Yavanajātaka

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The *Yavanajātaka*, attributed to the Greco-Indian Sphujidhvaja, is one of best-preserved specimens of Greco-Indian astral treatises composed around the middle of the first millennium CE. It belongs to a subset of Jyotiṣa literature known as *horā* (horoscopy) with notable foreign influences associated with the Yavanas (Greeks). The extant recension of the text contains about 2270 verses. It deals with various topics in horoscopy and other indigenous forms of astral divination, with content that provides a reflection of the Indian society at the time of its composition. Although the *Yavanajātaka* was known to Indian astronomers from at least the seventh century, the *Yavanajātaka* does not appear to have been widely circulated. Interest in this text was generated among Indian and western scholars since the late nineteenth century, and in particular through the meticulous studies by David Pingree during the second half of the twentieth century.

AUTHORSHIP AND DATE

The *Yavanajātaka* (YJ), literally "Genethliallogy of the Greeks," is an astral treatise in Sanskrit on topics that deal largely with a variety of Indianized Hellenistic horoscopy. Little is known concerning its provenance and the author Sphujidhvaja beyond the latter's bilingual Greek–Sanskrit construction, namely, "[one bearing] flag (*dhvaja*) of Venus (*sphuji*<*asphujit*<Ἀφροδί[τη])" (Kern 1865; Pingree 1978). It has been suggested that the "Lord of the Greeks" (*yavaneśvara*), described as the author of the text, is associated with the Greek settlers who lived within the "domains of the WESTERN KṢATRAPAS in those areas of India later known as Gujarat, Mālwā, and Rajasthan" during the reign of Rudradāman in the second century CE (Pingree 1978: I.3). Dating of the *Yavanajātaka* has undergone a series of misguided speculation (see below) and was recently revised after careful re-examination and in the light of new evidences (Falk 2001; Mak 2013; Brown 2018). The text gives no date of composition and has no use of the *bhūtasaṃkhyā* system of numeral expressions. It contains references to the Śaka era (78 CE) and the Koṣāṇa era (127 CE–227 CE?) (*see* KANIṢKA ERA), making its composition no earlier than the second, and possibly third, century CE. YJ 79.15 mentions the Indian astronomer Vasiṣṭha, whose extant work *Vasiṣṭhasiddhānta* cited in the *Pañcasiddhāntikā* uses an epoch of 499 CE, suggesting possibly therefore an even later *terminus post quem*. There are two testimonia of the text: (i) Bhāskara's *Āryabhatīyabhāṣya* (629 CE), commentary on *Āryabhaṭīya*, *Kālakriyāpāda*, v.16 (YJ 79.55, 57–8); and (ii) Bhaṭṭotpala's *Jagaccandrikā* (966 CE), commentary on Varāhamihira's *Bṛhajjātaka* 7.9 (YJ 79.15). References to *Yavanajātaka* or *Sphujidhvaja* are not found in the sixth-century *Bṛhajjātaka*, where multiple Yavana authors and their works are mentioned. Although the text contains likely earlier astrological and astronomical materials, including the reference to an epoch of 22 CE (YJ 79.14) and astronomical observation of that period as pointed out in Brown (2018), the composition of the *Yavanajātaka* is unlikely to predate the *Bṛhajjātaka*, and should be placed sometime between 550 and 600 CE.

HISTORY OF INTERPRETATION

The authorship and dating of the *Yavanajātaka* have been the subject of a series of speculations over the past century or so. In 1897, Shastri first published his tentative decipherment of what he considered to be the colophon of the *Yavanajātaka*. He interprets the two unusual expressions "*viṣṇugraha++++*" [sic] and "*nārāyaṇāṅkendumayādi*" [sic] in the last chapter of the text to be *bhūtasaṃkhyā*

The Encyclopedia of Ancient History: Asia and Africa. D. T. Potts (General Editor), Ethan Harkness (General Editor), Jason Neelis (General Editor), Roderick McIntosh (General Editor).

DOI: 10.1002/9781119399919.eahaa00596

expressions representing two dates, 91 and 191, of an unknown era. Shastri hypothesizes that the two dates are connected to two writers, Yavaneśvara and Sphūrjjidhvaja [sic], who are the authors of the prose and versified versions of the text respectively, and further speculates the era to be Śaka. Kane (1955a, 1955b) deciphers other portions of the texts and accepts Shastri's proposal with the revision of era to Gupta and the author's name to Sphujidhvaja. Pingree (1963, 1978) follows Shastri's Śaka-era interpretations and revises the *bhūtasaṃkhyā* reading of the first date to Śaka 71 [sic]. Combining the above assumptions, Pingree establishes that the *Yavanajātaka* is a work composed in 269/270 CE by Sphujidhvaja; it was a versified version of a lost prose translation made by Yavaneśvara in 149/150 CE based on a lost Greek exemplar composed in Alexandria. These claims make the *Yavanajātaka* a progenitor of all later *horā* works, as well as one of the earliest dated texts in the extant Sanskrit literature (Pingree 1978).

Objections over Pingree's Hellenocentric interpretation of various aspects of the text have been raised by a number of scholars: Zimmermann (1981) on the salient Indian elements such as Ayurveda in the text; Shukla (1989) on the faulty mathematics in Pingree's edition and his unwarranted emendations in the last chapter; and Falk (2001) on the interpretation of the epoch and the problem with the Kuṣāṇa era. With respect to the authorship and dating of the text, the Shastri–Pingree interpretation turns out to be untenable upon the re-examination of the manuscript sources and the discovery of a new manuscript in 2011 in Kathmandu by Japanese scholar Michio Yano (Mak 2013). There is no indication that Yavaneśvara was the original author, let alone the existence of a prose Sanskrit translation from a putative Greek exemplar from Alexandria. Both past scholar Bhaṭṭotpala and modern scholar Kern interpret Yavaneśvara, literally "Lord of the Greeks," as an epithet for Sphujidhvaja. The two spurious *bhūtasaṃkhyā* expressions appearing in Pingree's edition of the text are the results of his misreading and emendation. The readings from the two manuscripts, (i) *viṣṇugrahakṣ<ā>ṅsu++++<tārā>t* (N)/*viṣṇugraha<kṣe>++tāvatārāt* (Q) and (ii) *nārāyaṇā<rke>ndumayādidṛṣṭām* (N)/*nārāyaṇārkendumayādidṛṣṭāṃ* (Q), describe instead the lineage of transmission of the text: Viṣṇu, Sun, Moon, and Maya. This explains why these passages contain no words for "year" or any era, as the text gives no date of composition.

CONTENT

Horoscopy and other divinatory techniques

Horoscopy was unknown in Vedic India. The accompanying planetary lore and the concept of the zodiac with twelve equally divided signs is absent in the *Vedāṅgajyotiṣa*, the earliest Vedic astral treatise extant. Although the origin of horoscopy is certainly Greco-Babylonian, the horoscopy described in the *Yavanajātaka* has no known parallel in any extant Greco-Babylonian sources. Some idiosyncratic details of the iconography of the zodiacal signs described in the first chapter, titled "The Nature of the Signs and Planets" (*gṛhagrahasvarūpa*), such as the male–female Gemini (*mithuna*) instead of the male twins, and Virgo (*kanyā*) as a torch-bearing maiden riding on a boat in water, are unknown in Greco-Roman sources and could be of Egyptian origin (Pingree 1978). Some subdivisions of the signs into halves, thirds (*drekkāṇa* < δεκανός), and so on, appear to be similar to their Hellenistic counterparts. Other subdivisions, such as those of sevenths (*saptāṃśa*), ninths (*navāṃśa*), and twelveths (*dvādaśāṃśa*), are not attested in Greek sources. The ninth part of a sign (*navāṃśaka*) plays a particular and important role in the *Yavanajātaka* as in all extant specimens of Indian horoscopy. A possible explanation is that the zodiacal circle contains 108 *navāṃśakas* (12×9), a number divisible by twenty-seven, which is the number

Table 1 Key astronomical constants and values in the *Yavanajātaka* (Mak 2013: 76–7; **bold** indicates corrected values, cf. Pingree 1978).

Content	Verse no. in ch. 79 of YJ
Beginning of the epoch of luni-solar *yuga*: **22 March 22 CE**	4/14
Omitted *tithis* (*avama*) = *tithis* – civil days [I]	5
Rising of asterism = civil days + Sun's revolution [II]	8
Intercalary month (*adhimāsa*) = synodic months – solar months [III]	10
In one luni-solar *yuga* of 165 solar years, there are:	3
61,230 *tithis*	6
61,230 – 958 (omitted *tithis* or *avama*) [I] = **60,272 civil days**	7
58,231 risings of the Moon	8
60,272 + 165 [II] = 60,437 risings of asterism	8
1980 solar months	9
1980 + 61 [III] = 2041 synodic months	9
2,206 sidereal months (synodic months + Sun's revolution)	9
From the above values,	34
1 solar (sidereal) year = $\mathbf{365\frac{47}{165}}$ **days** ≒ **365.28485 days**	
1 synodic month = $\mathbf{29\frac{1083}{2041}}$ **days** ≒ **29.53062 days**	
1 sidereal month = $\mathbf{27\frac{355}{1103}}$ **days** ≒ **27.32185 days**	
1 solar month = $\mathbf{30\frac{872}{1980}}$ **days** ≒ **30.44040 days**	
Other relations given in the text:	5
1 *tithi* = 63/64 civil days	
1 civil day = **64/63 *tithi***	5
1 civil day = 30 *muhūrtas* (*m*)	7
1 *kuḍava* = 3 1/8 *palas*	28
1 *nādikā* = 60 *liptās* = 61 *kuḍavas*	28
1 civil day = 60 *nādikā*	28
1 *kalā* = 790 *nimeṣas*	29
1 *nādikā* = **10 *kalās*** (*k*)	29
1 *muhūrta* = 2 *nāḍikās*	29
1 civil month = 30 days	11
1 solar month = 30 days, 13 *m*, $(4 + \frac{8}{33})\ k = \mathbf{30\frac{872}{1980}}$ **days**	11
1 synodic month = 29 days, 16 *m*, $(-2 + \frac{762}{2041})\ k = \mathbf{29\frac{1083}{2041}}$ **days**	12
1 sidereal month = 27 days, 9 1/2 *m*, $(3 + \frac{121}{1103})\ k = \mathbf{27\frac{355}{1103}}$ **days**	13

of *nakṣatras*. From these details one can see that the *Yavanajātaka* has its origin in a certain variety of Hellenistic horoscopy that was modified before or while it was transmitted to India.

The *Yavanajātaka* contains some noteworthy Indian elements, such as *karma*, Ayurveda, Indian deities and castes, *nakṣatra* lore, divination using the Sanskrit alphabet, and so on (Zimmermann 1981; Sarma 2008; Mak 2013). The extent of these uniquely Indian elements suggests that the work was originally conceived as an adaptation instead of a translation. The religious outlook of its author is Brahmanical, with a notable antipathy toward the Kāpālikas (Mak 2013, 2014), skull-wielding ascetics of a transgressive form of Śaivism that emerged in India sometime around the fifth century and

was associated with the Tantric movement in India.

The astronomical chapter

The last chapter of the *Yavanajātaka* (chapter 79 in Pingree's edition) deals exclusively with topics of mathematical astronomy and calendrics. It is the only extant Sanskrit source that refers explicitly to Greek astronomy and is therefore of historical significance. It discusses a wide range of topics which are later considered standard in *siddhānta* astronomy: astronomical cycles with a given epoch, calendrical computation with four types of months (lunar, solar, sidereal, and civil), intercalation, true and mean motion of the planets, time measurement, the computation of weekdays, and so on (Mak 2013: 67). As in the *Vedāṅgajyotiṣa*, there is no use of zero or *bhūtasaṃkhyā* in a place-value system (Mak 2018: 8). The use of an astronomical cycle (*yuga*) of 165 years, described as "the best of the Greeks" (*yavanottamānām*) and compared to a work of Vasiṣṭha (YJ 79.3), has no known parallels. Many of the key astronomical constants and values used in the work (see Table 1) appear to be unique.

As in the earlier non-astronomical chapters, materials of both Hellenistic and Indian characters are found in this last chapter in an amalgamated manner at a granular level of analysis (Mak 2019). The use of the Greek unit *liptā* (from λεπτόν) and the sexagesimal time units unknown in the *Vedāṅgajyotiṣa* suggests the Greek influence on the work. On the other hand, uniquely Indian elements such as references to the Śaka era, the Kuṣāṇa era, and the use of Vedic time units such as *pala* and *kuḍava*, suggest strong Indian influences. The computation of planetary weekday (YJ 79.53), uncommon in Hellenistic astral text, is standard in all Indian astral treatises since the *Āryabhaṭīya* of the fifth century CE. The use of *tithi* (an artificial division of a thirtieth of a synodic month) as the base time unit, described as the *bīja* ("seed," or "essence") of the astronomical system (YJ 79.6) finds precedent in early Indian works such as the *Vedāṅgajyotiṣa*, but not in any extant Hellenistic sources. The description and specification of the Indian water-clock (YJ 79.27) is reminiscent of that of *Arthaśāstra* 2.20.34. Although the conspicuously non-Vedic materials in the *Yavanajātaka* are certainly of ultimately foreign origin, Sphujidhvaja appears to have modeled his works on an Indian source. The text is therefore an amalgamation of two astronomical traditions, a unique Indian adaptation of a variety of Hellenistic astral science for a learned Indian audience.

Relationship with *Vṛddhayavanajātaka* and *Bṛhajjātaka*

The overall content and structure of the horoscopic portion of the *Yavanajātaka* is comparable to Mīnarāja's *Vṛddhayavanajātaka* (Pingree 1976) and Varāhamihira's *Bṛhajjātaka*. Like Sphujidhvaja, nothing is known about its author Mīnarāja except his epithet as Lord of the Greeks (*yavanādhirāja*) and the possibly Greek–Sanskrit bilingual construction of his name, Mīnarāja as "King of Mὶν [πόλις] (Śaka settlement on the Indus River)," as Pingree suggests. From the testimony of al-Biruni, and also the number of surviving manuscripts, the *Vṛddhayavanajātaka* appears to have enjoyed much greater popularity than the *Yavanajātaka*, of which only two near-complete manuscripts are extant. Both texts claim to have followed the lineage of Maya, whose work of 100,000 verses is no longer extant. Most importantly, the two works contain nearly eighty-four identical verses in a pattern that suggests that the *Vṛddhayavanajātaka* most likely predates the *Yavanajātaka* (Mak 2014, 2018). Metrical archaism in some chapters of the *Vṛddhayavanajātaka*, together with the absence of later cultural references such as the Kāpālikas, suggest that the *vṛddha* in the title may be interpreted as "old," or "older" as a means to disambiguate it from the later *Yavanajātaka* or other *horā* texts. Though no

date is given in the *Vṛddhayavanajātaka*, the presence of the pseudoplanet Rāhu and the absence of Ketu point to a form of pre-*navagraha* Indianized horoscopy created likely during the early centuries of the Common Era, before *śānti* rites featuring *navagraha* are established in texts such as the *Yājñavalkyasmṛti* of the fourth century CE.

The relationship between the *Yavanajātaka* and the *Bṛhajjātaka* has not been fully explored. The *Bṛhajjātaka* contains Sanskritized Greek vocabulary such as those of the zodiacal signs not found in the *Yavanajātaka*. Among the astronomers mentioned in the *Bṛhajjātaka* are Maya, Yavana, Maṇittha, Parāśara, Śakti, Viṣṇugupta, Devasvāmin, and Siddhasena. While Yavana could be a reference to Mīnarāja or Sphujidhvaja, both styled as "Lord of the Greeks," the common reference to Maya is perhaps the most important clue that connects the three works.

SEE ALSO: Astrology in the pre-Islamic Iranian world; Kaniṣka era; Western Kṣatrapas.

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