Book reviews and refereeing

This is in response to the review of the book *Gaṇita-Yukti-Bhāṣā* which appeared recently in *Current Science*[1]. While the reviewer seems generally appreciative of the two-volume work running into nearly 1100 pages, he has objected to the inclusion of an Epilogue on the revised planetary model of Nīlakaṇṭha, which appears on pages 837–856 in volume II of the book. According to the reviewer:

> 'Absence of Sarma during the final stages of publication of the work has facilitated the addition of some spurious content in the name of an epilogue to an otherwise perfect edition of *Yuktibhāṣā*.
>
> Ramasubrahmaniam [*sic*] *et al.* have been overzealous in adding, their published work on *Implied Heliocentric Picture of Planetary Motion*, which is already under challenge, to the monumental work of Sarma. The epilogue as above which presents a speculative interpretation of the computational contrivance of Nīlakaṇṭha's *Tantrasaṅgraha* has no connection with *Yuktibhāṣā* at all. Reference to *Tantrasaṅgraha* at the outset in *Yuktibhāṣā* is only in a general sense to mean the traditional wisdom adapted for his particular epoch . . . .
>
> It is hoped that the publishers shall do the needful to relieve the great work of K. V. Sarma of the burden of a spurious thesis.'

The reviewer is entitled to his view that the planetary theory discussed in *Yuktibhāṣā* has 'no connection . . . at all' to the revised planetary model introduced by Nīlakaṇṭha in his *Tantrasaṅgraha* and *Āryabhaṭīyabhāṣya*. Now that the critical edition of *Yuktibhāṣā* is available, he could have dealt with this issue in detail in a refereed journal article. However, he has chosen the columns of a book review to make the outrageous allegation that late K. V. Sarma, our esteemed co-author, would have disapproved of the Epilogue to volume II of the book as being spurious and not relevant for understanding the contents of *Yuktibhāṣā*.

Normally such allegations deserve to be ignored. However, since *Current Science* has allowed such allegations to appear in its book review section, we would like to make a brief response.

In his introduction to the two volumes, Sarma has clearly expressed his view that the planetary theory being discussed in chapter VIII of *Yuktibhāṣā* is founded on the revised planetary model introduced by Nīlakaṇṭha, and refers to K. Ramasubramanian *et al.*[2] for a detailed exposition of it. According to Prof. Sarma (in his introduction to the book, vol. I, p. xlii).

> 'Chapter VIII deals with the Planetary Theory and the computation of Mean and True Planets . . .
>
> In a nut-shell the planetary theory broadly is like this. The Earth is the centre and the Sun and the Moon go around the Earth. As for other planets, with Earth as centre, the *śīghra* goes round the Earth with the mean motion of the Sun. The mean planet moves on a circle with the *śīghra* as centre. The true planet is on the *mandocca* circle with the mean planet as its centre. Alternatively, the last two circles can be interchanged. This theory is advocated by Nīlakaṇṭha in his commentary on *Āryabhaṭīya*, and practically all later Kerala authors have followed suit. In fact Nīlakaṇṭha tries to say that it was the view of Āryabhaṭa also. If *śīghra* is identified with the Sun itself, then this agrees broadly with the modern theory with the positions of Earth and Sun reversed. [On this, see K. Ramasubramanian, M. D. Srinivas and M. S. Sriram, Modification of the earlier Indian planetary theory by Kerala astronomers (c. 1500 AD) and the implied heliocentric picture of planetary motion, *Current Science* 66 (May 1994) 784–90.]'

In fact, it was Sarma who first noticed that chapter VIII of *Yuktibhāṣā* presents a discussion of an entirely new planetary model, and he also traced it to the works of Nīlakaṇṭha. In an article on *Yuktibhāṣā*, Sarma and Hariharan state[3]:

> 'Chapter VIII deals with the planetary theory . . . There is a new concept in the treatment of the epicycles as compared to the *Āryabhaṭīya* and other works.
>
> In a nut-shell the planetary theory broadly is like this. The earth is the centre and the sun and the moon go around the earth. As for other planets, with earth as the centre, the *śīghra* goes round the earth with the mean motion of the sun. The mean planet moves on a circle with *śīghra* as centre. The true planet is on the *mandocca* circle with mean planet as its centre. Alternatively, the last two circles can be interchanged. This theory is advocated by Nīlakaṇṭha in his commentary on *Āryabhaṭīya* and practically all later Kerala authors have followed suit. In fact Nīlakaṇṭha tries to say that it was the view of Āryabhaṭa also. If *śīghra* is identified with the sun itself then this agrees broadly with the modern theory with the positions of earth and sun reversed. In fact the western astronomer Tycho Brahe (1546–1601) appears to have adopted a similar theory.'

Thus it may be noted that, in his Introduction to *Yuktibhāṣā* (cited above), Sarma has only reiterated this point and referred to our *Current Science* article[2] for further details. The Epilogue to Volume II contains material based on this article and the Proceedings of a Conference held in 2000 to commemorate the 500 years of *Tantrasaṅgraha*, which was held under the guidance of Sarma, who also contributed the lead article[4]. This material was given as an Epilogue as it was felt by all the authors (including late Sarma) as useful background material for understanding the discussion in chapter VIII of *Yuktibhāṣā* on planetary theory. While we would very much welcome serious, scholarly criticism of our understanding of the planetary theories of Nīlakaṇṭha and Jyeṣṭhadeva, we believe that the kind of outrageous allegation made by the reviewer, that we have introduced spurious material which would not have been approved by our esteemed co-author who is no more, borders on the scurrilous and ought not to have found its way into the pages of this reputed journal. In any case, our response above should put such baseless speculation to rest.

Another point which seems to have confused the reviewer is the appearance of a reference to *Tantrasaṅgraha* in the context of the discussion in chapter V of

Yuktibhāṣā on the avāntarayuga (intermediate cycle) of 576 years. According to the reviewer:

> 'Text of the *Yuktibhāṣā* and the translation by Sarma do not refer to *Tantrasaṅgraha* in the discussion of the avāntarayuga of 576 years (210,389 days). Explanatory notes by Ramasubrahmaniam [*sic*] *et al.* give the impression that the minor period owes its origin to *Tantrasaṅgraha* of Nīlakaṇṭha. In fact, the *Tantrasaṅgraha* dyugaṇa or day-count of 1,577,917,200 could not have given the perfect integer day count of 210,389 days in 576 solar years . . . The arithmetic involved is 210,389 × 7500 = 1,577,917,500 of Āryabhaṭa and not 1,577,917,200 of Nīlakaṇṭha.'

In our explanatory notes in the book (vol. 1, p. 173), there is a reference to the avāntarayuga of 576 years found in *Tantrasaṅgraha*[5], but nowhere do we claim that this concept originates with *Tantrasaṅgraha*. And, unfortunately for the reviewer, the number of civil days is the same in both *Āryabhaṭīya* and *Tantrasaṅgraha*[5] namely 1,577,917,500. The wrong number 1,577,917,200 happens to be a typographical error on p. 173 of the book, on which the reviewer has built an entire fiction!

On a serious note, we would like to state that, having carefully studied both the texts, it is our considered view that *Yuktibhāṣā* closely follows *Tantrasaṅgraha* in its exposition of most of the topics, especially in the second part on astronomy. This is indeed made clear right at the beginning of *Yuktibhāṣā*, where it is stated that (see Sarma's translation in our book, vol. I, p. 1):

> 'Here, at the outset, with a view to expound, following the *Tantrasaṅgraha*, all the calculations as are needed for the computation of the motion of the planets, first the elementary calculations . . . are being set out.'

However, *Yuktibhāṣā* is not a commentary on *Tantrasaṅgraha*. In fact, it includes lot of demonstrations and explanations of the background mathematics, as well as the results and procedures presented in *Tantrasaṅgraha*. If anything, the reviewer's claim that '*Tantrasaṅgraha* has no connection with *Yuktibhāṣā* at all', seems truly spurious.

We are disappointed that the reviewer has failed to present any scholarly review and critique of the book, and has only made some unwarranted allegations. The moral of the story, according to us, should be that even book reviews need some form of refereeing, or at least an exercise of editorial supervision.

1. Chandra Hari, K., *Curr. Sci.*, 2008, **95**, 1483–1484. This is the review of the book *Gaṇita-Yukti-Bhāṣā*, critically Edited with English Translation by K. V. Sarma, with Explanatory Notes by K. Ramasubramanian, M. D. Srinivas and M. S. Sriram, Hindustan Book Agency, New Delhi, 2008.
2. Ramasubramanian, K., Srinivas, M. D. and Sriram, M. S., *Curr. Sci.*, 1994, **66**, 784–790.
3. Sarma, K. V. and Hariharan, S., *Indian J. Hist. Sci.*, 1991, **26**, 185–207.
4. Sriram, M. S., Ramasubramanian, K. and Srinivas, M. D. (eds), *500 Years of Tantrasaṅgraha: A Landmark in History of Astronomy*, Indian Institute of Advanced Study, Shimla, 2002.
5. Sarma, K. V. (ed.), *Tantrasaṅgraha*, Hoshiarpur, 1977, pp. 73–74.

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Unusual citrus

On a mid-November afternoon in 2007, we were on a casual visit to the garden at our Department of Botany, where we saw a twig hanging entrapped on a bough of a citrus tree (*Citrus aurantifolia* [Christm.] Swingle). Thinking that the twig might have been detached from some nearby tree, a routine happening, we overlooked it.

Later, on a closer look, we noticed that it was not a twig from another nearby tree, but a part of the same citrus tree. A side branch of the tree displayed a unique feature (Figure 1 *a*). Instead of tapering into a deadened tip as all other branches did, this particular branch started broadening exuberantly beyond the tip, and became curved, acquiring a *U*-shape (Figure 1 *b*). The diameter of the 'tip' measured 0.9 cm, which was the average value for the normal twigs. As it grew further, beyond the point of termination, it started broadening and ended into a node (1.6 cm). Beyond this, it broadened further, with a diameter of 2.3 cm. Then the branch curved upwards, acquiring roughly *U*-shape, and producing further two major nodes. From these nodes erupted a large number of smaller branches of varying diameters (1.0–1.9 cm). These

Figure 1. ***a***, Citrus tree distant view: unusual feature in the box; ***b***, Close-up of the box.