



ASTROLOGY AND ASTRONOMY IN IRAN

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i. History of astronomy in Iran.

ii. Astronomy and astrology in the Sasanian period.

iii. Astrology in Islamic times.

i. History of Astronomy in Iran

The Achaemenid and Parthian periods. In the earlier portions of the Avesta there is no trace of mathematical astronomy (which in any case, would be inappropriate in such a context) and only a few hints at some sort of observational astronomy involving the sun, the moon, and certain fixed stars. See *Yašts* 6 (to the sun), 7 (to the moon), 8 (to Tištrya), and 10 (to Miθra). The earliest mathematical astronomy that developed in territory under Iranian control was that which originated in Mesopotamia, was improved during the Achaemenid period, and culminated in the Babylonian solar, lunar, and planetary theories of the Seleucid and Parthian periods. That some of this Babylonian astronomy and the astral omen literature that was associated with it was adopted by scholars in Iran itself is implied by its transmission to India



in the late fifth or early fourth century B.C. and by the preservation of Babylonian methods of interpreting gnomon-shadows. This is included in the Pahlavi text *Šāyast nē šāyast*, chap. 21 (E. W. West, *Pahlavi Texts* I, SBE 5, pp. 397-400). We have no direct evidence, however, that would clarify the nature of Iranian astronomy during the Achaemenid period.

In the Parthian period, however, we do find evidence from eastern Iran that Babylonian mathematical astronomy and astral omens continued to be studied and that Indian concepts had begun to be influential. For the first of these hypotheses the evidence consists of planetary omens reported by the Chinese historian Ssū-ma Chien (ca. 100 B.C.) and of the structure of Early Han planetary theory; both the omens and the theory seem to have originated in Mesopotamia. The evidence for the second hypothesis is found in the Buddhist Sanskrit texts of which manuscripts were preserved in Central Asia or which were translated into Chinese or into Central Asian languages in the second century A.D. and later. In some of these texts—particularly the *Śārdūlakarṇāvadāna* and the *Mahāmāyūrīvidyārājñī*—there are included both Indian adaptations of Mesopotamian astronomy and astral omens and lists of the Indian *nakṣatras*. The latter were originally 27 or 28 constellations, in one of which the moon appeared to be on each night of a sidereal month; they had become, in the second half of the first millennium B.C., 27 arcs of 13;20° each along the ecliptic.

The Sasanian period. In the third century A.D. the first two Sasanian rulers sponsored Pahlavi translations of Greek and Sanskrit works on astronomy and astrology. Among the texts so translated were the Greek astrological treatises of Dorotheus of Sidon and Vettius Valens, and the astronomical *Syntaxis mathematike* (*Almagest*) of Ptolemy, as well as a Sanskrit astrological work by one Farmāsb (Parameśvara ?). These Pahlavi translations are now lost, but we do have Arabic translations of the Pahlavi version of Dorotheus of Sidon and of a Sasanian astrological treatise entitled *Ketāb Zaradošt* which clearly illustrate the fact that Sasanian science was indeed syncretic, based on both Greek and Indian sources. Arabic texts also preserve numerous fragments of other lost Pahlavi astronomical and astrological texts; and it appears probable that Sasanian scientists transmitted some Indian theories to Syria. From this evidence and from passages in the *Bundahišn* (a ninth-century compilation of older data) we can form some idea of the character of Sasanian astronomy. The astronomy of the *Bundahišn*, as befits a “popular” encyclopedia, was elementary and basically Indian; it devotes completely disproportionate space



to the *nakṣatras*, for instance, and repeats a primitive Indian explanation of the cinematics of the planets, according to which their motion is effected by cosmic chords.

But there existed a more professional astronomical literature in the Royal Tables (*Zīg ī šahryārān*), which are known to us only from citations in Arabic treatises, especially those of Bīrūnī. These allow us to distinguish three such Royal Tables. The first, composed in about 450, was dependent for the one parameter that we know to have been in it on the *Brāhmapakṣa* of Indian astronomy. The second was composed in 556, under Ḳosrow I Anōšīravān, on the basis of an Indian *Zīj al-arkand*, which evidently belonged to the *Ārdharātrikapakṣa*; for some unknown reason Ḳosrow's astronomers preferred this work to Ptolemy's, which they also consulted. This version of the Royal Tables was used by Māšā'allāh (q.v.) in his *Ketāb fī'l-qerānāt wa'l-adyān wa'l-melal*, written about 810; from this we can see that it rejected the Indian method of finding the mean longitudes of the planets by means of their integer rotations in a *yuga* (world period), but retained many of their methods and parameters for correcting these mean longitudes to the true ones. The last set of Royal Tables was written under Yazdegerd III in the 630s or 640s and was translated into Arabic by Tamīmī; we have only fragments of this translation. From these it appears that the planetary equations were computed by means of the Indian model employing a double epicycle and that the dimensions of these epicycles were mostly taken from the *Ārdharātrikapakṣa*.

The early 'Abbasid period. The Sasanian tradition of astronomy apparently stayed alive until the middle of the ninth century. For many of the eighth and ninth-century Islamic astronomers, though they wrote in Arabic, came from Iran and used Pahlavi works on astronomy and astrology. The most important of these scientists:

1. Māšā'allāh b. Aṭarī, a Persian Jew from Baṣra, was one of the leading astrologers in the 'Abbasid caliphate from the founding of Baghdad in 145/762 (he helped to cast the city's horoscope) until his death in about 200/815. Besides preserving valuable information about Ḳosrow's Royal Tables he wrote a work on astronomy, translated into Latin as the *De elementis et orbibus coelestibus*. This work contains a unique exposition of a Syrian planetary theory that combines Aristotelian and Ptolemaic theories with what appear to be Indian ones transmitted through Sasanian Iran.

2. Nowbakht Ḥakīm was an astrologer from Iran contemporaneous with



Māšā'allāh; his son, Abū Sahl Faḏl, also an astrologer, was one of the leading intellectuals in the Baghdad of Hārūn al-Rašīd.

3. Abū Ḥafṣ 'Omar b. Farroḳān Ṭabarī was an astrologer from Ṭabarestān who translated Pahlavi works into Arabic (for example, the five books on astrology by Dorotheus of Sidon) and paraphrased Ptolemy's *Apotelesmatica* (*Tetrabiblos* Ar. *Ketāb al-arba'a*) in 812. The few astronomical theories with which his name is associated are Indian; he presumably derived them from Pahlavi books.

4. Aḥmad b. Moḥammad Nehāvandī made astronomical observations at Jondišāpūr in about 790.

5. Rabbān Ṭabarī translated Ptolemy's *Almagest* from Pahlavi into Arabic, if Abū Ma'shar is a credible witness.

6. Moḥammad b. Mūsā Ḳvārazmī, who wrote the first work on algebra in Arabic, composed a *Zīj al-sindhend*, based primarily on the versions of Brahmagupta's *Brāhmasphuṭasiddhānta* due to Fazārī and to Ya'qūb b. Ṭāreq, but in which some elements of the *Zīj al-šāh* of Yazdegerd III were included. Ḳvārazmī's *Zīj*, as modified by Abu'l-Qāsem Maslama Maḡrītī and Ebn al-Šaffār, was translated into Latin by Adelard of Bath in 1126. By this translations, and that of the commentary of Ebn al-Moṭannā by Hugh of Sanctalla, and by the *De rationibus tabularum* of Abraham b. Ezra, some knowledge of Sasanian astronomy was spread to medieval Europe. Ḳvārazamī's *Zīj* is also the basis of the astronomy of the Samaritans. A number of his minor works on observational instruments and on astronomical problems connected with the Muslim calendar and Islamic religious practices also survive.

7. Yaḥyā b. Abī Maṣṣūr, who came from Ṭabarestān to the court of al-Ma'mūn in Baghdad, was the principle author of the *al-Zīj al-momtaḥan*, which also was in part indebted to the *Zīj al-šāh*.

8. Ḳāled b. 'Abd-al-Malek from Marv-al-rūd was one of the leading astronomical observers under al-Ma'mūn.

9. **Abū Ma'shar** (171-272/787-886) came to Baghdad from Balk, and began the practice of astrology there in the 820s. In his *Ketāb al-olūf* and *Zīj al-hazārāt*, written between 226/840 and 246/860, he combined the Indian, Sasanian, and Greek astronomical traditions to which Islam was heir, and attributed the resulting amalgamation of disparate elements to an antediluvian Persian text that he claimed to have been written in the reign of Ṭahmūraṭ.



10. Ḥabaš Ḥāseb from Marv wrote at least two *zīj*s in the middle of the ninth century, which represent the beginnings of the development of trigonometry and the construction of new astronomical tables that characterized the next, otherwise Ptolemaic, period of Islamic astronomy.

11. Moḥammad Farḡānī, also in the middle of the ninth century, wrote an abridgement of Ptolemaic astronomy that was translated into Latin by John of Seville in 1135 and by Gerhard of Cremona in the 1170s; this work maintained its popularity in the west as an astronomical textbook into the sixteenth century. He was also the author of a partially preserved commentary on the *Zīj al-sindhend* of K̲vārazmī.

The tenth, eleventh, and twelfth centuries. Toward the end of the ninth century, through the efforts of Ḥabaš, Battānī, and others (primarily Syrians, and in particular those from Ḥarrān), Islamic astronomy was Ptolemaicized. The *Almagest* became the accepted text throughout the Middle East. Its parameters were sometimes modified because of new observational data or for other reasons; its mathematics were improved—especially its trigonometry, both plane and spherical, where the sine, cosine, and tangent functions were introduced (the first two from India). Methods of utilizing projections and analemmas in solving problems in spherical trigonometry were developed from material derived from India; and astronomical tables were made more elegant and useful. But the essential models and methods of Ptolemaic astronomy were not challenged. At the same time, although this involved an inherent conflict with Ptolemy, Aristotle's *De caelo* and *Metaphysics* were generally accepted as establishing the fundamentals of physical astronomy. From about 236/850 to 638/1240 Persian astronomers also followed Ptolemy; the only innovations they made were along the lines of those mentioned above, except that a few introduced some Indian or Sasanian material into their works, taken from the older Arabic texts or, in the case of much of the Indian material in Bīrūnī's works, directly from Sanskrit. The most prominent Persian astronomers of this period:

1. 'Abd-al-Raḥmān Ṣūfī (291-376/903-86) of Ray wrote the standard Arabic work on the constellations, the *Ketāb ṣowar al-kawākeb*. There exist three Persian translations of this; the first was made by K̲vāja Naṣīr-al-dīn Ṭūsī in 1250, while the other two date from the seventeenth century.

2. Abu'l-Wafā' Būzjānī (328-388/940-98) wrote, among other things, *al-Zīj al-wāzeḥ*, which was wrongly believed in the last century to have an advanced



lunar theory.

3. Kūšyār b. Labbān Jillī (of Gīlān), who was an important astrologer and mathematician, composed *al-Zīj al-jāmeʿ* in about 1010, based primarily on *al-Zīj al-ṣābeʿ* of Battānī. It was translated into Persian in 483/1090 by Moḥammad b. ʿOmar Tabrīzī.

4. **Abuʿl-Rayḥān Moḥammad Bīrūnī** was a prolific author of astronomical treatises in the first half of the eleventh century. Among the more important ones that are still extant are: *On the Solar Equation*, *On Transits*, the *Taḥdīd al-amāken*, *On Shadows*, *On the Astrolabe*, and the *Astrology* (in both Arabic and Persian). In each of these he provides immensely useful information concerning his predecessors and concerning Indian astronomy; the latter he deals with at greater length in his *India* and in his translation of Vijayānanda's *Karaṇasāra*, which he entitled *Ġorrat al-zījāt*. However, he was not a very competent Sanskritist, and these works are filled with errors. But his principle contribution to astronomy is his great *al-Qānūn al-masʿūdī*, which he wrote in 422/1030-31.

5. ʿOmar Kayyām (q.v.) wrote a *al-Zīj al-malekšāhī* for the Saljuq Sultan Malekšāh (r. 465-85/1072-92). The sultanic calendar that was described in it had considerable currency among later astronomers. Unfortunately, only a small portion of this *zīj* is known to survive.

6. ʿAbd-al-Raḥmān Kāzenī of Marv composed a magnificent *al-Zīj al-sanjārī* for the Saljuq Sultan Sanjār b. Malekšāh (r. 511-52/1118-57). There is a Persian version of this as well as an Arabic epitome; the latter was translated into Greek by Gregory Chioniades in about 1300.

7. ʿAbd-al-Karīm Šīrvānī, known as al-Fahhād, wrote six *zīj*s in the middle of the twelfth century. The most important seems to have been the *al-Zīj al-ʿalāʾī*, which allegedly took over the parameters of Abuʿl-Wafāʾ. This *zīj* is lost, but its parameters are preserved in the *al-Zīj al-momtaḥan* written by Moḥammad Fāresī for Yūsuf Moẓaffar, the ruler of the Yemen from about 1249 till 1295; it was also translated into Greek by Gregory Chioniades in about 1300.

In this period were also written many treatises on the astrolabe and on other astronomical instruments. Our earliest examples of these often splendid products of Persian craftsmanship date from the late tenth century.

The school of Marāḡa. Ptolemy's planetary models consist of couplings of



circles. Each epicycle, or small circle of given radius, bears on its circumference one of the planets (with the exception of the sun) and rotates in a clockwise direction for the moon, in a counter-clockwise direction for the five star-planets. The center of the epicycle rotates in a counter-clockwise direction on the circumference of a deferent circle; but this circular motion is uniform, not with respect to the center of the deferent, but with respect to another point called the equant. Moreover, the center of the earth lies not at the center of the deferent circles, but in the case of each in the opposite direction from the equant and at the same distance from the deferent-center. (The moon and Mercury have peculiar devices of their own, while the sun has a simple eccentric model.) These geometric models of Ptolemy, if regarded as representing physical reality, cause the planets to travel in orbits of which the earth is not the center and which, in any case, are not circular; moreover, even the mean motion is not uniform circular motion about the center of the deferent. But Aristotelian physics attributes to the heavenly bodies uniform circular motion through eternity about the center of the universe, where the earth is located; this is a condition of the perfection of the fifth element. Therefore, the planets' distances from the earth should not vary; nor should they rotate non-uniformly in their orbits. This incompatibility of Aristotelian physics with Ptolemaic (and pre-Ptolemaic) astronomy had bothered various philosophers and astronomers since antiquity; the Indian models employing double epicycles, for instance, which had been adopted in Sasanian Iran, represent one proposed solution to the problem of maintaining concentricity.

A solution to the problem of the equant was proposed by the astronomers of Marāḡa in the thirteenth century. The device that they utilized—a small circle whose radius is half that of a larger circle within which it rolls—is called a Ṭūsī-couple after its “inventor” (it was, in fact, known to Proclus, but not employed by him in an astronomical context), K̲vāja Naṣīr-al-dīn Ṭūsī (1201-74). Ṭūsī edited the collection of treatises known to the Arabs as the “Middle Astronomy,” to the Greeks as the “Little Astronomy,” and the *Almagest* of Ptolemy. He composed in Persian a *Bīst bāb dar oṣṭarlāb* and a *Zīj-e il-kānī*—the latter at the command of Hūlāgū (Hūlegū, 1256-65), the founder of the Marāḡa observatory. Naṣīr-al-dīn Ṭūsī wrote the *Ḥall-e moṣkelāt-e moʾīniya* and the *al-Taḍkera* in both of which he displays how the Ṭūsī-couple can be used to eliminate the equant. His work was carried on by Qoṭb-al-dīn Šīrāzī (1236-1311) in his *Nehāyat al-edrāk fī derāyat al-aflāk*, written in 1281 (a Persian abridgement was made in 1304/05), and in his *al-Taḥfat al-šāhīya*, composed in 1284. Their theories, as developed by Ebn al-Šāṭer (1304 to



1375-76) at Damascus, seem to have been known to, and adopted by, Copernicus. But later Persian astronomers, such as Maḥmūd b. Moḥammad Jagmenī, who wrote a very popular *Molakkaṣ fi'l-hay'a*, do not seem to have realized the significance of the models proposed by Naṣīr-al-dīn and Qoṭb-al-dīn.

The Samarkand school and its Indian imitators. In the early fifteenth century Sultan Oloḡ Beg (1394-1449) built an observatory at Samarkand and gathered together a group of scientists whose task it was to assist him in revising the accepted astronomical parameters of the *Zīj-e īl-kānī*. The best known members of this group are Ġiāṭ-al-dīn Jamšīd Kāšī, who completed the *al-Zīj al-kāqānī* in 1413-14, Qāzī-zāda Rūmī, and 'Alā'-al-dīn Qūšjī. The principle result of their efforts was the publication of the *Zīj-e Oloḡ Beg* in about 1440, which was immensely popular in Islam and was translated into both Arabic and Sanskrit.

The effects of Oloḡ Beg's work were felt in India in the seventeenth and eighteenth centuries. Through the translations of his and Kāšī's *zīj*s, the *jyotiṣ*is of Benares in the seventeenth century learned of Ptolemaic astronomy and introduced some of its methodology into their Sanskrit works; contemporaneously at Delhi Farīd-al-dīn composed in 1629 the *Zīj-e šāhīahānī*, based on the *Zīj-e Oloḡ Beg*. In the early eighteenth century the Maharaja of Amber, Jayasīṃha (1699-1743), built observatories at Benares, Mathura, Delhi, Ujjayini, and Jaipur in imitation of that at Samarkand; with the assistance of Kayrallāh Khan, he composed a *Zīj-e jadīd-e moḥammad-šāhī*, dedicated to the Mughal Emperor Moḥammad Shah (1719-48). But it seems unlikely, in the present state of our ignorance, that these Indian texts added anything of significance to Oloḡ Beg's work, which remained the authoritative treatise on astronomy in Persian until the introduction of modern astronomy in the nineteenth century.

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(D. Pingree)

ii. Astronomy and Astrology in the Sasanian Period

The arts of divination probably began to penetrate Iran (or at least its court circles) from Mesopotamia already in the Achaemenid period. (See Xenophon, *Anabasis* 1.7.18.) The philhellene Arsacid dynasts must have been still more open to such foreign influences, although eastern Iran, from which they came, appears to be yet untouched by astrological doctrine in the second century B.C. (judging by the inventory of personal names at Nisa). The sun and moon emblems on Arsacid coins may simply reflect traditional Iranian reverence for the chief luminaries, but they may also be symptoms of a growing consciousness of astrology (the most developed form of divination), particularly of the individual's nativity. (See suggestions on the role of the Parthians in Neugebauer, *The Exact Sciences*, pp. 175-76, 186.) By the end of the Arsacid period, the Hellenistic-Roman science of astronomy *cum* astrology was fully developed (see especially Claudius Ptolemy's *Tetrabiblos*, ed. and tr. in Loeb Classical Library no. 350, Cambridge, Mass., and London, 1964; and comprehensive survey in Bouché-Leclercq, *L'astrologie grecque*). The Talmud could depict a mage of that time, living in Mesopotamia, as expert in genethliology and catarchic (appointive) astrology (Neusner, *History of the Jews*, p. 165). Perhaps the world chronology of the *Spand* and *Warštmānsr nasks* of the Sasanian Avesta already received its definitive form under the Arsacids (see E. W. West, *SBE* IV, pp. 31-34, 284-89; cf. *Ayādgār ī Jāmāspīg* and *Bahman Yašt* and see also below). It was in the course of the Sasanian period, however, that Iran assimilated both Hellenistic-Roman and Indian sciences of the heavens and integrated these with traditional Zoroastrian ideas.

Highly relevant to the Arsacid period are the subjects [Mithraism](#) and



Zurvanism. It is here assumed that the exposure of Zoroastrian priests to Near Eastern divination (including judicial astrology), from the Achaemenid period on, helped foster cosmological speculation; and this developed a body of myth around Zurwān “Time,” who must already have served as a personification of the fructifying year-cycle (cf. *Dēnkard*, bk. 3.193: “In [time] is the realizing of the potency of being”). It is not here attempted to assess the sectarian status of the “Zurvanites.” The sacred character of time in Zoroastrianism, based primarily on its association with fertility and secondarily on cosmological doctrine, will only be briefly touched on. Important considerations will be found under calendars.

Astronomy and astrology, in the ancient Iranian view, together formed one science, which answered the questions: “How are the movements of the sun and moon and stars?” (astronomical aspect) and “what is their work and function?” (astrological aspect; asked in [*Dādistān ī*] *Mēnōg ī Xrad* 49). This was natural, since Zoroastrianism had traditionally viewed the luminary bodies as living divinities and creations. The science is termed “star-telling” (*star-gōwišnīh*) in *Dēnkard*, bk. 4 (ed. Madan, p. 412.18; tr. R. C. Zaehner, *Zurvan*, p. 9). Its practitioners are known variously:

“asterism-reckoner” (*axtar-āmar*, *Bundahišn*, pp. 28.8, 58.2); “zodiac-teller” (12-star-gōwišn, *Dēnkard* 5.2.9, ed. Molé, *La légende*, pp. 108-09); “star-reckoner” (*stār-hangār*, *Škand-gumānīg wizār* 4.28; cf. Persian *setāra-šomār*, Scheftelowitz, “New Material,” p. 327); “time-knower” (*hangām-šnāsag*, *Dēnkard*, bk. 4, p. 428.15; cf. Persian *setāra-šenās*; see J. de Menasce, *JA* 237, 1949, pp. 1-3). A loan word occurs appropriately in Central Asia, where Indian literature, sciences, and arts were influential, and whence Indian astrology may have begun to reach Iran proper from the early Sasanian period or even before: Sogdian *Sambatsar* (Skt. *sāmvatsara*, see M. A. Mehandale, *IJJ* 3, 1959, p. 142). The terms *star* and *axtar* have varied applications to the heavenly bodies (cf. the range of Latin *sidus*) but remain sufficiently clear. The large body of technical terms in astrology was rendered in Middle Iranian by calques, occasionally by borrowings as well (see below; for examples of Iranian contributions to the terminology of Islamic and Western astrology, see MacKenzie, “Zoroastrian Astrology,” p. 528 n. 76).

The problem of evidence. Throughout the Sasanian period the mass of the Iranian peoples presumably revered the sun, moon, Sirius, and some other stars in essentially the same way their ancestors had done. It is not possible to know what proportion of the population was affected by astrological doctrine.



The professional court astrology of the Sasanians is reconstructed from the testimony and methods of Islamic historians and astrologers (see i and iii). A simplified system is represented in the 8th-9th century A.D.: Middle Persian (Pahlavi) books (particularly *Bundahišn*, *Dēnkard*, *Zātspram*, and *Mēnōg ī Xrad*, but also the more popular *Kār-nāmag*). These texts probably indicated the “popular” astrology known to the provincial intellectuals (priests and scribes) of the Sasanian period and more or less disseminated among all the people. The Middle Persian books base their claim of authority on older tradition, and they may thus be regarded as presenting an essentially valid picture of religious beliefs of the Sasanian period (see *Dēnkard*, bk. 3.420; H. S. Nyberg, *JA* 219, 1931, pp. 4-5). Thus the astrological fatalism of the *Šāh-nāma* need not entirely be due to the Arab conquest and Islamic astrology.

The mage Ablat (referred to above) is but one evidence of Iranian-Aramean communication on topics of cosmology. The process may go back to the second century B.C. (if the imagery of III Esdras 4:34 is indeed Iranian; cf. *Zātspram* 34.25; for other possible Iranian influences on the Apocrypha, see Widengren, *Iranisch-semitische Kulturbegegnung*). The Mandeans, at whatever date their religion took its present form, adopted the Zoroastrian (Younger Avestan) calendar (Taqizadeh, “An Ancient Persian Practice”); they even assimilated Zoroastrian chronology into their apocalyptic mythology (*Ginzā* 18; Lidzbarski, pp. 407ff.). Perhaps then the Mandaean *Book of the Zodiac* (tr. E. S. Drower, London, 1949) likewise borrowed from Iranian, as well as Hellenistic-Roman sources.

Even more striking is the syncretic religion of Mani (who was “born in an auspicious sign,” Salemann, *Man. Stud.*, p. 28, M 543 R 4-5). While its belief in astrological determination (see Widengren, *Mani and Manichaeism*, pp. 69-72) may be attributed to late Hellenistic and Roman culture, it combines astrology with features common to Zoroastrianism: (a) great emphasis on the formation of the universe as a result of the conflict of the Two Principles; (b) therefore concern with cosmic chronology and the fulfillment of the Three Times, already in Mani’s own book, the *Šābuhragān*; (c) special reverence for the sun and moon; (d) a gnostic execration of the planets as demonic; (e) a “primitive” (i.e., mythological) approach in thinking about the heavens; thus the Manicheans were derided by *Alexander of Lycopolis* for not studying modern astronomy. Even if Mani is not himself an indication of astrology’s penetration of western Iran and of Zoroastrianism, his missionaries in Iran must have assisted such a penetration.



In the brief Middle Persian sketches of the transmission of Zoroastrian scriptures and other knowledge (Bailey, *Zoroastrian Problems*, pp. 79-86; Zaehner, *Zurvan*, pp. 7-9, 139), two major periods of scholarly activity are suggested: During the reigns of Ardašīr I and Šāpūr I (A.D. 224-72) there began the compiling of the Avesta and much literature from foreign sources; under Kōsrow I the process was completed (531-79) under strong Indian influence. The astrologers whose works were translated from Greek have been cited above; see also the account of Ebn Nawbakt in the *Fehrest* (tr. Dodge, II, pp. 574-75; cf. pp. 639-45). Perhaps already in the early phase various divination texts were translated, dealing with such topics as auguries from birds and dream interpretation (see *Fehrest*, tr., II, pp. 736-42). Thus the *Kār-nāmag* need not be anachronistic when it refers to Pābak's dream-interpreter (*xwamn-wizār*; ed. Antia, 1.12) or to Ardawān's augur ("bird-gazer," *murwniš* in 3.4-7); for there must have been a foundation already laid for the early Sasanian intellectual labors.

As the systems of ephemerides (Mid. Pers. *zayč*, Persian/Arabic *zīj* used by the court astrologers were revised and combined, there must have occurred considerable debate and rivalry among these professionals. E.g., Manūčīhr (writing in the ninth century) refers to the problem of reconciling three systems: the *Zayč* of the Sovereigns, the Indian *Zayč*, and the *Zayč* of Ptolemy (*The Epistles of Manushchihar*, ed. B. N. Dhabhar, Bombay, 1912, II.2.9-11, not correctly understood by E. W. West). These systems all date to the Sasanian period (see [Astronomy](#)). Perhaps the intensive labor on them in the reign of Kōsrow I was motivated, not only by the desire for more accurate predictive tools, but by the approach of the last century of Zardošt's millennium. In this period various astral portents might be expected (see below).

An astrological work of special interest is the Mid. Pers. **Wizīdag* (selection[s]), mentioned in the *Fehrest* (see above). This was a commentary, dating from Kōsrow I's reign, on Vettius Valens' *Anthologiae*; it was perhaps added to during the last decades of Sasanian rule and after (cf. Taqizadeh, "Some Chronological Data," p. 137). Part of the book was transmitted through Muslim astrologers, including Ebn Hebenṭā; and it is known to have included a horoscope of the world agreeing with the one in the Mid. Pers. *Bundahišn* (see below; Nallino, "Tracce di Opere," p. 353). The **Wizīdag* is attributed to a [Bozorjmehr](#), and presumably the semi-legendary vizier of Kōsrow I is intended. It is of interest that the Middle Persian sayings ascribed to Wuzurg-Mihr (see below) grapple with the problem of fate and free will; and the game of nard, said



to be his invention in the Wizārišn ī čatrang, is supposed to symbolize the processes of the cosmos and human life. These consistencies may support the historicity of the vizier.

The practice of astrology is described principally in Islamic sources. The young Ardašīr is said to have been told by astrologers that he was born under a lucky sign and would be a ruler (Nöldeke, *Geschichte der Perser*, p. 5; cf. last section, below). When Wahrām V was born, the court astrologer cast his horoscope (ibid., p. 86). Bīrūnī relates that a horoscope was cast for each king's accession and at every Nowrūz; and a horoscope of Kōsrow I survives in the work of astronomer Qasrānī (Taqizadeh, "Some Chronological Data," pp. 128-30; cf. Pingree, "Astronomy and Astrology," p. 242). The *Bundahišn* (chap. 26.105, p. 178.7) likewise advises the taking of "a lucky auspice" (*murwāg ī nēk*) on Nowrūz. Kōsrow I is said to have written down the astrologers' prediction of the length of his successor and deposited the document in the state archives (Ta'ālebī, *Gōrar*, tr. Zotenberg, pp. 638ff.; cf. pp. 619ff., regarding a dream of Kōsrow). The young courtier in the Mid. Pers. "King Kōsrow and His Page" appropriately includes in his education "the subject of the stars and planets" (*Pahlavi Texts*, p. 28.7-8). The merger of ancient Zoroastrian cosmology and astrological ideology evident in the *Bundahišn* seems also represented in Islamic accounts of Kōsrow II's throne: a combination orrery and horloge, adorned with representations of the seasons and including machinery to mimic the weather. In short, the entire universe was represented in order to glorify the earthly god (*bay*) in its midst (see Ta'ālebī, pp. 698ff.; Christensen, *Iran Sass.*, pp. 466-68; Herzfeld, "Der Thron des Khosrō").

Basis for the assimilation of astrology. The Avesta depicts the entire field of existence as a complex of living beings, whether divine or mortal. All these beings are implicated in the cosmic struggle against the demons, the focus of which is the earth and her fertility. When the pre-Zoroastrian Persians "called the whole circle of the heavens Zeus" and sacrificed to the elements, sun, and moon (Herodotus 1.131), they demonstrated an ancient belief in visible, celestial deities who might assist mankind. At this stage the problematic apparent motions of the planets were not recognized (cf. the astronomy of Homeric civilization, see Dicks, *Early Greek Astronomy*). The sky displayed a simple rhythm of day, month, and year which shaped the productive activities of humanity. (See, e.g., the Old Persian month names in Cameron, *Persepolis Treasury Tables*, pp. 44-45.) This divine guidance of the annual cycle was represented in the calendars; therefore the calendar itself possessed a certain



potency. To retain it, the calendar had to be kept aligned with nature (*Dēnkard*, bk. 3.419). The Persian song of the 360 uses of the date-palm (Strabo 1.1.14) may have celebrated the cycle of the luni-solar year; while Achaemenid pageantry honored the 365 days of the “Younger Avestan” calendar (Quintus Curtius 3.3.10). The year also had a personal significance for the individual; Herodotus remarks that birthdays were important festivities (1.133). This framework of belief and attitude was suitable for the reception of astrological theories.

The “Younger Avestan” calendar was not original in assigning patron divinities to each month and each month-day; cf. Egyptian usage (Herodotus 2.82). But each day thus acquired a unique identity; and it would be easy to take the next step and attribute to each a unique potential and significance, depending on the patron and on the configuration of the heavens which defined that day. Thus the Mid. Pers. “Day Xordād of month Frawardīn” (*Pahlavi Texts*, pp. 102-08) lists the momentous historical events which happened and were yet to happen on that day. The Avestan *Sīrōza* prayers and the Mid. Pers. “Praise of the 30 Days” (*Zand ī Xwurdag Abestāg*, pp. 415-76) are not imbued with astrology, but they are conformable to it. Thus a section of the *handarz* of Ādurbād Mahrspandān assigns certain activities to certain days (*Pahlavi Texts*, pp. 69-71; for his familiar astrological practice, cf. *Book of the Zodiac*, pp. 75-80.) A Syriac text describing Zurvanite cosmology refers to the “day-lords,” perhaps implying an astrological context (H. S. Nyberg, *JA* 214, 1929, pp. 238-39); certainly these day names are placed in an astrological context when translated into Sanskrit (Neugebauer and Pingree, *The Pañcasiddhāntikā* I, pp. 32-33).

The process of attributing astrological meaning to the days and the months is logically extended to years and their multiples. In Zoroastrianism the simple world-year of 12,000 years, with one millennium to each zodiacal sign, strongly reinforced the doctrines of the apocalypse. It is defined in *Bundahišn*, chap. 5 B.15 and 36, pp. 58.12-15, 238-40. (For the much longer epochs used by the professional astrologers, see the medieval Islamic evidence in Kennedy and Van Der Waerden, “World-Year;” Kennedy, “Ramifications;” cf. Kennedy and Pingree, *Astrological History*, pp. 72-75.) The correlation of millennia and signs would have rendered intelligible the mystery of “the period for the complete defeat of the Lie” (*Dēnkard*, bk. 3.407), which Ohrmazd knew through his omniscience (cf. *Dēnkard*, bk. 3.267, *Mēnōg ī Xrad* 8, *Zātspram* 1.8). Time, as an agent, promoted fertility (*Zand ī Xwurdag Abestāg*, tr., p. 460); as a



process, destined by the necessity of circular motion to return to its beginning, it presaged the certain defeat of the demons (see *Dēnkard*, bk. 3.267 and cf. 208; *Zātspram* 34.49). For Iranians of the Sasanian period, the “present age” (the millennium of Zoroaster: see Kennedy, “Ramifications,” pp. 37-38) represented the time in which that defeat would begin to be realized (*Bundahišn*, chap. 1.28, p. 7.1-6). The astrological shaping of Zoroastrian apocalyptic ideas probably occurred in the late Arsacid and Sasanian periods. The text *Zand ī Wahman Yasn* perhaps gives an occasional glimpse of an earlier stage of belief.

Astrology offered support for the idea of the god Ohrmazd’s total goodness. He could be said to have commanded the equitable distribution of material (as well as immaterial) goods through the sun, moon, and twelve zodiacal signs (*Mēnōg ī Xrad* 12); but the intrusion of the demonic planets brought injustice into the world. Belief in the twelve signs and seven planets as the proximate “determiners and arrangers of the world” (*ibid.*, 8) required, however, one modification from classical theory. If the planetary bodies were to be regarded as evil, the sun and moon could not be included among them. The canonical “seven” was preserved by substituting the head and tail of Gōčīhr (see below). But some confusion occurred, and *Bundahišn*, chap. 27.52, p. 188.3-5 counts a total of ten planetary bodies.

In *Wizārišn ī čatrang* 30, Wuzurg-Mihr says of people: “They all revolve and progress according to the seven and the twelve.” This basic principle of cosmic and terrestrial correspondences, carried to an extreme, encouraged atheism. In the ninth century Mardān-Farrux argued against the atheistic (*nēst-yazd*) Dahrīs, believers in Time as the ultimate principle (*Škand-gumānīg wizār* 6). Already in the Sasanian period Eznik of Kolb described Zurwān as equivalent to *baxt* “fate” (H. S. Nyberg, *JA* 219, 1931, p. 54). Pahlavi texts take several approaches toward reconciling with astrology the traditional Zoroastrian doctrines of meritorious initiative summed up as “good thoughts, good words, good deeds.” *Mēnōg ī Xrad* 24 and 27 distinguish *baxt* (i.e., what is determined at one’s birth) and *bagōbaxt*, divinely bestowed reward for merit. The sayings of Ādurbād Mahrspandān in *Dēnkard*, bk. 6 divide the “affairs of the world” into twenty-five categories (ed. Sanjana, XII, 1911, p. 87). Of these, five are the result of *brēh*, “determination:” life, wife, children, power, property (cf. the names of the twelve Houses below). The remainder result from action, energy, essence, and inheritance. The Pahlavi *Wīdēwdād* 5.9. says succinctly: “Material things are by fate, immaterial things by action” cf. *Pahlavi Texts*, p. 76,



Zaehner, *Zurvan*, pp. 398-99). The *Ayādgar ī Wuzurgmihr* 105-09 (*Pahlavi Texts*, p. 94) considers this point at greater length. “Wuzurgmihr” removes determination to the background of human existence, in effect identifying it with the force of necessity which energizes all processes in the cosmos, when he says: “Fate is the reason [for whatever befalls a person]; action is the cause” (*čim* and *wahānag* respectively). These terms are clarified by the discussions in *Škand-gumānīg wizār*, e.g., the summary in 9.20-21: “The knowingness of the creator, by reason of the necessity for createdness, by agency of a means created createdness for action.” The *Ayādgar* could conceivably be a fragment of the **Wizīdag*. It should be noted that not all Zoroastrian texts feel obliged to discuss the question of freedom and determination. Often, as in the *Čīdag handarz ī pōryōtkēšān* (*Pahlavi Texts*, pp. 41-50; ed. and tr. M. F. Kanga, Bombay, 1960), the astrological factor is totally ignored in favor of traditional Zoroastrian doctrine. For the influence of astrology on Zoroastrianism in the Islamic period, see B. N. Dhabhar, tr., *The Persian Rivayats of Hormazyar Framarz and Others*, Bombay, 1932, pp. 128-31.

Concept of the heavens. The first of Ohrmazd’s material creations was the sphere of the sky, which encloses the other creations like an egg. (See texts in Bailey, *Zoroastrian Problems*, pp. 120-48; see also Āsmān for further details.) It has been suggested that the notion of the heavens’ sphericity is a borrowing from Hermetic cosmology (Widengren, *Iranisch-semitische Kulturbegegnung*, p. 76). Beyond the sky lay the heaven of Ohrmazd. Between it and earth at the center of the “egg” were three other spheres or “stations” (*pāyag*): those of the sun, the moon, and (just above the earth) the stars. This archaic arrangement of the heavenly bodies is delineated in *Bundahišn*, chap. 2 (see Henning, *Astronomical chapter*). The number of spheres was later made a potent seven, but with no change in the basic order (e.g., Dhabhar, *Persian Rivayats*, p. 426; for the number seven as pervading the cosmos [cf. Isma‘ilism] see *Bundahišn*, chap. 28. 17-18, pp. 194-95). For the distances between the stations, see Zaehner, *Zurvan* (on the *Pahlavi Rivayat*) and Dhabhar, *Persian Rivayats*, pp. 426-27. The various heavenly bodies were created at their stations in a state of repose. Their motions began only when the Evil Spirit and his demons, including the planets, invaded the sky from below and pulled it downward somewhat (*Bundahišn*, chaps. 2.17, 4.10, pp. 29.12-30.1, 41.13-42.2; *Zātspram* 1.27, 32). Ahriman thus penetrated as far as the star station, where the stars and the planets wage war; and the sun was dislodged from his position on an axis passing through the center of the earth-disc and the top of the sky-sphere. The violent assault of Ahriman explains the assymetry in the sky—why the



revolutions of the heavenly bodies are at an oblique angle to the plane of the earth, why the north celestial pole is not at the zenith of the sky. In the present, disarranged universe the north-point is inauspicious. (This traditional belief was inherent in the Av. term for “north,” *apāxtara-*, i.e., the direction “further away.” See Eilers, “Stern—Planet—Regenbogen,” pp. 114-15.) The south, “the breast of the world” (*Bundahišn*, chap. 28.9, p. 163.3-4) is pointed out as the auspicious direction by the sun, which inclines toward the south as it rises (*Dēnkard*, bk. 3.18).

Sun and moon. In the Avestan and Pahlavi texts the good luminaries are referred to in such formulae as “I reverence the stars, moon, and sun” (*Mihr Niyāyišn* 12). These beings are created but immortal; their radiance is intrinsic to their being (*Dēnkard*, bk. 3.51). The sun and moon are commanders over the stars (*Bundahišn*, chap. 2.12, p. 28.12-13); all revolve around Mount Tērag, the central point of the earth-disc, at their appropriate levels (*Yt.* 12.25, *Bundahišn*, chap. 5 B.2, p. 55.6-7). The sun represents Ohrmazd, and his daily passage testifies to ultimate victory over the demons (*Dēnkard*, bk. 3.18, 81; bk. 5.20). He exerts a force on earthly things, drawing them upward (*Dēnkard*, bk. 3.160). He fosters creatures and measures out time (*Mēnōg ī Xrad* 49). The seasons are defined by his movement through the zodiac (*Dēnkard*, bk. 3.419). Each nycthemeron is divided by him into two night-periods (*gāh*) and three day periods. Thus it can be said that “the sun gives a command to the people of the world three times a day” (*Čīdag handarz* 48, *Pahlavi Texts*, p. 48). He determines the rhythm, not only of economic life, but also of ritual practices. (Regulations relating to reverencing the sun may be found in *Šāyast nē šāyast* [chaps. 7.1-6, 12.31, tr. E. W. West, SBE 5, pp. 297-99, 351-52] and *Nīrangistān* [tr. S. J. Bulsara, *Aērpatastān and Nīrangastān*, Bombay, 1915, pp. 155-56]; see also the Mid. Pers. *Xwar Niyāyišn*.) Because he is the repository for each person’s “light-image” (*ēwēnag*), he is a reminder of future immortality (*Zand ī Xwurdag Abestāg*, tr. Dhabhar, p. 322; Bailey, *Zoroastrian Problems*, pp. 96ff.).

The moon has particular associations, not only with light, but with water. Thus this god distributes health and growth to plants and, through Gōšurwān (q.v.), to animals (*Bundahišn*, chap. 26.21-25, pp. 164.13-166.1; *Māh Niyāyišn*). The lunar month and year are regarded as relevant primarily to agriculture and animal husbandry, but also to human fertility (*Dēnkard*, bk. 3.259, 419).

Stars. While the term *stā/ār* may refer to any of the luminous heavenly bodies, “fixed star” is either *stārag ī awiyābānīg* (*Bundahišn*; chap. 2.5, p. 27.6) or *axtar*; the latter also indicates “constellation” and “zodiacal sign.” Stars



were classed physically according to three magnitudes (*wuzurgīh*); for these and for estimates of the size and velocity of the heavenly bodies, see *Bundahišn*, chap. 2 in Henning, “Astronomical Chapter.” Two levels were assigned to the stars. The upper level was that of the “stars not subject to mingling.” These fought the tenth battle of the original creation and kept the demons from ascending farther (*Bundahišn*, chap. 2.9, 6 I, pp. 28.1-10, 71.4-11). They are manifested chiefly in the Milky Way, called the Way of King Kayūs (with reference to the legend of *Dēnkard*, bk. 9.21, ed. Sanjana, XVII) or the Brilliance of *Gōčīhr* the Dragon (*Bundahišn*, chap. 5 B. 22, p. 60.5-6; for *Gōčīhr*, see below). This level or sphere is ruled by the divine Fortune of the Religion, and the Milky Way appears like a symbolic girdle (*kustīg*) around the heavens (see Henning, *op. cit.*, p. 240; MacKenzie, “Zoroastrian Astrology,” pp. 521-22; Eilers, *op. cit.*, pp. 108-11).

The lower sphere of the zodiac, however, is of more immediate importance to mankind. Here the twelve signs (see below) are arrayed together with the other constellations and stars (6,480,000 and more, *Bundahišn*, chap. 2.2, p. 26.8-9) to meet the demons’ assault.

Four star quadrant-commanders and numerous district-commanders exercise jurisdiction over the various parts of the sky, all under their chief commander, Polaris. The disposition of the leaders is as follows (*Bundahišn*, chap. 5.4, cf. the Indian division of the sky among the stars, Filliozat, “Notes d’astronomie,” pp. 337ff.), as shown in [Chart 1](#).

From the Sasanian times the ecliptic was divided longitudinally into 27 lunar mansions of 13° 20’ each; there were modifications of the Indian system (also used by the Sogdian Manicheans) of 28 mansions. This mapping of the sky accentuated the identity of various constellations and asterisms, who were thus viewed as companions of the zodiacal signs (*Bundahišn*, chap. 2.2, pp. 25.14-26.3; Henning, *op. cit.*, pp. 242-46; Hampel, *Kopenhagener Handschrift*, pp. 194-204).

The stars in general are concerned with the mechanism for the circulation of the waters (e.g., *Zand ī Xwurdag Abestāg*, tr., p. 321). Polaris and Ursa Major in particular are “holding the seed of the earth:” Sirius, Canis Minor, the Pleiades



and its neighbors are the most important of those “holding the seed of water” (*Bundahišn*, chap. 7.3, p. 72.4-9); others are plant patrons. The most individualized stars are the quadrant commanders, venerated already in the Avesta: (1) Ursa Major guards the ominous northpoint, the direction of hell, with the aid of the guardian spirits (*frawahr*; *Bundahišn*, chap. 2.7, p. 27.11-12, *Mēnōg ī Xrad* 49). He prevents the entrance of any more demons to harass the zodiac. Each of his seven stars is attached by a cord to one of the seven earth-continent (Kīšwar) (*Zand ī Xwurdag Abestāg*, tr., p. 325), and he is a patron of rivers (*Bundahišn*, chap. 10.11, p. 83.10-12). (2) Sirius is the major patron of the atmospheric and earthly waters: he fought the second battle of the original creation (*Bundahišn*, chap. 6 B, Yt. 8; see also *Apōš*). Hence particular reverence is paid to him (e.g., *Xwar Niyāyišn* 8, *Sīrōza* 1.13 and 2.13, *Stāyišn* 30 *rōzag* 13; cf. the role of Sirius in promoting fertility in Homeric astral lore). Sirius has an affinity with the “water-lord” Cancer (the rising sign of the world) and is termed “the horse of Cancer” (*Zātspram* 3.7). (3) Polaris (invoked in *Vd.* 19.42?) is variously termed *Peg of the Place* (i.e., the pole), *Peg of the Meridian* (lit. “of mid-sky”), and *Peg of Culmination* (*Bundahišn*, chap. 2.4, 5 A. 3, pp. 27.3-4, 52.7; *Škand-gumānīg wizār* 4.31). While its nearly stationary position earns it the role of commander-in-chief of the stars, Polaris is otherwise of little mythological significance (see Khareghat, “The Identity,” pp. 130-33; Henning, op. cit., pp. 241-42). (4) *Formalhaut*, an assistant to *Tištār* (along with Ursa Major and Vega), protects the seas (*Bundahišn*, chap. 10.11, p. 83.10-12; *Zand ī Xwurdag Abestāg*, tr., p. 438). On the problem of the identity of *Sadwēs*, see MacKenzie, “Zoroastrian Astrology,” p. 513; *Formalhaut* is also rendered probably by the positional order in which the commanders are listed (according to right ascension). (5) Vega watches the rampart of the Harburz mountains and repels demons; he may thus be invoked as a curer (*Mēnōg ī Xrad* 49; *Zand ī Xwurdag Abestāg*, tr., pp. 226-28, 324; see also the Pazand and Pahlavi charms in *Modi, Two Amulets*).

The zodiac. The Avesta revered the heavens as a collective entity, *Θwāša* “space,” as well as the individual bodies. By the Sasanian period the concept of the zodiac had been borrowed (as indicated by its name, *spihr* from Greek *sphaira* [Henning, op. cit., p. 329]) to express the central organization of the lower star level. It too is said to be Ohrmazd’s first material creation (*Bundahišn*, chap. 2.2, p. 25.9; see Bailey, *Zoroastrian Problems*, pp. 147-48). He maintains the “invisible revolution” which moves it (*Mēnōg ī Xrad* 1.12; cf.



57.13); and the guardian spirits rule over “the supreme power of the chariot of Spihr” (*Dēnkard*, bk. 3.382). Spihr is personified as the God who receives wellbeing (*nēkīh*) from above and distributes it on earth (*Bundahišn*, chap. 26.31-33, p. 166.11-15, *Mēnōg ī Xrad* 2.28). As a moving process, the *spihr* is “like a year” (*Bundahišn*, chap. 2.6, p. 27.8-10): divided into 12 signs like the 12 months, each extending 30° along the ecliptic like the 30 days of the solar month. (On the units *suš*, “degree” [from Akkadian?] and *lipūh*, “minute” [from Greek *leptē*], see Henning, op. cit., pp. 238-39). Each sign can be divided into its decans (*dahīg*), three units of 10° each (*Bundahišn*, chap. 5.9, 6 B. 4, pp. 54.2, 62.9). Each is also personified as a general on Ohrmazd’s side (*Mēnōg ī Xrad* 8). They are shown in [Chart 2](#) (*Bundahišn*, chap. 5 A, MacKenzie, “Zoroastrian Astrology”).

“The commencement of all years, months, and days [is based] on the ephemerides of the signs” (*Dēnkard*, bk. 3.419, ed. Madan, p. 403.11-12). Thus it is appropriate that each sign should also be the lord of one millennium of the cosmic year (*Bundahišn*, chap. 36, pp. 238-40). The starting point of the zodiac, the lunar mansions, and the year is 0° Aries (*Dēnkard*, bk. 3.419; *Bundahišn*, chap. 5 B. 4, 25.26, pp. 55.14, 161.9-11). Upon passing the threshold (*āstānag*; see *Mīr. Man. I*, pp. 181-82), the sun attains its exaltation (*bālist*) and works most powerfully on the world (cf. *Tetrabiblos* 1.19). The Iranian were familiar with the intricate interaction between the signs and the planetary bodies, based on a sign’s terms; its role as house, exaltation, and dejection; and its relation to the other signs, determining aspect, opposition, felicities, and afflictions (*Bundahišn*, chap. 5.9, p. 54.1-3). These details are not systematically described in Middle Persian literature but are implied in horoscopes actually given.

In the casting of a horoscope it was necessary to evaluate the significance of each sign within the system of “the twelve houses of the signs” (*Bundahišn*, chap. 5 A. 9, p. 53.15). The rising-sign constituted the first house, the next sign below the horizon the second house, and so on through the zodiac. (For the identification of houses with signs, see *Zātspram* 2.21. This procedure was simpler than measuring 30° segments strictly from the degree of the horoscope, whereby each house would usually overlap two signs.) The significance of the houses for human life is shown in their names, [Chart 3](#) (see



MacKenzie, “Zoroastrian Astrology,” p. 526, for their Western equivalents).

The planets. The heavens, as a whole, have a beneficent “forward movement” (*Zand ī Xwurdag Abestāg*, tr., p. 465), but a planet (Mid. Pers. *abāxtar*) is (by etymology) “retrograde, *errans*” (Eilers, “Stern—Planet—Regenbogen,” p. 115). Its irregular motions are limited by the chord which tethers it to the sun or moon (*Bundahišn*, chap. 5 A. 8, p. 53.8-14, *Škand gumānīg wizār* 4.39-40; for the Indian source of this idea, see Pingree, “Astronomy and Astrology,” p. 242). Planets are essentially “distributors of harm” who have assumed the dress of light (*Škand-gumānīg wizār* 4.30). They steal and divert to the wicked some of the wellbeing which the good luminaries have to distribute (*Mēnōg ī Xrad* 12). But since they are subject to determination by the luminaries and their specific opponents (see above) are sometimes more powerful, they may be compelled to be beneficent (*kirbakkar*, *Bundahišn*, chap. 5 B. 12, pp. 57.7-58.4; *Škand-gumānīg wizār* 4.23). But at times the planets are more powerful and able to exercise their malefic (*bazakkar*) nature. (For an appeal to their beneficence, see the Pazand charm in Kanga, “King Faridūn,” pp. 144-45.)

The characters of the five chief planets (listed above) are little differentiated in the texts, but the bulk of classical lore may be assumed to be present. (Cf. Pingree, “Representation of the Planets” for Indian visualizations of the planets.) Mercury is said to be airy, Venus watery; Mars is associated with heat; Saturn, the death-star, is associated with cold; Jupiter is the life-star (*Bundahišn*, chaps. 5 B. 13-14, 27.54, pp. 58.4-12, 189.1-2; cf., e.g., Wright, *Book of Instruction*, pp. 230-33). The Iranian name of Saturn is the only planetary name which has been borrowed in Mandaean astrology (*Book of the Zodiac*, pp. 60, 65).

As mentioned above, the sun and moon were removed from the category of planetary bodies; their two demonic opponents replaced them. These are referred to in *Bundahišn*, chap. 5.4, p. 49.13-15 (depicting the polarity of good and evil throughout the cosmos) as Dark (i.e., presumably “eclipsed”) Sun and Dark Moon (cf. *Škand-gumānīg wizār* 4.46). These hostile entities which intercept the light of the luminaries are the head and tail of the dragon Gōčīhr (q.v.) (*Bundahišn*, chap. 5 A. 5, pp. 52.12-53.1, *Dādistān ī dēnīg* 69 [tr. West, SBE]). At the beginning of celestial motion the head (the ascending node of the moon’s orbit upon the ecliptic, Sanskrit Rāhu) was in Gemini, the tail (Sanskrit Ketu) in Sagittarius. The dragon’s body is thus arched threateningly across the



sky.

The sun has another enemy in the “tailed Mūš Parīg,” apparently a comet. It is tied to the sun’s chariot but occasionally becomes loose and does great harm (*Bundahišn*, chap. 5.4, 5 A.6-7, pp. 50.6-7, 53.1-5; *Škand gumānīg wizār* 4.46). Such erratic bodies as comets and meteors would naturally be judged as ill-omened; cf. *Dādistān ī dēnīg* 37.55 and *Book of the Zodiac*, pp. 140-41. But see below for an auspicious meteor.

Judicial astrology and genethliology. *Dēnkard*, bk. 3.419 (ed. Madan, p. 402.12) refers in passing to the “nativities of people” (*zāvišn ī mardom*). *Dēnkard*, bk. 7.7.9 (p. 650.17-18), describing the state of affairs in year 400 of the Religion (i.e., the end of the first cent. A.D., since that era was identified with the Seleucid one), describes the use of astrology to see into the future: “At this [time] then occurs a state of benightedness. The material creatures observe the planets and stars with the revelation of mathematics.” The surviving horoscopes of Māšā’allāh (Kennedy and Pingree, *Astrological History of Māshā’allāh*) to some extent reflect Sasanian astrology, but the only complete horoscope in Zoroastrian literature is that of the world (*zayč ī gēhān*) at the moment of mingling with evil (*Bundahišn*, chap. 5 A, pp. 51-53; MacKenzie, “Zoroastrian Astrology,” *Zātspram* 2.21). All the planetary bodies are placed at their points of exaltation for this dramatic beginning of celestial motion. A portion of “Gayōmard’s fate” is given in *Bundahišn*, chap. 6 F, pp. 68-69 (see also *Zātspram* 2.21 and MacKenzie, op. cit., p. 522, with note on the terms for “lucky” and “unlucky”). This account emphasizes the roles of Jupiter and Saturn and so is in harmony with the conjunction astrology of the Sasanian period, which emphasized the 980-year Jupiter-Saturn cycle (Pingree, “Astronomy and Astrology,” p. 245; Kennedy, “Ramifications,” p. 41).

Two examples of prognostication may be cited from the *Kār-nāmag* (ed. Antia, 3.5, 4.6). (1) The rise of a new king is discerned: “The zodiac has fallen. The planet Jupiter has again come into exaltation. Mars and Venus are conjoining in the sector of Ursa Major and the sign Leo and are giving support to Jupiter.” (2) The course of Ardašīr’s flight is divined: “The moon is departing from Saturn and Mars to Jupiter; it has united with Jupiter and Mercury. The lord of the mid-sky (i.e., Gōčīhr) stands under the determination of the sun” (cf. *Škand-gumānīg wizār* 4.47).

Astrological signs are a prominent motif in Zoroastrian apocalyptic texts (*Ayādgār ī Jāmāspīg* is distinctive in almost ignoring them). As the end of the



current, tenth millennium approaches, there will be signs, miracles, and wonders (*nišān, abdīh, škoftīh*; *Dēnkard*, bk. 8.14.12-14, pp. 691-92). Each century ends with an eclipse (*ibid.*, bk. 7.8.51-54). The year, month, and day will become one-third shorter, the night brighter. The sun will show a mist, the moon will change color; earthquakes and violent winds will occur. “Mercury and Jupiter arrange rulership for the wicked” (*Zand ī Wahman Yasn* 4.64, 6.4). At the beginning of the eleventh (*Ōšēdār’s*) millennium, the birth of the prince (*kay*) *Wahrām the Mighty* will be signalled by a meteor (*ibid.*, 7.6; see also Widengren, *Iranisch-semitische Kulturbegegnung*, p. 67). Later “kingship will come to the prince when the planet Jupiter attains its exaltation and casts down Venus” (*Zand ī Wahman Yasn*, 7.6).

The most prominent sign will be the halting of the sun at the meridian just before the savior arrives at the end of millennia 10, 11, and 12. The halts last 10, 20, and 30 days respectively; and the sun struggles to regain its original, potent (cf. *Tetrabiblos* 1.4) position at the zenith. These portentous events appear to be autonomous cosmic actions in some accounts (*Dēnkard*, bk. 3.160, 407; *Bundahišn*, chap. 33.29-33, pp. 218.5-220.3). A more archaic view regards them as miracles produced by the saviors to confirm the faith of believers and to alert non-believers (*Zand ī wahman Yasn* 9.1-7, *Dēnkard*, bk. 7.9.2, cf. 7.8.58-59). At the completion of the twelfth millennium, the sun achieves its goal (*Zātspram* 34.28), the customary motions of the zodiac and luminaries are changed (34.49), and the latter strengthen *Sōšāns*, the final savior (35.21). When *Sōšāns* accomplishes the Renovation, the luminaries return to the original perfection of stasis in their exaltations. The expulsion of evil from the sky is manifested by the plunging to earth of *Gōčīhr* the dragon (*Bundahišn*, chap. 34.17, p. 225.1-3).

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iii. Astrology in Islamic Times

Astrology is a method of predicting terrestrial events from the configurations of the planets, the stars, and the astrological places (twelve ecliptic arcs originating from the point of the ecliptic on the local eastern horizon). It has been influential in Iran since at least the beginning of the Sasanian empire, when Mani used astrological concepts in his teachings and when the Greek and Sanskrit technical treatises by Dorotheus, Vettius Valens, Ptolemy, Hermes, Cedrus, and Parameśvara were translated into Pahlavi. It is probable, however, that Hellenistic astrology had already flourished in Iran under the Parthians, when Greek culture prevailed and Greek traders similar to those who carried astrology to India in the second century were familiar with the Parthian empire. Moreover, traces of late Babylonian celestial omens, mingled with elements of Hellenistic astrology, survive in Mandaean and Syriac as well as in Greek and Arabic texts, which may also have circulated in Parthian Iran. The celestial omens themselves had certainly been known in Iran during the Achaemenid period, when they were transmitted to India.

Except for some scattered fragments in the ninth-century books, the Pahlavi literature on astrology is, unfortunately, known only from citations and translations in Arabic. The eighth-century versions of Zaradošt and Dorotheus are still extant, and there are many fragments of the lost works of Andarzgar, Valens, and others. This Iranian tradition, supplemented by some Syriac texts, was the major source for the theories of the early 'Abbasid astrologers, such as Nowbakt Ḥakīm and his son Abū Sahl, Māšā'allāh, 'Omar b. Farroḡan Ṭabarī, and Yaḥyā b. Abī Maṣṣūr Ṭabarī. It should be noted, moreover, that in this same period a certain Stephanus, a Christian from Persia, revived the study of astrology in Constantinople.

The shift from the use of Pahlavi to Arabic in scientific discourse made accessible to Iranian astrologers the many new Arabic versions of Greek,



Syriac, and Sanskrit texts composed in the eighth and ninth centuries. Like the astronomers, the 'Abbasid astrologers faced the problem of constructing a new and consistent theory out of the divergent traditions which they had inherited. The final synthesis was achieved in the middle of the ninth century by Abū Ma'shar Balkī whose theories were basically Ptolemaic, though modified by materials of Indian, Sasanian, and Syrian (Harranian) origin, and whose works established the standard for professional astrologers both in Iran and throughout the rest of the Islamic world.

Islamic astrology, following the traditions of its various sources, comprises a number of branches differing both in their objectives and in their methods. These branches are: Genethliology, which describes the lives of individuals on the basis of their nativities (*mawālīd*); *astrological history*, which recounts the rise and fall of dynasties and religions (*dowal and adyān or melal*); *catarchic astrology*, which guides its adherents in the choice of the propitious times for initiating activities (*eḳtīārāt*); *interrogations*, which provide answers to queries addressed to the astrologer (*masā'el*); and *iatromathematics*, which applies astrological doctrine to medical practice. Closely related to astrology are astral magic and divination from celestial omens.

Genethliology. The basic tool utilized in all astrological predictions is the horoscopic diagram or theme (*zā'erja* or *šūra*), which was originally developed in Hellenistic Egypt for the practice of genethliology. The theme in Islamic astrology was normally a rectangle divided by two parallels to each of its two pairs of opposite sides into nine equal rectangles; the four corner rectangles were further each divided by diagonals to make twelve places (*amkena, amāken*) surrounding the central rectangle. Each of the twelve places has influence over specific aspects of the native's life. The first, fourth, seventh, and tenth are cardines (*awtād*), and are the most influential places; the next four are succedents, and the remainder cadents.

The ecliptic with its twelve zodiacal signs (*borūj*) is superimposed on the twelve places. The precise fit is computed with the help of the local oblique ascensions; the longitude of the beginning of the first place is that of the point of the ecliptic on the local eastern horizon at the moment of the nativity as confirmed by the *nomūdār*. Each zodiacal sign is the house (*bayt*) of a planet (*kawkab*), which is its lord (*rabb* or *šāheb*). Each sign is further subdivided into three equal parts called decans (*wojūh*), into nine equal parts called in Sanskrit *navāṃśas* (*nowbahra*), and into five unequal parts called terms (*ḥodūd*);



each part also is ruled by a planet. In addition, the twelve zodiacal signs are grouped into four triplicities (moṭallaṭāt), each of which is connected with one of the four elements and is ruled by a diurnal and a nocturnal planetary lord.

The longitudes of the planets and of the lunar nodes at the time of the nativity are recorded in the appropriate places in the theme, as are those of some of the lots (*sehām*), which are points on the ecliptic as distant from a specified point in the theme (e.g., the ascendent) as are two other specified points from each other. The strengths of the planets in influencing the native are affected in various ways: by their distances from their exaltations (*šaraf*) and dejections (*habūṭāt*); by their presence in their own houses, decans, *navāms`as*, or terms, or in those of their friends and enemies; by their configurations with the other planets—conjunction (*qerān*) or one of the four aspects (*anzār*), i.e., sextile (*tasdīs*) to 60°, quartile (*tarbī*) to 90°, trine (*taṭlīt*) to 120°, and opposition (*moqābala*) to 180°; and by their modes of motion, such as retrogression (*roḡū*) or conjunction with the sun (*taḥt al-šo`ā`* or *eḥterāq*). The moon experiences three additional conditions related to its relative swiftness; it may approach (*ettašala*) another planet, leave (*enšarafa*) it, or be unimpeded in motion (*kālī al-sayr*). The first two conditions are occasionally applied to the other planets when appropriate.

In interpreting the theme the astrologer must weigh the relationships of planets of various potencies and characteristics with the several zodiacal signs and astrological places. He may also consider the influences of the lots, the lord of the triplicity of the ascendent, or other elements. All these contingencies provide him with a large number of possible predictions, both specific and general. He then must construct a coherent and plausible biography from these contingencies, combined with a knowledge of the social and economic position of the native's family. This part of the astrologer's art is most subjective and arbitrary, and relies heavily on individual interpretation. Thus astrology cannot be granted the status of an exact science even if its fundamental premise concerning the relationship between superterrestrial bodies and the earth and its inhabitants were to be accepted.

The length of the life that a native will enjoy is normally determined by the projection (*tasyīr*) of the prorogator (*haylaḡ* or *qesma*), which is a point selected in accordance with elaborate rules. The prorogator moves towards the eastern or western horizon in the nativity theme at the rate of 1° of local oblique ascension per year. As it passes through the terms of benefic and malefic planets, it affects the life of the native accordingly; when it reaches an



anaeretic point (*qāṭe*) in the theme, the native dies. The length of life is also determined with the help of the *kaḍkodāh* and the theory of the periods (*fardārāt*) and the subperiods (*fardārīyāt*), contributed and governed by each of the planets. The combinations of these various elements generate another set of numerous predictions concerning specific times in the native's life.

Partly motivated by the desire to create a constant demand for their services, astrologers in antiquity devised a system of continuous horoscopy based on the revolutions of the years of the nativities (*taḥāwīl senī al-mawālīd*). The events in each year (or month, or day) in the native's life, while predicted in general terms from the nativity theme (*aṣl*), could be more specifically described from the anniversary (or monthly or daily) theme. Each year was ruled by a point (*entehā*) traveling at the rate of one zodiacal sign per year; the planetary lord of the sign occupied in any given year by that point was the lord of that year (*sāl-koḍāh*). Other predictions were based on a comparison between the anniversary theme and the nativity theme; the influential factors were the transits (*mamarrāt*) of the planets through the places in the nativity theme and the mutual conjunctions with and aspects to the positions each of them occupied in that theme. The possible combinations of such a complex interplay of variables was immense, and obviously had advantages for the astrologer.

Astrological history. The possibility of applying some of the methods of continuous horoscopy to predicting or reconstructing historical events was apparently first realized in Sasanian Iran. Various *tasyīrāt* and *entehā'āt* traversing the ecliptic at different rates of motion were invented, and combined with several *fardārāt* to provide overlapping periods ruled by the several zodiacal signs and planets. Annual events in society were predicted from the local theme cast for the moment of the vernal equinox (*taḥāwīl senī al-'ālam*). An ingenious approximate correlation was observed between the Zoroastrian concept of the twelve millennia (which also agreed with the *tasyīrāt*) and the revolutions of the conjunctions of Saturn and Jupiter (*taḥāwīl al-qerānāt*). The conjunctions of these two planets were separated by approximately twenty years; the theme of the time of any conjunction was used to determine the course of public affairs during the following two decades. Twelve or thirteen successive conjunctions remain in the same triplicity for a period of some 240 or 260 years; the theme of the time of the first conjunction in a triplicity is regarded as deciding the fate of a dynasty. After about fifty conjunctions or a millennium, the whole cycle starts again



with a first conjunction in the fiery triplicity; from the theme of that first conjunction are predicted the character and religious message of a major prophet. These techniques were utilized by Islamic astrologers to reconstruct the past as well as to foretell the future.

Catarchic astrology. The determination of the appropriate time for initiating an activity, catharchic astrology, was an important part of the profession. Theoretically the theme of an activity determines its course in conjunction with the nativity and anniversary themes of the principle actors; however, from antiquity catarchic astrology was based primarily on the moon's position in the zodiac and its relations with the other planets, though other procedures—in particular the calculation of special lots—were developed by catarchic specialists. In cases of partnerships, including marriages, the compatibility of the participants was established by comparing their nativity themes before determining a proper time for consummating the union.

Interrogations. Astrologers could answer any queries on the basis of the theme of the time at which the question was asked. The most common method of interpretation was to utilize the cardines, of which the ascendent indicates the actor, the descendent the object or person acted upon, the midheaven the means of action, and the hypogee the result. Similar methods employing the directions associated with the cardines were utilized in locating lost or stolen objects, runaway slaves, or buried treasures. Complex associations of the zodiacal signs and planets with human physiognomic and psychological characteristics enabled the astrologer to describe, e.g., thieves and lovers for his clients.

Iatromathematics. Queries concerning the fate of the sick constituted an important part of the interrogations. Together with considerations derived from the nativity and anniversary themes they formed a special branch of astrology. Physical characteristics of the native, including blemishes, congenital weaknesses, and chronic diseases, were predicted from the nativity theme, especially with the help of the planetary, zodiacal, and decanic *melothesis*. Diagnosis of a contracted disease was also based primarily on the *melothesis* at the time of the onset of the illness or at the time at which the query was addressed to the iatromathematician; obviously, the anniversary theme could also be consulted. The prognosis of the course of the disease depended on the motion, phases, and contacts of the moon. The selection of the means of treatment and the times of application was influenced by diagnosis, prognosis, and catarchic astrology. The success or failure of the



doctor and his treatment could also be judged by an interrogation. A subbranch of iatromathematics was devoted to preparing medicines with astral powers; thus, mineral, vegetable, and animal products associated with the individual planets and zodiacal signs were gathered at the astrologically favorable moments, and were combined into drugs that were specifics for diseases caused by the stars.

Astral magic. The same kind of association of terrestrial objects with celestial bodies, and many others, were utilized in the practice of magic. Since Allāh has delegated to each of the zodiacal signs, fixed stars, decans, and planets the power to cause certain changes in the sublunar sphere, and as each of these stellar bodies has at its command demon agents who carry out the changes decreed by the stars, the manipulation of the appropriate terrestrial objects, the performance of the designated rituals and sacrifices, and the recitation of the prescribed prayers at the astrologically propitious moments, will induce the stellar deities to grant the magician's petition and to dispatch demons to carry out his wishes. The forms of astral magic practiced by Islamic astrologers represent a fusion of the Neoplatonic theurgy of Ḥarrān with material from Indian, Sasanian, and other Near Eastern Sources.

Celestial omens. Striking astral and meteorological phenomena had been regarded as omens in Mesopotamia before the Old Babylonian period, and from there the belief in such portents had spread to Iran, India, Egypt, and Greece during the rule of the Achaemenids. In theory, these divine omens contradict the determinism of astrology, but in practice those who believe in astrology also believe in celestial omens. Since planetary omens had to a large extent been absorbed into astrology as a means of determining the strengths of the planets. Celestial omens in Islam consisted primarily of eclipses, perihelia, mock suns, and weather phenomena like lightning, thunder, rain, snow, hail, rainbows, and cloud formations. Most of these omens were interpreted according to the month, day, or hour at which they occurred, the direction in which they were observed, and the color (where applicable) of the phenomenon.

Astrology was constantly practiced in Iran during the Islamic period, though from time to time theologians denounced it as based on a denial of Allāh's omnipotence. However, as an intellectual tradition, its vitality was less sustained and after the hectic activity of translation and synthesis that occupied the astrologers of the eighth and ninth centuries, between the late ninth and thirteenth centuries authors merely compiled vast compendia of



excerpts from their predecessors' writings. The only country in which some new material appeared was India, where both the Toghloqs in the fourteenth century and the Mughals in the sixteenth and seventeenth sponsored the translation of Sanskrit texts into Persian. However, as far as we know, these had little impact either in India or in Iran. Contemporary Iranian astrologers probably are more inclined to use European and American than medieval Islamic manuals.

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For the writings of individual Iranian astrologers see the articles on these.

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