

# Greco-Babylonian Astral Science in Asia: Patterns of Dissemination and Transformation

Bill M. Mak

## Abstract

Greco-Babylonian astral science had a wide dissemination throughout Eurasia during the first millennium CE. The traditional model proposed by Neugebauer, Pingree and Yano revealed how certain unique astronomical and astrological ideas spread unilaterally to India and China under different guises. This paper proposes an supplementary model where scientific notions exemplified in culturally hybrid astral texts such as the *Yavanajātaka*, *Gārgīyajyotiṣa*, *Xiuyao jing* 宿曜經, and *Qiyao rangzai jue* 七曜攘災決, are treated as conglomerates of smaller packages of knowledge rather than texts representing unique monolithic traditions. These bodies of foreign knowledge invariably interacted with the indigenous systems, in India and China where an astronomical tradition was already firmly established and a process of negotiation thus ensued. Different strategies were developed to absorb certain aspects of the foreign knowledge into the indigenous ones.

**Key words:** Indian astronomy, Greco-Babylonian astronomy, Chinese astronomy, Indo-Greeks, Sino-Indian cultural exchange

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## 1. Introduction

Greco-Babylonian astral science had a wide dissemination throughout Eurasia during the first millennium CE. The model proposed by Neugebauer and Pingree reveals how certain unique astronomical and astrological ideas from Babylonia and the Hellenistic world spread almost unilaterally to India and subsequently to China<sup>1</sup>. This presents, however, only half of the picture as the transmission of foreign ideas does not entail wholesale reception. Rather foreign knowledge often undergoes an uneven process of acculturation, where parts of it may be readily absorbed, others transformed, rejected or quietly ignored. This paper explores how

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<sup>1</sup> It may be noted that such statement is in no way contradictory to the larger picture of circulation of astral knowledge, as in the case of Indian mathematics and astral science introduced to Europe via the medieval Islamic intermediaries. Our interest here focuses on what took place during the initial contact and from the perspective of the indigenous recipient.

foreign astral knowledge interacts with its indigenous Indian and Chinese counterparts, and proposes a supplementary model where culturally hybrid astral texts such as the *Gārgīyajyotiṣa*, *Yavanajātaka*, *Xiuyao jing* and *Qiyao rangzaijue* may be treated as conglomerates of smaller packets of knowledge of heterogeneous sources rather than adulterated products of their exemplars belonging to a certain unique, monolithic tradition. Such fluid interaction between systems of knowledge results in the bewildering heterogeneity of the resultant texts that is often difficult to characterize. With this framework in mind, this paper examines the hybridity of these Sanskrit and Chinese astral texts and attempts to reveal the contexts in which they emerged. In particular, emphases are placed on the importance of proper editions, produced with a sound knowledge of their sources and a keen awareness of the complexity of the issues involved.

## 2. Formation of a pre-modern astral texts in India and China

A text is a coherent body of words, composed and organized as “conveying the authentic or primary form of a particular work” (OED). What is a translation then? It is “a written or spoken rendering of the meaning of a word or text in another language” (OED). In Western scholarship, a work is associated with the notion of implicit originality, which translation often lacks. However, in pre-modern India and China, and in fact upon scrutiny, as in many other parts of the ancient world, the modern concept of an authentic, original work does not always apply. A text may simply be a mindful (and in some cases, less so!) compilation of materials, akin to its original etymological sense of *texere* or “to weave,” where the result is a product artfully crafted from a variety of materials available to the author-compilers, original or recycled. Thus, leaving aside the question of originality of the “woven” text, or the idea of an individual, original author, what is often more revealing about these works is how the texts were put together, the criteria for the choice of materials, and the intended readers for whom these purportedly new works were composed.

Similarly, caution should be taken with regard to the notion of translation in pre-modern works associated with foreign sources. What purported to be a translation or a work bearing a foreign title does not entail a mere mechanical replica from one language to another as we now define what translations are<sup>2</sup>. Rather than measured by how faithful they are to the original, interpretation and creativity, for better or worse, are often factors not to be overlooked in the production of such texts.

The four astral works we examine here: *Yavanajātaka*, *Gārgīyajyotiṣa*, *Xiuyao jing* 宿曜經, and *Qiyao rangzai jue* 七曜攘災決, are all transmitted as coherent texts or at least purportedly so in their extant recensions. While all these texts contain materials clearly translated from a foreign exemplar, they could not be considered translation in the strictest sense. The source of

these works may not have been singular or uniform to begin with. It might have been transmitted orally or in a written form, which may in turn be translation, citation from other works, paraphrases, or something originally composed. To accurately assess the homogeneity of these text or the lack thereof, one needs to apply critical philological skills to establish the text in the best possible way. In other words, one should first and foremost aim to produce an edition of the text, with minimal emendation, and with the maximal conviction that the text was composed by its author with the intention to deliver a sensible body of knowledge, regardless of its sources or how well the author actually achieved his goals. These goals may include the coherence and completeness of ideas, and the soundness of the logic and mathematical correctness involved. Secondly, as ancient texts are transmitted through intermediaries such as scribes and translators, errors and all kinds of deviation from the source are common. The task of the editor is thus to provide the best reading amidst the variants, and in some cases, with a prudent application of emendation. A proper edition of the astral texts in question should allow the reader to see with utmost clarity the original text as intended by the past author, as understood by the present editor. Instead of producing a mere diplomatic edition that purports to be objective, a competent editor, unless he claims to have no understanding of the text he edits, should never shy away from making critical editorial decisions and should supply emendations as he sees fit. Lastly, a good edition should provide an accurate record of what those decisions are and the evidences from the manuscripts and other sources by which those decisions are made. A good guess is always better than no guess, and if there are sufficient evidences presented with clarity in an edition, there is always a chance for better interpretation by the reader if the latter does not agree with the choice of the editor.

### 3. *Yavana-jātaka*

#### 3.1 Text

The first complete edition together with a full English translation and commentary was published by Pingree in 1978. To put simply, Pingree considered the Sanskrit text to be a versified version of a prose translation of a Greek astral text composed in Alexandria some

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<sup>2</sup> An outstanding example would be the large corpus of Chinese Buddhist translations, which contains beside clear cases of translations and apocrypha, also cases where translated materials were compiled or underwent further transformation. See Funayama Tōru, 船山徹. 2011. "Learning, plagiarism and forgery: a few observations on the significance of 'parallel' passages in Indian and Chinese Buddhism." In 中国印度宗教史とくに仏教史における書物の流通伝播と人物移動の地域特性 (*Regional characteristics of text dissemination and relocation of people in the history of Chinese and Indian religions, with special reference to Buddhism*) 平成19年度～平成22年度科学研究費補助金(基盤研究(B))研究成果報告書. Kyoto: Institute for Research in Humanities, Kyoto University, pp.257-281, particularly, pp.277-281 on what the author described as "Chinese Buddhist Compilation Scriptures."

time prior to the second century. He identified the versified and prose versions of the text to be dated to 269/270 CE and 149/150 CE respectively, and considered the text to be a progenitor of most subsequent Greco-Indian astral works<sup>3</sup>. Furthermore, he claimed to have identified the earliest dated representation of zero in a decimal place-value system in the text, and possibly among all Sanskrit texts<sup>4</sup>. All these claims have been shown to be untenable in the subsequent re-examination of the source materials and in view of the discovery of the new ones<sup>5</sup>. It may be noted that while still in his twenties, the young Pingree, who followed the footsteps of Neugebauer, made these sensational claims while looking for the missing links between Hellenistic astral science and its Indian counterpart (as well as a topic for his PhD thesis to be submitted to University!)<sup>6</sup>. For the following few decades, these discoveries were viewed by the Western scholarly world as a tremendous success. To the merit of Pingree, his 1978 edition of the text, developed largely from his Ph.D. thesis titled *Materials for the Study of the Transmission of Greek Astrology to India* completed in 1960, was meticulously put together with a full critical apparatus, together with extremely erudite annotations and commentary on the parallel Greek, Latin, Arabic, and other Sanskrit passages. As a result, Pingree's two-volume edition of the *Yavanajātaka* is much more than just an edition; it is a comprehensive study of the formation of Greco-Indian astral science and the Indian *jyotiṣa* tradition, unparalleled in scope and most exhaustive in references.

The discovery of Pingree's incorrect claims with regard to the dating, interpretation of zero and *bhūtasamkhyā* leads us to further investigate Pingree's methodology and his approach to his source materials. To start with, Pingree created his text based on a single Nepalese manuscript (N) which he described as extremely faulty. Such claim was used for Pingree's justification of his rather liberal emendation. Furthermore, some of his emendations turn out to be faulty especially in the chapter of mathematical astronomy, as pointed out by K.S. Shukla in 1989<sup>7</sup>. Shukla's criticism of Pingree's unwarranted emendation and failure to understand the

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<sup>3</sup> David Pingree, "The Empires of Rudradāman and Yaśodharman: Evidence from Two Astrological Geographies," *Journal of the American Oriental Society* 79 (4): 268. Also by the same author, *The Yavanajātaka of Sphujidhvaja* (Cambridge: Harvard University Press, 1978), Vol. 1, p. 3.

<sup>4</sup> *Ibid.*, Vol. 2, p. 406.

<sup>5</sup> Bill M. Mak, "The date and nature of Sphujidhvaja's *Yavanajātaka* reconsidered in the light of some newly discovered materials," *History of Science in South Asia* 1 (2013): 1-20; also, "The Last Chapter of Sphujidhvaja's *Yavanajātaka* critically edited with notes," *SCIAMVS* 14 (2013): 59-148.

<sup>6</sup> Pingree started out his investigation of Indo-Greek astral science by examining the *Vṛddhayavanajātaka*, a work of which he produced an edition. For an updated discussion on this work, see Bill M. Mak, "The First Two Chapters of Mīnarāja's *Vṛddhayavanajātaka*," *Zinbun* 48 (2018): 1-31. Pingree never completed the translation and analyses of this work as he intended, after he realized the greater importance of the *Yavanajātaka* when the manuscript materials were made available to him by P. V. Kane, the erudite Indian scholar who previously worked on this work.

<sup>7</sup> K. S. Shukla, "The Yuga of the *Yavanajātaka*—David Pingree's text and translation reviewed," *Indian Journal of History of Science* 24.4 (1989): 211-223.

basic, underlying mathematical principle of the text remains without response. The so-called Hipparchus' value for the length of the solar year as well as the "earliest zero" are all Pingree's own emendations not attested in any extant manuscripts. This is certainly not good news, as it sounds like as if one of the most respected scholars in Indian history of science fabricated his findings. Be that as it may, Pingree's insight into the connection between Greek and Indian science remains highly valuable, as there are no other ways to explain some of the unique features the two systems share such as the use of sexagesimal units replacing older ones, the lore of horoscopy with twelve signs and twelve *topoi* (astrological places), and a body of Greek astronomical/astrological loanwords which make no sense in Sanskrit<sup>8</sup>. Given our understanding of the evolution of Indian astral science from the Vedic period up to the classical period of the *Siddhāntas*, it is beyond doubt that the Hellenistic materials had been an important influence. The evidences for transmission simply have to be sought elsewhere. Moreover, given Pingree's problematic treatment of the text in his edition and the availability of new materials, a new edition of the work is a desideratum.

### 3.2 Content

*Yavanajātaka*, the title of the text, means literally the "genethliacal astrology of the Greeks (*yavanas*)." However, a label should not be taken at its face value without a thorough consideration of its actual content, just as no connoisseur of foreign cuisines would endorse their originality without actually tasting them and without the caveat of their often assumed authenticity. Indeed, from whose perspective should this text be considered Greek? As the text was composed in Sanskrit, the Greekness of the text was necessarily a concept addressed to and defined by the Sanskrit readership. To evaluate the Greekness of the text, there are no other ways than to examine the text itself. In Figures. 1 (a) and (b), I have shown two models of analyses by looking at the Greekness of the text by chapters and by verses from the final portion of the text (Chapter 71-79) respectively:

The Indianness or Greekness of the segments of the text is defined by how strongly the materials thereof may be characterized unequivocally as such, and may be described under the five categories as follows (summarized in Table 1):

- i) Unique Hellenistic elements: Greco-Sanskrit lexica, e.g., *horā*, *liptā*.
- ii) Hellenistic system overlaid with Indian elements, e. g., Greco-Indian horoscopy, weekday astrology.

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<sup>8</sup> Michio Yano 矢野道雄, "Greek Words Borrowed in Sanskrit Astronomical and Astrological Texts" (in Japanese) インドの占星術・天文学書に見られるギリシア語からの借用語について," in *The Bulletin of the International Institute for Linguistic Sciences Kyoto Sangyo University* 京都産業大学国際言語科学研究所所報8 (1987): 74-85; Klaus Karttunen, Yonas and Yavanas in Indian Literature. (Helsinki: Finnish Oriental Society, 2015), pp. 368-375.

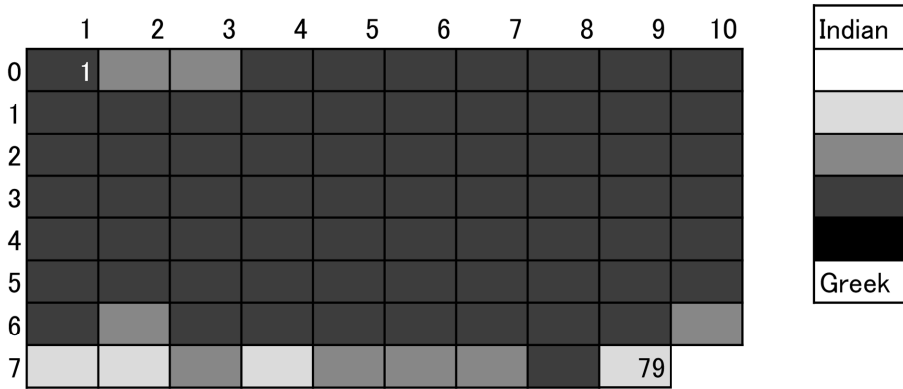


Figure 1 (a). The character of the *Yavanajātaka* by chapter

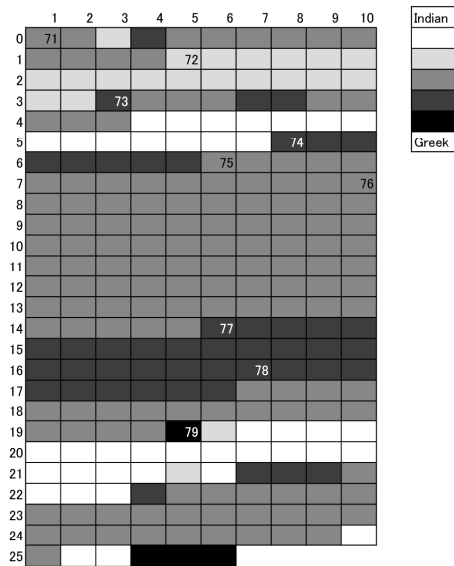


Figure 1 (b). The character of the *Yavanajātaka* by verse (Ch. 71-79)

Table 1. Five categories of Indianness (A)/Greekness (B)

A	Indian
Undisputedly A	
Likely A with some features shared in B	
Common to A and B	
Likely A with some features shared in A	
Undisputedly B	
B	Greek

- iii) Common elements shared in both Hellenistic and Indian systems or systems with mixed elements of both Hellenistic and Indian origin: *Yātrā* (military astrology) based on *nakṣatras* and Hellenistic weekday astrology.

- iv) Indian system overlaid with Hellenistic elements, e.g., *Yuga* system using *tithi* as base time unit, but with Hellenistic planetary model.
- v) Unique Indian elements: *nakṣatras*, *tithi*, *karma*, *āyurveda*.

While there are inevitably some preconceived notions as to what constitutes Greekness or Indianness based on the extant materials and some arbitrariness in assignment, what is apparent here is that the Greekness of the *Yavanajātaka* varies depending on where and how closely we look into the text. The latter portion (Ch. 71–79) of the text is arguably less Greek than the rest as shown in Figure. 1(a). If we take a granular view of this latter portion as in Figure. 1(b), we see a more contrasted pattern in which uniquely Greek materials are juxtaposed against those uniquely Indian. In defining a text like the *Yavanajātaka* as Greek and foreign, Pingree overlooked the heterogeneity of the composition of the text and rather facetiously argues that the Indian elements are simply interpolations to the translation of the Greek original<sup>9</sup>. This interpretation is based on his assumption that the text was based directly on an unknown text composed in Alexandria, a claim that finds no support whatsoever within the text itself.

Once we have moved beyond such unfounded and methodologically unsound assumptions and reexamine the text as it is, it becomes clear that the long list of the uniquely Indian elements is in fact tightly embedded within the text. These includes both astral and general concepts such as: *Tithis*, *nakṣatras*, *navāṃśaka*, the two pseudoplanets Rāhu and Ketu (lunar nodes), references to the four Indian castes (*varṇa*), the concept of *karma*, the Āyurvedic system of the *triṅṇa*, and a host of Indian deities and characters, including a description of the inauspicious skull-wielding Śaiva ascetics (*kāpālīka*, unlikely to be earlier than the fifth century). There were also predictions connected with the Sanskrit alphabet and military astrology (*yātrā*) with twenty-eight *nakṣatras*. If interpolation has become so pervasive, one wonders whether the work should be considered a translation after all. If we separate these disparate features into those which are undisputedly Greek (sexagesimal units, geometric division of celestial sphere and horoscopy), and undisputedly Indian (*nakṣatras*, *tithis* as basic units of astronomical calculation, cultural concepts such as karma and castes), we can see how Sphujidhvaja, the author of the *Yavanajātaka*, most likely drew his sources from existing materials that were already products of such amalgamation of two distinct bodies of astral lore. In the last chapter of the work, Sphujidhvaja contrasted the Indian astronomer Vasiṣṭha's view against his understanding of the Greek's (97.3), computed the planetary revolution within a

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<sup>9</sup> The introduction of these Indian materials, according to Pingree, are made by the “versifier–translator” Sphujidhvaja, based on the prose original by Yavaneśvara. See Pingree, *The Yavanajātaka of Sphujidhvaja*, Vol. 1, p.5. I have argued that the *Yavanajātaka* is an original composition, neither a direct translation nor a versification, and that Yavaneśvara and Sphujidhvaja are the same person. See Mak, “The date and nature,” p. 14.

Table 2. References to the *Yavanas* in the *Yavanajātaka*

Chapter	Occurrence	Forms
1	6	yavanābhidhānam (1.49b) yavaneṣu vindyāt (1.50d) yavanair niruktāḥ (1.61d) yavanair niruktāḥ (1.63b) nirukto... yavanopadeśāt (1.92b) yavanendrakalpe (1.123c)
2	1	yavanair niruktās (2.5a)
3	2	yavanākhyayā (3.1b) niruktā yavanair (3.38a)
8	1	yavanair niruktā (8.23d)
11	1	yavanākhyayā (29.1a)
36	1	niruktā yavanaiḥ purāṇaiḥ (36.2d)
38	1	yavanair niruktāḥ (38.10d)
59	1	yavanā nirūcuḥ (59.4b)
77	1	yavanapradhānaiḥ proktaḥ (77.9ab)
78	1	yavanā nirūcuḥ (78.3d)
79	3	yavanopadeśād (79.1c) yugo ravindvor yavanottamānām (79.3c) idaṃ babhāṣe... yavaneśvaraḥ prāk (79.61cd)

*yuga* of 165 years based on the Indian unit *tithi* (97.3–6), defined the Epoch with Indian eras such as Śāka and Koṣāṇa (97.14–15), and provided the conversion of at least two sets of incommensurable time units—Vedic and Hellenistic (97.28)<sup>10</sup>. In these verses, the author plays the role of a mediator between the old Vedic science and the new knowledge inspired by some form of Hellenistic astral science. Such amalgamation attests to the creativity of Indians as they came into contact with a foreign culture, mediated most likely by people who had access to both cultures, generically labelled as the “Indo-Greeks” or “Greco-Indians.” There is in fact no better analogy of the hybridity of the materials found the *Yavanajātaka* than the name of the author itself, *Sphujidhvaja*, which is a portmanteau construction meaning “Venus-flag,” in half Greek and half Sanskrit, as Pingree himself has pointed out<sup>11</sup>.

A comparison of the *Yavanajātaka* with other similar texts such as the Mīnarāja’s *Vṛddhayavanajātaka* and Varāhamihira’s *Brhājātaka* suggests that the *Yavanajātaka* is unlikely a progenitor of other Indian *jātaka* texts as Pingree claims. Sphujidhvaja refers to the *yavana*-s (often in plural) in twenty instances (Table 2), indicating his access to some other external source(s)<sup>12</sup>. Furthermore, the presence of some nearly identical materials between the *Yavanajātaka* and the *Vṛddhayavanajātaka* raises the question of originality of at least one or possibly both works<sup>13</sup>. Though judging from internal evidences that the *Yavanajātaka* could

<sup>10</sup> For a critical re-evaluation of these verses, see Mak, “The Last Chapter,” pp. 83–125.

<sup>11</sup> Pingree, *The Yavanajātaka of Sphujidhvaja*, Vol. 1, p. 5.



be dated anytime between the hypothetical Epoch of 22 CE and its terminus ante quem of 629 CE<sup>14</sup>, given its citations of other sources, its reference to Vasiṣṭha, and that neither the work nor the name of Sphujidhvaja was known to Varāhamihira, I would suggest that the most likely date of the final compilation of the work should be some time around or shortly after Varāhamihira, that is, in the late sixth century.

The lesson we learned from Pingree is that the overzealousness in looking for the *Urkanon*, or the ultimate source, could lead us to some very misleading claims, overlooking completely the organic process which results in textual patterns that cannot be so clearly defined. The *Yavanajātaka*, though presented as a foreign text of the *Yavanas*, is the product of a member of the learned Indian community, who was keen to demonstrate to his fellow members the superiority of this new system inspired by the Greeks. Prior to the composition of the *Yavanajātaka*, what kind of Indo-Greek astral texts existed, how long did this process of amalgamation take place, what texts were involved and who were the translators, are perhaps questions that can no longer be satisfactorily answered given the paucity of extant materials. To be fair to Pingree, it was perfectly legitimate for him to look for all these Greek connections; it just so happens that they are not all found in this particular text. As there are still at least a dozen of *yavana* manuscripts that still await analyses, a more complete picture of the transmission of Greco-Babylonian astral science in India may emerge in the future, especially if these works are subjected to more rigorous examination together with other early *jyotiṣa* works prior to Varāhamihira such as the *Gārgīyajyotiṣa*.

## 4. *Gārgīyajyotiṣa*

### 4.1 Textual sources

The Sanskrit text of the *Gārgīyajyotiṣa* in sixty-four chapters has been transmitted in one form or another since its formation during the early centuries of the first millennium up to the nineteenth centuries, when manuscripts of the texts were still copied with a varied degree of accuracy. The antiquity of this text can be inferred by the references found in the *Mahābhārata*<sup>15</sup>. Within the *jyotiṣa* tradition itself, Garga was known to early authors such as

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<sup>12</sup> It seems to me rather odd that if the work was indeed based on an original Greek treatise as Pingree claimed, why would the Greek author refer to other authors as the “Greeks” (*yavana-*) instead of either referring to specific authors or remaining silent to his Greek readers by default? The authors mentioned in the *Yavanajātaka* such as Garga and Vasiṣṭha are all Indians.

<sup>13</sup> See discussion in Mak, “The First Two Chapters,” pp. 10–11, where I posit two most likely scenarios, namely Sphujidhvaja in Ch. 12–18 cited and redistributed the seven sets of consecutive verses in the *Vṛddhayavanajātaka*, or that both descended from an older source no longer extant by Maya.

<sup>14</sup> Mak, “The date and nature,” p. 17; “The Last Chapter,” p. 81.

<sup>15</sup> Marko Geslani, Bill M. Mak, Michio Yano, and Kenneth Zysk, “Garga and early astral science in India,” *History of Science in South Asia* 5.1 (2017): 151–191.

**Table 3. Manuscripts of the *Gārgīyājyotiṣa* (G1)**

* A	Asiatic Society Bengal Calcutta. 1D20. 160 ff. JHM C-177 PMF 597.
* B	Benares 36370. (1878) 122. 137 ff. CESS A2, 117.
* Bh	BORI 542 of 1895/1902. 226 ff. CESS A2, 117. JHM C-135 PMF 285.
* D	National Library, Calcutta. Th319. 295 ff. A5-78.
* E	BORI 345 of 1879/80. 232 ff. CESS A2, 117.
F	BORI 36 of 1874/75. 79 ff. CESS A2, 117. JHM C-177 PMF 572. JH C-154X. From Aṅga 36.
* G	Cambridge Trinity College. R. 15.96. 109 ff. CESS A2, 117. JHM C-175 PMF 491. Pingree transcription "DEP notes <i>Gargasamhitā</i> , 1 of 2" (APS Box 14).
* H	Banaras Hindu University. 2B/1288. No. 34. 227 ff. CESS A5, 78.
* L	National Library, Calcutta. Th171. 147 ff. CESS A5, 78.
* M	Bombay U Desai 1433. 192 ff. CESS A2, 117. JHM C-173 PMF 408.
* N	National Library, Calcutta. Th216. 228 ff. CESS A5, 78.
* P	Paris BN 245.1. Sanscrit Bengali 184. 207 ff. CESS A2, 117; A3, 29.
* Q	Rajasthan Oriental Research Institute, Alwar. 2549-2603. 186 ff. A5, 78.
* R	Rajasthan Oriental Research Institute, Alwar. 2548-2603. 245 ff. A5, 78.
* S	Benares 35311. 201 ff. CESS A2, 117.
W	National Library, Calcutta. Th218. 46 ff. CESS A5, 78. From Aṅga 36.

Mīnarāja in his *Vṛddhayavanajātaka* (third century CE?) and Varāhamihira in his *Bṛhatsamhitā* (sixth century CE). Thanks to the effort of the Garga workgroup established in 2016, the hitherto unedited text of this massive work is gradually coming into light. Our workgroup has identified in total sixteen manuscripts of G1, among which fifteen manuscripts contain the astral chapters (indicated by asterisk, Table 3)<sup>16</sup>.

An important task prior to the critical edition of the text is to evaluate the reliability of the extant manuscripts and to produce a provisional stemma codicum<sup>17</sup>. At present, some significant discrepancies and variants are noted between the extant manuscripts and the older testimonia from Buddhist sources and Utpala's commentary to the *Bṛhatsamhitā*<sup>18</sup>. Somewhat disturbingly the titles of the sixty-four chapters supposedly given in the introductory section of the work titled *aṅgasamuddeśa* do not tally with the chapter headings of the manuscripts, suggesting that our text in its extant corrupt state may be beyond a satisfactory recovery.

<sup>16</sup> This collection is based largely on Mitchiner's pioneering work. See John E. Mitchiner, *The Yuga Purāna* (Calcutta: Asiatic Society, 1986), pp. 21-25. The sigla follow those of Mitchiner. \* indicates manuscripts which are only partially available to us. APS = American Philosophical Society, Pingree archive; JH = John Hay Library Pingree Collection; JHM = John Hay Library microfilms.

<sup>17</sup> See Mak (forthcoming), "Planetary science and time-reckoning in the *Gārgīyājyotiṣa*," paper presented at the panel "Frontier research on the *Gārgīyājyotiṣa*," The 17<sup>th</sup> World Sanskrit Conference, Vancouver, Canada, July 12, 2018.

<sup>18</sup> See Bill M. Mak, "Tithikarmagaṇa in *Gārgīyājyotiṣa*—Tithi worship according to a number of early sources," *Journal of Indian and Buddhist Studies* 66.3 (2018): 958-911.

## 4.2 Content

If Babylonian astral science plays a vital role in its Hellenistic counterpart, and if the Indians were in contact with the Hellenistic world even before Alexander's campaign, it would not be inconceivable to find Babylonian elements in the early Indian astral sources. Since Mesopotamia was in fact geographically closer to India and was culturally dominant in Eurasia before the rise of the Greeks, one would reasonably expect some form of contact between the Indians and the Babylonians, whether directly or mediated by other intermediary cultures. It was under such assumption that Neugebauer and Pingree engaged in the comparative analysis between Babylonian astronomical and astrological materials and their Indian counterpart. As Neugebauer was a mathematician, he was interested mostly in the mathematical elegance in an astronomical system. The Babylonian astronomical system is characterized by the use of twelve-part division of the celestial sphere as coordinate (zodiac signs), the use of sexagesimal unit and an arbitrary division of a synodic month into thirty "days" in the lunar table. For the first two, since they are not present in the entire Vedic corpus, chronologically they were most likely transmitted to India as part of Hellenistic astral science. For the last feature, it finds a correspondence in the Indian concept of "tithi," that is, the arbitrary division of a synodic month into thirty parts. There are however some key differences between the two. To start with, such division appears to be used as a matter of convenience in the construction of lunar table to avoid the anomalistic movement of the Moon. There is no evidence that such arbitrary division was ever used as a discrete time unit, nor does it have any other significance both astronomically or culturally in the Babylonian context. In fact, such time division was never given a special designation other than just "day" in cuneiform sources. In the case of the Indian "tithi," though etymologically of uncertain origin, it plays an important role in ancient Indian society as shown in texts such as the *Gārgīyajyotiṣa*, where each of the fifteen *tithis* of each half, or *pakṣa* of the synodic month is associated with a particular divinity and a set of auspicious and inauspicious activities to be performed or avoided. Furthermore, as we have seen earlier in the case of the *Yavana-jātaka*, the *tithi* was used as a base unit in the *yuga* system of astronomical computation, a method that is not attested in Babylonia, Greece or anywhere else. Despite such differences, rather misleadingly Neugebauer called the corresponding Babylonian concept "tithi," and suggested this Babylonian "tithi" to be the origin of the Indian *tithi* (!). Similarly misleading was Pingree's attempt to identify the twenty-seven or twenty-eight *nakṣatras* with the Babylonian normal stars expressed in Akkadian. Leaving aside the obvious fact that both the Indians and the Babylonians were looking at the same stars which render such superficial comparison problematic to start with, the Babylonians in fact never had a discreet system of twenty-seven or twenty-eight *nakṣatras*, let alone to use them as coordinates.

In 1987, Pingree published his article on the Venus Omen, comparing the materials found

in the Venus chapter (*śukracāra*) in the *Gārgīyajyotiṣa* and the Akkadian texts *Enūma Anu Enlil* and *Šumma Ālu*, providing thus the “first step toward the goal of explicating [the] Indo-Mesopotamian connection<sup>19</sup>.” Yet these first steps were rather shaky ones, considering that unlike the *Yavanajātaka* which he edited, the Sanskrit text of the *Gārgīyajyotiṣa* was not even edited or published and the readers were asked to accept his interpretation by faith. The comparison between the Babylonian omens and their Indian counterparts (supposing Pingree’s reconstruction to be correct) appears also dubious and the resemblance Pingree proposed could only be sustained with a fair amount of cherry-picking<sup>20</sup>.

By becoming obsessed with this question of singular origin, one has overlooked what the text actually presents. As myself and other scholars begin to examine the content of this text, we see that this text is a large compilation of astral lore, once again, just like the *Yavanajātaka*, from materials of diverse sources<sup>21</sup>. An examination of the topics of the text suggests that the author, or the compiler, known as Garga, was most concerned with the topic of omens, to which the astral phenomena played an important role. In this text, the rituals and omens associated with the uniquely Indian concepts of *nakṣatras* and *tithis* are the subject-matters of the first chapter. In other chapters, one finds references to the *yavanas*, namely, the Greeks, including the well-known *Yugaṭpurāṇa* where the Greek invasion of India was described anachronistically in a prophetic fashion. To validate Neugebauer and Pingree’s Mesopotamian hypothesis, one would first need to have a proper methodology to isolate these materials as belonging to an older layer of the text. Failing that, the superficial resemblance of certain omens in the Indian and Mesopotamian sources leads to no definitive result, leaving with us the possibility of transmission in either direction as well as from possibly an altogether different source.

## 5. *Xiuyao jing*

### 5.1 Textual sources

In 759 CE, the Central Asian Buddhist teacher Amoghavajra produced with the help of his Chinese disciple Shi Yao 史瑤 an astral compendium titled *Wenshushili pusa ji zhuxian suoshuo*

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<sup>19</sup> David Pingree, “Venus Omens in India and Babylon,” in *Language, Literature, and History: Philological and Historical Studies presented to Erica Reiner*, edited by F. Rochberg-Halton, AOS 67 (New Haven: American Oriental Society, 1987), p. 293.

<sup>20</sup> The comparison was made with the help of John Steele at Brown University in April 2017 and the some of the results were presented at the 228<sup>th</sup> meeting of the American Oriental Society in Pittsburgh, U.S. on March 17, 2018, under the title “Garga and the Astronomical Chapters of the *Gārgīyajyotiṣa*.”

<sup>21</sup> An example to illustrate the way the author of the text compiled different materials may be found in the Venus chapter itself (*Śukracāra*). On the topic of omens on the sixfold *maṇḍala*-division of the path of Venus, three sets of theories were presented, attributed presumably first to Garga himself (vv. 76-82), then Pitāmaha (vv. 83-100), and finally the Great Sages (vv. 127-134).

*jixiong shiri shan'e xiuyao jing* 文殊師利菩薩及諸仙所說吉凶時日善惡宿曜經, literally “Treatise on the Auspicious and Inauspicious Times and Days, Good and Bad Nakṣatra-s and Planets, as Proclaimed by the Bodhisattva Mañjuśrī and the Sages.” Five years later in 764 CE, Yang Jingfeng 楊景風, another disciple of Amoghavajra who was a Tang official at the Bureau of Astronomy, produced a revision of the text. The two editions of the text circulated as two fascicles of one text, which later became an authoritative manual for all matters related to calendars, astronomy and astrology in the Esoteric Buddhist tradition. This work is particularly important in Japan even today and was credited as one of the earliest sources to have introduced the concept of planetary weekdays to East Asia. The convoluted transmission of this text in China and Japan is described in detail in Yano’s *Mikkyō senseijutsu* 密教占星術<sup>22</sup>.

There are two main recensions of the work: Japanese and Chinese. The Japanese recensions are represented by over a dozen Sino-Japanese manuscripts preserved in various locations in Japan<sup>23</sup>. The Chinese recensions are represented by no less than four block print versions (Korean, Jin, Song, Ming) of the text. Some of the major differences between the two recensions include the omission of a number of passages in the introductory chapter and the complete omission on the chapter on weekday computation in the Chinese recension. Currently, there is no published edition of the Japanese recension<sup>24</sup>.

## 5.2 Content

Similar to other Indian astral compilation such as the *Gārgīyajyotiṣa* or Varāhamihira’s widely popular *Bṛhatsaṃhitā*, the *Xiuyao jing* is composed of thematic units loosely strung together. An analysis and comparison of the materials from the two recensions reveal the relation between the two fascicles composed by the two authors Shi Yao and Yang Jingfeng (Table 4). Largely speaking, Yang’s version of the text is an expansion and a revision of Shi’s. While both versions are attributed to their teacher Amoghavajra, at least in the case of Yang’s version, it is clear that Yang, the Chinese court official, was responsible for the eloquent introduction and the new and last chapter on weekday computation adapted from Gautamsiddhārtha’s *Jiuzhi li* 九執曆. Some materials from Shi’s new versions are removed while others are replaced. For example, Shi’s multilingual description of the names of the weekday in Chinese, Sogdian, Persian and Sanskrit disappeared, presumably thought to be no

<sup>22</sup> Yano Michio 矢野道雄, *Mikkyō senseijutsu* 密教占星術 (Tokyo: Tokyo Bijutsu, 1986). An English translation prepared by Mak with corrections by Yano is currently in print, and is scheduled to be published in 2019 by Aditya Prakashan.

<sup>23</sup> Hayashi Takao 林隆夫 and Yano Michio 矢野道雄, “Two Versions of the *Xiuyao jing* and the Doshisha Manuscript” (in Japanese) 『宿曜經』の二系統と同志社写本, in 第50回同志社大学理工学研究所研究発表会 2012年度学内研究センター合同シンポジウム講演予稿集 (京都: 同志社大学, 2012), pp. 22-27.

<sup>24</sup> A collated edition of text using five Japanese manuscripts/redactions and four Chinese block print versions was prepared by Mak in 2016.

Table 4. Comparison of first/second fascicles and Japanese/Chinese redactions of the *Xiuyao jing* (Ch.=Chapter, Ja/Jb=Japanese recension (Kakushō), T=Taishō Tripitaka)

Topic	Title	Yang ed.			Shi ed.	
		Ch.	Ja	T1299-1	Jb	T1299-2
0.0 Preface	序		1a	387a	-	-
1.1 General descriptions of zodiac signs, nakṣatras and planets	定宿宮圖	1	1a	387a	-	-
1.2 Sign-nakṣatra relation, sign astrology	十二宮生屬	1	2b	387b	-	-
1.3 Chart of 12 signs with nakṣatras, months and ruling planets	Y: 天竺十二宮圖 S: 二十七宿 十二宮圖	1	5b	395a	5b	395a
1.4 Indian epoch and months	天竺曆元	1	6a	388a	6a	394c
1.5 Modified chart of 12 signs with Chinese elements	新修十二宮圖	1	7b	-	-	-
1.6 Indian nakṣatras-tithi calendar	月宿傍通曆	1	8a	-	-	-
1.7 <u>Converting tithis into nakṣatras</u>		-	-	-	6b	394c
1.8 <u>Chinese lunar mansion day calendar</u>	大唐月建圖	1	-	388a	-	-
1.9 Uneven division of nakṣatras		1	9b	388b	7b	395b
2.1 Nakṣatras-tithi natal astrology	宿直所生	2	10b	388c	7b	395b
2.2 Seven classes of nakṣatras	(安重, 和善…)	2	20a	390c	12a	396c
2.3 <u>Inauspicious directions in travel</u>	行動禁閉法	-	-	-	14b	397a
2.4 <u>Clothes</u>	裁縫衣裳服用 宿法	(2)	(10b)	(388b)	16b	397b
3.1 Three enneads of nakṣatras	三九祕宿	3	21b	391a	16b	397c
3.2 Inauspicious conjunction of planets and nakṣatras; astronomical calculation	五星日月犯宿	3	22b	391c	19a	398a
4.1 <u>Description of seven planetary days with multilingual glosses</u>	七曜直日 (外語名)	-	(23a)	-	20b	398a...399b
4.2 Planetary divination	七曜占	4	23a	391c	19b	398c
4.3 Inauspicious planetary directions	面衝七曜	4	23a	391c	-	-
5.1 Three types of weekday-nakṣatra-tithi combinations	秘密雜占 (曜宿合)	5	26a	392c	24a	398b
5.2 Avoidance of Venus	秘密雜占 (擇太白)	5	26b	-	25a	399b
5.3 Inauspicious conjunction of planets with six types of nakṣatras	秘密雜占 (曜犯六宮宿)	5	27b	392b	-	-
5.4 Interrogative horoscopy with planets and places	秘密雜占	5	27b	392b	-	-
5.5 Lost horoscope and nakṣatra melothwsia	秘密雜占	5	28a	392b	-	-
6.1 Auspicious and inauspicious tithis	黑白月分	6	28b	392c	1a	393c
6.2 Fifteen tithis, their deities and fortunes	黑白月日善惡	6	29b	(Ch. 7) 393a	2a	394a
7.1 Weekday computation	算曜直 (法)	7	31a	-	-	-

longer necessary since the formulae for weekday computation are given in Yang’s version. Some other changes are noted in the Chinese recension, such as the inclusion of the Chinese lunar mansion calendar and some sporadic variants of twenty-eight instead of twenty-seven lunar mansions in the later Chinese block print editions, are possibly a reflection of subsequent tendency of sinicization by the Chinese scribes. Although the text in all redactions purport to be a translation based on an exemplar composed by the Bodhisattva Mañjuśrī, from the analyses above it is clear that the work is a collaboration between multiple parties, namely Amoghavajra and his two disciples. In addition, in Yang’s edition, annotations are often marked by the expression *Jingfeng yue* 景風曰 (“according to Jingfeng”) or *Tangyun* 唐云 (“in Tang,” hence, in Chinese) to separate certain passages from the main text. Thus, while most of the materials are likely to be Indic or Central Asian in origin, the composition and the rearrangement of the content made by the two Chinese editors each contains unique features of its own and should not be considered as translation contrary to its own claim.

## 6. *Qiyao rangzaijue*

### 6.1 Textual sources

The *Qiyao rangzaijue* (hereafter, QYRZJ), or “Essence of seven-planet appeasement,” is a Chinese astral compendium composed by a Sino-Sogdian \*Kaṃkuṭa 金俱吒 some time in the ninth century CE. The author was described in the text as a Brahman 婆羅門 of the country of West India 西天竺國, although this description could have been a generic one for foreign monks of any non-Buddhist religion from the West, i.e., Central Asia and beyond. The text cites a number of Buddhist works, but contains also a substantial amount of non-Buddhist materials not attested in the extant Buddhist corpus. In fact, the QYRZJ itself was never incorporated into the official Chinese Buddhist canon and had very likely a very limited circulation in China before it vanished altogether in China after the Tang Dynasty. It was brought from Chang’an to Japan by the monk Shūei 宗叡 in 865 CE. where it became one of the main texts of the Sukuyōdō, the Japanese astral school of the esoteric lineage. It was through the Japanese transmission that the text of QYRZJ survives up to the present day.

There are at least three editions of the QYRZJ extant in Japan, all likely descendants of the same ninth century copy Shūei brought from China. The oldest copy is the Sakai edition 酒井本 transmitted through a lineage of masters of the the Sukuyōdō and it contains a colophon describing its earlier redaction in year 3 of Hōan 保安三年 (1122). Another copy dated to year four of Meiwa 明和四年 (1767) is currently kept in the Shimoura Collection 下浦文庫 at the Tokyo University of Science 東京理科大学. Lastly, a block print edition which underwent multiple redactions by the monks of the Buzan Sect of Shingon Buddhism 真言宗豊山派 was published in year three of Bunsei 文政三年 (1820). This last edition was based on the a



manuscript kept in Hasedera Temple 長谷寺 in Nara, which is likely the same as the manuscript dated to year two of Kyōwa 享和二年 (1802) and used for the rather corrupt Taishō edition (T1308) in Vol. 21 of the Taishō Tripiṭaka (*Taishō shinshū daizōkyō*) 大正新脩大藏經 edited from the 1920s to 1930s<sup>25</sup>.

## 6.2 Content

The QYRZJ is a compilation of smaller texts or excerpts from a variety of astral texts and does not give an impression of a congruous composition. The ritualistic content nonetheless occupies a significant portion of the text as the title suggests, but auxiliary topics marginally connected to the planetary apotropaism are included. The text is largely divided into fifteen parts as follows:

- i. Preamble: Basic astronomical definitions and the general principle of solar and lunar genethliacal astrology.
- ii. Planetary appeasement rite (*grahaśānti*) 七曜攘災法: The effects of seven luminaries (in the order of Sun, Moon, Jupiter, Mars, Saturn, Venus and Mercury) in one's Natal Lodge (*mingxiu* 命宿, *janmanakṣatra*) or Natal Star (*mingxing* 命星). Topics include characters of the native, special instances (eclipse, etc.) and a set of apotropaic rituals involving the drawing of the deity to make an amulet, wearing the amulet and the method of discarding it.
- iii. Coordinate system of the lunar lodges 宿度法: Coordinates of the twenty eight unevenly divided lunar lodges following the Chinese polar coordinate system established since Western Han<sup>26</sup>. These coordinates are to be applied to the ephemeris in part ix.
- iv. Chart of seven luminaries in twelve houses 七曜旁通: A simplified chart given the general outlook of a particular luminary in one of the twelve houses (*topoi*). Luminaries are given in the order of Sun, Moon, Venus, Jupiter, Mercury, Mars and Saturn.
- v. Navagraha profecion 九曜行年: A concise description of the profecory outlook of the seven luminaries in their Sogdian names together with the two Indian pseudoplanets Rāhu and Ketu. A short description of the tastes (*rasa*) associated with the luminaries Mars, Mercury, Jupiter and Saturn.
- vi. Sun and Moon in twelve houses: A more detailed description of the effects of the two luminaries in the twelve houses. The content is incompatible with that of (iv).
- vii. "Lost horoscope" (*naṣṭajātaka*): A description of three procedures to determine the Natal Lodge (*janmanakṣatra*) based on the *Xiuyao jing*. The first procedure is based

<sup>25</sup> Yano Michio, "The *Ch'iyao jang-tsai-chueh* and its Ephemerides," *Centaurus* 29 (1986): 28.

<sup>26</sup> Ibid, pp. 29-30; see also Yabuuti Kiyoshi 藪内清, *Chugoku-no tenmon rekihō* 中国の天文曆法 (東京: 平凡社, 1969), pp. 54-64.



on the body part the querist touches, corresponding to one of the twenty-eight lunar lodges (melothesia). The second and third procedures are computational based on one's birth day and month, and are comparable to the Greek rectification methods given in *Tetrabiblos* 3.2 and *Anthologiae* 1.4.

- viii. Astral *dhāraṇī*: Sanskrit (or psuedo-Sanskrit) mantras for the astral deities in the order of *navagraha*, *saptarṣi* (Seven Stars of the Northern Dipper), Sun, Moon, Mars, Mercury, Jupiter, Venus, Saturn, Rāhu, and Ketu.
- ix. Ephemeris of the luminaries: A presentation of the goal-year periods of Jupiter, Mars, Saturn, Venus and Mercury, Rāhu and Ketu, giving their monthly positions in year columns within the rotational cycle of the luminary.
- x. Miscellaneous Chinese astrological terms. Chinese geographical correspondences to the twenty-eight lunar lodges. Correspondence of twelve earthly branches to the twelve Chinese Jupiter stations (次).
- xi. Propitiatory rituals toward the five luminaries 五星供養: Rituals prescribed for Venus, Jupiter, Mercury, Mars and Saturn, with depiction of the deity, Buddhist sūtras or mantras to be recited, objects to be offered and specific rites to be performed.
- xii. Miscellaneous hemerology and horoscopy: Four sets of catarchic techniques borrowed/developed from the *Xiuyao jing*—a) Combination of *nakṣatra*-day and planetary weekday; b) Four divisions of twenty-eight *nakṣatra* days (*Xiuyao jing*: three divisions of twenty-seven *nakṣatras*); c) general horoscopy based on malefics in the ascendent and other houses; d) Seven divisions of twenty-eight *nakṣatra* day. One set of genethlical astrology (e) based on planetary days described in Sogdian in the standard weekday order (also from *Xiuyao jing*). The section ended with a mantra of *saptarṣi* which is different from the one earlier.
- xiii. Ecliptic coordinate of the twenty-four solar terms beginning from the winter solstice: The section begins with a remark on the discrepancy of solar motion counting from the twelfth year of Kaiyuan 開元 (724 CE).
- xiv. Horoscopy: A detailed exposition of the effect of the five luminaries (Mars, Mercury, Jupiter, Venus, Saturn) in the twelve houses. The houses were presented from the ascendent, followed curiously by the twelfth house (destitute) going backward to the second house (wealth).
- xv. Colophon: A variety of information given in different editions. This includes, a) A description of the twelve earthly branches in uneven degrees; b) An assignment of the Seven Stars of the Northern Dipper to the twelve earthly branches; c) A simplified table of giving the *nakṣatra* of the New Moon and Full Moon day of each month; d) A truncated set of remarks on horoscopy involving concept of triplicity and diurnal/nocturnal birth; e) Lineage, dates and other remarks.

The disparate content of the QYRZJ may be broadly grouped into three categories in terms of their functions, namely, i) appeasement planetary rituals, ii) techniques for determining the planet to be propitiated, and lastly, iii) auxiliary astronomical knowledge.

### 6.2.1 Appeasement planetary rituals

The materials from section (ii) and (xi) fall into this category, which is the main topic of the text as the title suggested. The materials described in section (ii) fittingly prescribed the appeasement rites for the seven planets. The order of the planets, namely Sun, Moon, Jupiter, Mars, Saturn, Venus and Mercury is unattested but resemble closely the Chinese convention and the planets were described also in terms derived from Chinese sources as exemplified in the *Tianguan shu* 天官書 of Western Han (Table 5)<sup>27</sup>. The content is however decidedly foreign as its application is connected to a variety of cathartic astrology which depends on the conjunction of the planet with one's Natal Star 命星 and the four seasons. The Natal Star is a fictive astral entity not defined in this section but variously elsewhere. The planetary iconography (Table 6) is attested in a number of non-Buddhist Chinese sources as well as somewhat rarely, sources associated with the Sukuyōdō<sup>28</sup>.

Section (xi), titled *Wuxing gongyang* 五星供養, describes a set of Buddhist propitiatory rituals toward only the five planets Venus, Jupiter, Mercury, Mars and Saturn, without Sun and Moon. The iconography of the five planets resembles those in a number of extent works associated with the *Jvaloṣṇīṣa* (\**Tejaprabha*) astral worship, characterized by animal headdresses (Table 6)<sup>29</sup>. It is likely the source of one distinct genre of Esoteric Buddhist planetary iconography<sup>30</sup>. The application is connected to cathartic astrology which depends on

<sup>27</sup> That is, Sun, Moon and Five Stars. The order of the Five Stars as exemplified with slight difference by astrological texts such as the *Wuxing zhan* 五星占, is Jupiter, Mars, Saturn, Mercury and Venus. See Christopher Cullen, "Wu xing zhan 五星占 'Prognostics of the Five Planets'," *SCIAMVS* 12 (2011): 221. The change was likely motivated by an attempt to conform the associated direction to the Chinese convention, namely East-South-Center-West-North as exemplified in the *Huangdi Neijing* 黃帝內經 dated likely to the Western Han.

<sup>28</sup> Some of representation of the seven planets described in the QYRZJ (ii), namely Jupiter, Saturn and Venus are found in an eighth century copy of a scroll titled *Wuxing er shi baxiu shenxing tu* 五星二十八宿神形圖, attributed to royal painter Zhang Sengyou 張僧繇 of the early sixth century, currently kept at the Osaka City Museum of Fine Arts. See Stephen Little and Shawn Eichman, *Taoism and the Arts of China* (Chicago: Art Institute of Chicago, 2000), pp. 132-137. The exact representation is found appended to a Japanese Buddhist scroll dated year 2 of Tenji 天治二年 (1125), purportedly based ultimately on an exemplar dated year 3 of Tenkei 天慶三年 (940) and is most likely made from the text of QYRZJ (ii), currently kept in the Metropolitan Museum of Art.

<sup>29</sup> The most outstanding example is the Dunhuang scroll painting "Zhisheng huoguang bing wuxing tu" 熾盛光佛并五星圖 by Zhang Huaixing 張淮興 dated to year 4 of Qianning 乾寧四年 (897) currently kept in the British Museum. For discussion on the *Jvaloṣṇīṣa* (\**Tejaprabha*) astral worship, see Mak (in print), "The Buddhist transmission of *Grahamātrkādhāraṇī* and other planetary astral texts," *Pacific World*, Third Series, 20 (2019).

Table 5. Chinese sources of the description of the planets in the QYRZJ

Sun	-
Moon	Essence of <i>Taiyin</i> 太陰之精
Jupiter	Son of Blue Emperor of the East 東方蒼帝之子
Mars	Son of Red emperor of the South 南方赤帝之子
Saturn	Son of Yellow Emperor of the Center 中方黃帝之子
Venus	Son of White Emperor of the West 西方白帝之子
Mercury	Son of Black Emperor of the North 北方黑帝之子

Table 6. Iconography of the five planetary deities in the QYRZJ

Venus	Woman garbed in yellow. Fowl headdress. Playing a pipa.
Jupiter	Old man garbed in blue. Boar headdress. Solemn demeanor.
Mercury	Woman garbed in blue. Mink headdress. Holding a scroll.
Mars	Copper teeth of red. Angry demeanor. Donkey headdress. Cladded in leopard skin. Four armed, with one arm each holding a bow, an arrow, a knife [and nothing].
Saturn	Brahman in black. Ox headdress. One hand holding a staff and another pointing forward with his finger, slightly crooked.

the entrance of the planet in the Natal Lodge 命宿/ Natal House 宿命宮 (note difference of terminology with Natal Star in (ii)), with the additional condition based on the Sogdian planetary weekdays.

In addition, a set of astral *dhāraṇī* is given in (viii). The conditions for the recitations of these mantras are given explicitly only the first two, namely that of *navagraha* and *saptarṣi*. The *navagraha śānti* mantra is recited when the Natal House is afflicted by Sun and Moon, and is in conflicting configuration with the Five Stars. The *saptarṣi* mantra is recited when the Natal Star/House is afflicted by Rāhu or Kētu. One would suppose the remaining *dhāraṇī* to be recited as part of the propitiatory ritual for the respective planet. This is however not explained here nor mentioned elsewhere in (ii) and (xi).

### 6.2.2 Auxiliary astronomical knowledge

The idea that planets bring out fortune or misfortune depending on its position in the heaven is present in both China and the ancient Near East. However, to apply divinatory techniques on an individual utilizing planetary movement requires one to first have an accurate grasp of planetary motion against the background of fixed star (sidereal coordinate), as well as a frame of reference that is in some ways tied to the native by means of the birth time (genethliacal) or time of query (cathartic). The types of techniques used in the QYRZJ are as shown in Table 7.

<sup>30</sup> The same iconography is reproduced in later Esoteric Buddhist works such as the *Fantian jiuyao huoluo* (T1311) and the same Buddhist scroll in the Metropolitan Museum of Art collection described earlier.

**Table 7. Techniques used in the QYRZJ**

Section	Techniques	Specific technical knowledge required
(ii)	Catachic. To determine whether the period one of the seven planet traverses the querist's Natal Lodge/Star is auspicious or inauspicious.	c) Definition of Natal Lodge (vii) Alternative methods to determine the native's Natal Lodge.
	Additional condition: solar and lunar eclipses.	An advanced manipulation of the data provided in (iii) and (ix) with a set of techniques not given in the text.
	Additional condition: fixed days in four seasons.	(xiii) Ecliptic coordinates of the twenty-four solar terms.
(iv)	Catachic Horoscopy with twelve houses and seven luminaries. Used possibly in conjunction with (xiv) although the formats are different.	Ascendent/Ascendent house not defined, and the method to determine it is thus presumed to be identical to that of the Natal Lodge/Star/House (ii).
(v)	Catachic Horoscopy with dašā-like techniques applied to nine luminaries.	Techniques given only partially in this section.
(vi)	Catachic Horoscopy with twelve houses and Sun and Moon.	Same as (iv).
(vii)	Lost horoscope.	Three procedures given here are derived from <i>Xiuyao jing</i> .
(xii)	a) Catachic hemerology based on the combination of <i>nakṣatra</i> -day and planetary weekday.	Borrowed from <i>Xiuyao jing</i> . Definition of <i>nakṣatra</i> is given partially in (xv). Computation of the planetary weekday is not given.
	b) Catachic lunar hemerology. Four divisions of twenty-eight <i>nakṣatra</i> -days.	Derived from <i>Xiuyao jing</i> . Indication of sinification.
	c) Catachic horoscopy. Case of malefics in various configuration.	Comparable to <i>Xiuyao jing</i> 5.3/5.4.
	d) Catachic lunar hemerology. Seven divisions of twenty-eight <i>nakṣatra</i> -days.	Borrowed from <i>Xiuyao jing</i> .
	e) Planetary weekday genethliology.	Borrowed from <i>Xiuyao jing</i> .
(xiv)	Catachic horoscopy with twelve houses and Five Stars. Used possibly in conjunction with (vi) although the formats are different.	Same as (iv). A schematic horoscope diagram given at the beginning of this section.

The QYRZJ is not an astronomical treatise and it provides just the bare minimum of astronomical knowledge necessary to understand how the Natal Lodge/House may be determined through the various charts and ephemeris provided in the text, along with the computational and interpretative techniques mentioned above. Some basic astronomical principles and constants are given in the preamble (i) and the colophon (xv). Two coordinate systems, polar and ecliptic are given in (iii) and (xiii). The ephemeris for nine planets (not seven) including the two Indian pseudoplanets Rāhu (lunar node) and Ketu (lunar apogee) is given in (ix). Some information given in the text has no application elsewhere, such as the definition of traditional Chinese astrological terms in (x). The latter suggests the piecemeal nature of the work. Since materials from the three functional categories are usually treated as

separate genre in all traditions, Chinese, Indian, Greek or Near East, the selection the author of QYRZJ made appears to be expedient, albeit totally arbitrary.

## 7. Conclusion

In both India and China during the first millennium of the Common Era, foreign astral science was highly sought after given the important role such knowledge played in the indigenous cultures. A long and established tradition of astral learning both India and China often means that foreign ideas could only be properly introduced in reference to existing concepts and customs. This is in contrast to cases where indigenous systems were incomplete or undeveloped; in such cases the foreign system overtook the former. This is the case of Japan and Southeast Asia where the Indian variety of Greco-Babylonian astral science survived intact and became a recognizable feature in their method of time reckoning and cosmological vision. In India and China, the mediator of new foreign knowledge often had to come up with different strategies to compile, translate and interpret materials for a given audience. The aforementioned works: the *Yavanajātaka*, *Gargasamhitā*, *Xiuyao jing* and *Qiyao rangzai jue*, all share the common goal to introduce to the natives a new body of astral knowledge which contains a variety and a varied amount of foreign materials. Rather than a straightforward translation, the composers assembled materials thought to be relevant and of interest, translated, paraphrased and in some cases, reinterpreted them in manners that were comprehensible in the technical language. While the results are naturally mixed, contemporary editors such as ourselves must always exercise caution when we edit the texts, bearing in mind the variety of factors that might have led to each variant reading and that a sympathetic and cautious approach has proven to be more than useful to not only unravel the meaning of the texts, but also to make a tentative step into the cosmos the authors envisioned.