

HISTORICAL NOTES

ECLIPSE PERIOD 3339 IN *ṚGVEDA* - IN SUPPORT OF R. N. IYENGAR'S THESIS

The number 3339 of Gods who worshipped Agni appears at two places in *Ṛgveda* at *suktas* 3.9.9 and 10.52.6. This number has been interpreted earlier as the number of *tithis* in a period of 9 solar years, or, as the number of *bhāms'as* covered by the sun in 371 *tithis*. Both interpretations are based on the fact that a solar year contains 371 *tithis*.¹ Then one can ask the question: Why should one say so in a round about fashion? Now R. N. Iyengar² has answered it by correctly showing that the number 3339 is related to the eclipse cycle.

Ṛgvedic sukta 5.40 definitely refers to a solar eclipse observed by sage Atri. But it does not indicate a knowledge of the Saros period of 18 years and 11 days, because the solar eclipses occur at different places on the earth during the cycle. This is not the case with lunar eclipses as they can be seen from more than half of the earth's surface. Actually the Saros period was discovered by the Babylonians from their observations of lunar eclipses. So it is not at all surprising that the Vedic *Ṛṣis* could know about it from similar observations of lunar eclipses.

Vedic authors were experts in thinking of allegories for describing natural phenomena. There is one such allegory in respect of the phenomenon of waxing and waning of the moon during the lunar month. They believed that *pitrus*, the departed souls, dwell on the moon. So it was postulated that the *pitrus* got food in the form of solar light in small quantities every day during the bright half of the lunar month, and consumed it bit by bit in the dark half completing the meal on *amāvasyā* (the new moon day). Relation of this to Agni arose from the concept that the supreme god Indra is represented by Sūrya in the sky, by the Moon in *antarikṣa* and by fire on the earth. So in the case of fire *pitrus* became gods, food became *havya* and eating became worship. Thus the dark *tithis* of the lunar month signified worshipping gods. One can compare it with the simile in *Bhagavadgītā*:

*aham vaiṣvānaro bhūtvā prāñīnām dehamāśritaḥ /
prānāpana samāyuktaṃ pācāmyannam caturvidhām //*

Now there occurs a grand feast for *pitrus* on a *paurṇimā* (full moon day) instead of *amāvasyā* during a total lunar eclipse when the whole moon is devoured within a couple of hours. The priests were therefore curious to know when they would see such a spectacle again. And they found that the phenomenon repeats after 223 lunations. Then counting the dark *tithis* from the total lunar eclipse one arrives at the number 3339 upto 222½ lunations consisting of 223 dark halves and 222 bright halves. So one expects to see a lunar eclipse on the following full moon day. Calculations show that the total number of *tithis* including the bright ones would be $222\frac{1}{2} \times 30 = 6675$ at that point. Since it was known that the total number of *tithis* in 18 solar years is 6678, it is seen that the 19th solar year would start at *śukla caturthī* (S4)*. And 11 more days will have to pass before the full moon. So the eclipse period automatically comes out to be 18 years and 11 days. We see that there is no need to have any mechanism for correction as envisaged by R. N. Iyengar. In other words the vedic astronomers knew that the so called Saros period i.e. exactly 223 lunations, its conversion into years and days is secondary.†

Further there is no need for R. N. Iyengar to be apologetic about the average of 14.758 for the ratio $N/3349$, where N is the number of syllables in an *aṣṭaka*. In fact it is equal to the duration of a *pakṣa* in *Vedāṅga Jyotiṣa* i.e. $1830/124 = 14.758$ days. Of course it was known that the more correct value was $1831/124 = 14.7661$ days which is close to the modern value of 14.7654 days. Variation of *aṣṭaka* value between 14.38 and 15.63 mimics the actual observed values of 14, 15 and 16 days for a *pakṣa*. This cannot be pure coincidence. Thus Iyengar's correlation of 3339 with the number of syllables in *aṣṭakas* of *Rgveda* brings out the fact that Vedic *Ṛṣis* knew the synodic period of the moon fairly accurately. This strengthens Kak's³ conjecture about the astronomical code of *Rgveda*.

In conclusion, the knowledge of the length of the solar year, duration of the synodic lunar month and the eclipse period has to be appreciated as a great achievement of the ancient Vedic people.

* It is clear that the last 3 *tithis* out of 6678 are white *tithis*. So out of 3339 white *tithis* among them $3339-3 = 3336$ are included in 222½ lunations. Consequently the remaining $6675-3336 = 3339$ *tithis* are dark *tithis*.

† For example, in the modified five year *yuga* system¹, 19th year starts on S7, in which case, the eclipse period has to be taken as 18 years and 8 days.

REFERENCES

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2. R. N. Iyengar, "Eclipse period number 3339 in the *Ṛgveda*", *IJHS*, 40.2 (2005) 139-154
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