Further Observations On the Rigvedic Code

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1. Introduction

It was recently shown by one of us (Kak 1992b, 1992c) that the organization of the hymns in the Ṛgveda represents an astronomical code. Since the Ṛgveda represents the oldest book that has come down to us, the discovery of this code is of great significance for the understanding of the Rigvedic phase of the Indian civilization as well as the development of early science including mathematics and astronomy. The discovery of this code has shown that recent interpretations of the Ṛgveda have been one-sided.

The total number of hymns in the Ṛgveda is 1017 which is 339×3. It was argued in Kak (1992b) that this number represents the astronomical fact that the sun and the moon cross the sky, from rising to setting, in 339 measures of their diameters. This measure of 339 is also related to the fact that the sun as well as the moon are about 108 times their diameters away from the earth. In other words, $108\times\pi\approx339$. Since 360 is the canonical number of the year and 339 is assigned to the sun (or the space and the sky), the earth is assigned the number 21. Furthermore, the year of 366 days was divided into two equal parts of 183 days, the uttarāyana and the dakṣiṇāyana where the uttarāyana was taken to belong to the devas. Apparently, the 339 steps of the sun were now reconciled with the 183 count of the devas by postulating a space count of 78, since $339=183+2\times78$. This mapping may be seen in the Śatapatha Brāhmaṇa and also in the Vedic altars (Kak 1991). For example, the gārhapatya altar that represents the earth is surrounded by 21 stones. On the other hand, the āhavanīya altars for the space and the sky have 78 and 261 stones, respectively. The organization of Ṛgveda is replete with other astronomical numbers, which is consonant with the view that it reflects a long process of observation and development (Kak 1992a).

To summarize the method of this research, observe that the Rigvedic hymn numbers have not been considered in isolation, although the profusion of astronomical numbers associated with the year that one finds in the book would raise the question if there existed a deliberate plan behind their choice. The hypothesis that led to the discovery of the Rigvedic astronomical code was taken from the Satapatha Brahmana itself where it is clearly stated that the Ṛgveda is to be taken as an altar of mantras (ŚB 10-4-2).

But clearly the nature of the problem implies that conclusive proof of the decipherment of the code cannot be provided by the Ṛgveda itself. The validation for the decipherment is provided by a series of interlocking pieces of evidence at different levels.

This paper present further interpretation of the Rigvedic code which is validated by the literary evidence from the Ṛgveda and other early Indian literature. In particular, we argue that the code may be interpreted to imply the Rigvedic hymns were written in the geographical region of the Sarasvati valleys. These arguments further strengthen the interpretation of 339 as the number of sun or moon-steps.

2. The Code

The Anukramaṇīs ascribe books 2 to 7 to the ṛṣis Gṛtsamada, Viśvāmitra, Vāmadeva, Atri, Bharadvāja, and Vasiṣṭha or their families. Book 9 is a collection of hymns by several rsis to Soma Pavamāna, or Soma poured through the filter. Book 1 which consists of 191 hymns is classed into 15 groups of hymns by different seers. Book 10 also consists of 191 hymns and its first 84 hymns are classed into 25 groups based on ṛṣis, and its remaining 107 hymns are counted singly.

The classification of the family books 2 to 7 is based on hymns to different gods and these groups are 5, 4, 11, 7, 5, 12 respectively. Book 8 hymns are grouped according to the particular seers of the Kaṇva family. Including the Vālakhilya hymns these constitute 19 groups. The hymns of Book 9 are grouped into 7 according to the metre. These metres are Gāyatrī, Jagatī, Triṣṭubh, Anuṣṭubh, Uṣṇnih, Pragātha, and miscellaneous. These hymns are by a host of ṛṣis including Bhṛgu, Kaśyapa, and Kavi Uśanas. This information is summarized in Table 1.

TABLE 1: Hymns and Groups

Mandalas	1	2	3	4	5	6	7	8	9	10
Hymns	191	43	62	58	87	75	104	92	114	191
Groups	15	5	4	11	7	5	12	18	7	25+107

When the Ṛgveda is considered akin to the five-layered altar described in the Brāhmaṇas (Kak 1991) then the first two books should correspond to the space intermediate to the earth and the sky. Now the number that represents space is 78. When used with the multiplier of 3 for the three worlds, this yields a total of 234 hymns, which is indeed the number of hymns in these two books. The Rigvedic books were shown as a five-layered altar of mantras in Kak (1992b).

This arrangement may be represented by the book sequence

2-1 3-4 5-6 7-8 10-9 [Altar 1]

in the five layers courting from bottom up and left to right. The choice of this arrangement was prompted by the considerable regularity in the hymn counts as seen by considering Table 2.

TABLE 2: Hymns in Altar 1

191	114
104	92
87	75
62	58
43	191

Thus the hymn count separations diagonally across the two columns are 29 each for Book 4 to Book 5 and Book 6 to Book 7 and they are 17 each for the second column for Book 4 to Book 6 and Book 6 to Book 8. Another regularity is that the middle three layers are indexed by order from left to right whereas the bottom and the top layers are in the opposite sequence.

Furthermore, Books [4+6+8+9] = 339, and these books may be taken to represent the *spine* of the altar. The *underside* of the altar now consists of the Books [2+3+5+7] = 296, and the *feet and the head* Books [1+10] = 382. The numbers 296 and 382 are each 43 removed from the fundamental Rigvedic number of 339.

Now we investigate the other natural choices for comparison. Based on considerations of symmetry, these choices are:

1-2	3-4	5-6	7-8	9-10	[Altar 2]
1-2	4-3	5-6	8-7	9-10	[Altar 3]

Altar 2 has the books arranged in the same order across the layers, whereas Altar 3 has the books arranged in alternating order across the layers. Altars 2 and 3 yield the following set of numbers for the *underside*, the *spine*, and the *feet and the head*.

268	367	382	[Altar 2]
284	351	382	[Altar 3]

These numbers have no apparent order which leads one to conclude that Altars 2 and 3 were not the actual designs.

3. Sun-steps During the Solstices

We return to a further examination of the numbers 296, 339, and 382 in the design of Altar 1. We propose that since 339 has an obvious significance as the number of sun-steps during the average day or the equinox, the other numbers are likely to have a similar significance. We suggest that 296 is the number of sun-steps during the winter solstice and 382 is the number of sunsteps during the summer solstice. The background to the determination of the solstices in given by Sengupta (1938).

Let us evaluate this proposal. Since the number of sun-steps represents the length of the day, we have a ratio for the longest to the shortest day which is equal to 382/296 = 1.29. We know that the hymns of the Ṛgveda were composed in the region of the Drishadvati and the Sarasvati rivers which flowed in the latitudes of 30° to 22°. If we accept the tradition that Krṣṇa Dvaipāyana Vyāsa arranged the hymns into the current form, then again we must accept the same region for his work. Now the question arises whether these facts square up with our interpretations of the numbers 296 and 382.

The length of the day varies with the latitude. If θ is the latitude of the place of observation and ϕ is the inclination of the earth's axis to its orbit, then the ratio R, the duration of the longest day divided by the duration of the shortest day, for a spherical earth on a circular orbit and without an atmosphere is given by:

$$R = \frac{\cos(\theta-\phi)}{\cos(\theta+\phi)}$$

This figure needs correction because of the flattening of the earth and since refraction causes the sun to rise earlier and set later than it would if the earth had no atmosphere. This refraction causes the duration of daylight to be extended by about 6 or 7 minutes at the expense of the duration of darkness. This necessitates a correction of about 2°'s from the value obtained by Eqn (1).

Now consider ϕ, the obliquity of the ecliptic. Although its current value is about 23.5°, it is believed to vary slowly between about 24° and 22°. According to one estimate (Kulikov 1973) it changes about 47 seconds in a century. Considering that the settlements on the Sarasvati were in their golden age in the third millennium B.C.E., a further error of about 1° could have been caused by changing ϕ.

Considering refraction effects one obtains a value of $R = 1.2929$ for the latitude of 22° (Waugh 1973). With a further correction for ϕ and noting that it might have been smaller than the current value, this value can be revised to about 23°.

The latitude of 23° passes through Gujarat close to where Sarasvati would have emptied into the sea.

Note that Lagadha in the Vedāñga Jyotiṣa speaks of the ratio of the longest to the shortest day being 1.5 (Sastry 1985). After corrections are made this corresponds to a latitude of 34° which is correct for Northwest India to the north of the Sarasvati valleys. Since Vedāñga Jyotiṣa was composed after the early Rigvedic age when the focus of the civilization had passed east to the Yamuna-Ganga region and west to upper Indus region, the figure of 34° accords with this sequence.

4. Observation and Theory During the Rigvedic Times

If one accepts the interpretation of the Rigvedic code sketched above, two further possibilities need to be examined. Was the ratio of

382/296 a precise value reflecting the region where Sarasvati met the sea or was the value obtained after adjustment made in consonance with a theory?

We speculate that the figure may have been arrived at indirectly in the following fashion. TS 7.2.6 speaks of how the seasons were born of the *Ekādaśarātra* rite. Now the birth of seasons implies a shortening and lengthening of days. For two such rites at the two solstices leaves us with a total of 366-22=344 days. From the winter to the summer solstice this implies a total of 172 days. Since the lengthening was a total of 86 sun-steps, a growth of half a sun-step each day must have been assumed. If this is what happened then the latitude of 23° that we arrived at could only have been a rough value and any of the general region of the Sarasvati valleys could have been implied. Note also that a linear model of shortening and lengthening of days we assumed in Vedāṅga Jyotiṣa as well.

To return to the Rigvedic code, it appears that the primary number must have been the figure of 339 from which the other two numbers were derived by subtracting and adding 43. The number 339 could have been found through a geometric construction once the distance that the sun is 108 sun diameters away from the earth was agreed upon. Certainly, all these numbers would have been checked through independent measurements.

Note also that the figure of 339 could be measured at day or night by determining the sun or moon-steps over a certain arc. Such a process would have required time-keeping and if water clocks were used then the temperature variation over different parts of the day and night would introduce errors. The progress of time during night could be measured by the nakṣatras rising in the night sky but again refraction and flattening of the earth would introduce errors.

5. Concluding Remarks

The continuing analysis of the Rigvedic code stresses that the one-sided interpretations that have become popular in academic circles are deeply flawed. To understand the Ṛigveda one needs to analyze it at the *ādhibhautika, ādhidaivika*, and the *ādhyātmika* levels.

Traditionally, astronomy in India has been related to the Bhṛgus, one of the most important of the Vedic sage families. Most notably the figure Śukra Bhārgava appears to be the eponym for the planet Venus. The site most specific to the Bhṛgus is the city of Bhṛgukaccha (modern Bharuch). Later astronomical traditions of India were centered nearby in Ujjain, which was marked as the prime meridian. Dvārakā is also in the same general area; this is the city of Krishna in whose time the Vedas were compiled according to tradition. The calculations of this paper could be taken to reflect the varying lengths of the day in this region. Latitudes for the prime sites in this region are:

Bhṛgukaccha (Bharuch): 21° 47′
Dvārakā (Dwarka): 22° 18′
Ujjain : 23° 9′

Consider now the five sons of the great Vedic king Yayāti, an early descendent of Manu in the Puranic king lists, from whom are derived the five main branches of the Aryans in India. Two of these sons are related to the Bhṛgus through Devayānī, the elder of the two wives of Yayāti, who was the daughter of Śukra Bhārgava. These two sons are Turvaśa and Yadu. The Yadus are related to the region of Gujarat, which they ruled.

We conclude there is ample historical and astronomical basis to view Gujarat as a prime center of astronomical knowledge in Vedic times, although the Rigvedic code data could as well apply to the Sarasvati valleys further north. Our analysis indicates provenance for the Ṛgveda that agrees with literary evidence and this provides further validation for the decipherment.

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"For Purusa's Sake": Psychoanalytic Self Psychology and the Metaphysics of Selfhood in Indian Thought: Parts II and III

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Part I of this article (*Mankind Quarterly* 32, 19-42) laid out the aim of viewing three "schools" of Indian thought in terms of *self psychology*, a version of psychoanalytic theory developed by Heinz Kohut (1977, 1984) and modified to fit the Indian context (Collins and Desai, 1986; Collins, 1991). Kohut's key insight was to understand relevant parts of the world as *selfobjects*, i.e., objects that enhance, generate or support a sense of selfhood. For Kohut, the search, through selfobjects, for selfhood is the basic motivational principle in fully human life (the libidinal and agressive drives are seen as partial and subsidiary). The Sāṅkhya philosophy was then discussed in Kohutian terms, with *prakṛti* being viewed as a selfobject to *puruṣa*. The aim was to understand a relationship between these two fundamental Sāṅkhyan principles denied or unintelligible in the theory itself. Part III will treat some ideas from Kashmiri Śaivism in the same terms. The present section of the work discusses the thought of the Vedantin theologian Rāmānuja.

Rāmānuja's Viśiṣṭādvaita

Historically, the Sāṅkhya system preceded and is generally acknowledged to have strongly influenced development of the Vedānta philosophy (Potter, 1981: 20). Unlike Sāṅkhya, the Advaita branch of Vedānta has only one ultimate principle, the *brahman*, which corresponds roughly to Sāṅkhya's *puruṣa*. The material world does not exist as such in reality, and its appearance is the product of *avidya*, "ignorance." Advaita thus claims that in reality something like *puruṣa's kaivalya* state has already been reached (or more accurately has never been lost); because of the "illusion" (*mzyz*) of a world, personality etc. created by *avidya* "we" do not recognise this fact. But the Advaita equivalent of *kaivalya* is not in any sense "separate" from the world: the world's nature is nothing but the *brahman*.

From a selfobject perspective, Advaita seems to have dissolved the selfobject in the self, leaving the self's environment totally without