23 February and the morning rise on 13 September	137
Fig. 25.3	The temple of Jupiter Capitoline: plan and hypothetical elevation	138
Fig. 25.4	The constellation of the “great swallow” in Mesopotamian astronomy.	139

Tables

Table 3.1	Names of months in Old Persian and Etruscan.	11
Table 4.1	The Numan cycle.	17
Table 6.1	The Numan cycle and the movements of the Sun, the Moon and Venus.	24
Table 10.1	The movements of Venus and female fertility festivities. . . .	52
Table 11.1	Roman feasts, life landmarks and the motion of heavenly bodies	56
Table 13.1	The Saros cycle	69
Table 15.1	Solar eclipses in the Saros cycle and the initial 19 years of the Numan cycle	80
Table 15.2	Lunar eclipses in the Saros cycle and the initial 19 years of the Numan cycle	81
Table 15.3	Theoretical and historical eclipses	86
Table 15.4	The Saros cycle in the first 19 years of the Numan cycle.	89
Table 20.1	Composition of the revolutions of the lines of nodes and of apsides	109
Table 21.1	Planetary period relations	113
Table 21.2	Planetary period relations with the days, months and years of the Numan cycle in which each planet returns to its initial position.	113
Table 27.1	Correspondences between the Romulean and Numan years.	148

Notes

Chaps. 1 and 21 have been excerpted from the paper *Astronomia e Calendario nell'antica Roma*, given at the First Conference of the Italian Archeo-astronomy Society, in Padua, on 29 September 2001 (see *Rivista Italiana di Archeoastronomia*, vol. I, 2003, pp. 107–19).

Chapter 3 is from the paper *L'etrusco, lingua dell'Oriente Indoeuropeo I*, given at the Milan Glottological Fellowship on 14 June 1999 (see *Atti del Sodalizio Glottologico Milanese*, Vol. XXXIX–XL, 1998–9, pp. 229–49; reprinted in Magini 2007, pp. 21–7).

Chapters 4, 13–18 are extracted from *Astronomy and Calendar in Ancient Rome—The Eclipse Festivals*, Rome 2001; Chaps. 4, 6, 13, 14, 17, 9 and 10 have previously appeared in the paper *Cicli astronomici e feste del calendario di Roma antica*, given at the Conference on the History of Astronomy at the Capodimonte-Naples Observatory on 27 September 1997.

Chapters 7–11 are extracted from *Le feste di Venere—Fertilità femminile e configurazioni astrali nel calendario di Roma antica*, Rome 1996, and from *I moti di Venere e le feste delle donne nel calendario di Roma antica*, given at the Fourth Conference of the Italian Archeoastronomy Society, in Lerici on 24–25 settembre 2004 (see “*Rivista Italiana di Archeoastronomia*”, vol. IV, 2006, pp. 123–34).

Chapters 8 and 23 are from the paper *L'etrusco, lingua dell'Oriente Indoeuropeo IV: nomi di dèi e moti di astri*, given at the Milan Glottological Fellowship on 4 March 2002 (see *Atti del Sodalizio Glottologico Milanese*, Vol. XLIII–XLIV, 2002–3; pp. 49–62).

Chapter 12 is taken from the paper *Le feste dei solstizi in Roma antica*, given at the Seventh Conference of the Italian Archeoastronomy Society, in Rome, october 2007, being printed; see also *La dea bendata—lo sciamanesimo nell'antica Roma*, 2008, pp. 207–17.

Chapter 16 is taken from the paper *Eclissi e regalità: un rapporto difficile (Babilonia 1.900 a.C.—Roma 1.600 d.C.)*, given at the Third Conference of the Italian Archeo-astronomy Society, Capodimonte Observatory, Naples, 26–27 settembre 2003, in “*Rivista Italiana di Archeoastronomia*”, III. 2005, pp. 1–5.

Chapter 26 is taken from the paper *Il calendario romuleo e i suoi rapporti con i fenomeni astronomici*, given at the Second Conference of the Italian Archeoastronomy Society, Monte Porzio Catone, on 28 September 2002 (see *Atti del II Congresso di Archeoastronomia*, vol. II, 2004, pp. 77–81); see also *The astronomical foundations of the Romulean calendar and its relationship with the Numan calendar: an hypothesis*, in *Automata—Rivista di Natura, Scienza e Tecnica del mondo antico*, n. 3, « l'Erma » di Bretschneider Editore, Roma 2009.

Chapter 27 is taken from the paper *Il passaggio dall'anno romuleo all'anno umano e lo slittamento del solstizio d'inverno* given at the Tenth Conference of the Italian Archeo-astronomy Society, Trinitapoli, 22–23 ottobre 2010, being printed.

Other topics in this book have previously been covered in my seminar *I fondamenti astronomici del calendario umano*: Anna Perenna, October Equus, Regifugium e Vestalia, given at the University of Siena on 22 March 1999, and at lessons held at the Roma Tre University on 7 May 1998, at the Milan University Institute of Modern Languages—IULM, on 4 March 2002, and at the University of Siena on 17–18 April 2002.

Parameters Adopted for Calculations

I have adopted the following parameters in my calculations:

Sidereal year	365.2422	average solar days
Sidereal month	27.3216	average solar days
Synodical month	29.5306	average solar days
Draconitic month	27.2122	average solar days
Anomalistic month	27.5546	average solar days
Angular velocity of the Sun	0.9856°	per day
Angular velocity of the Moon	13.1764°	per day
The Moon's variance from the Sun	12.1908°	per day
Retrograde revolution of lunar nodes with respect to the fixed stars	6,793.48	days, equivalent to – 0.05299° per day
The Sun passes through a lunar node every	173.31	days
Direct revolution of the apsides with respect to the fixed stars	3,232.61	days, equivalent to + 0.11135° per day