

The Paṇḍit as Public Intellectual:
The Controversy over virodha or Inconsistency in the Astronomical Sciences

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[Forthcoming in ed. Axel Michaels, The Paṇḍit: Traditional Sanskrit Scholarship in India (Festschrift P. Aithal). Heidelberg: South Asia Institute; New Delhi: Manohar Publications (South Asian Studies, No. ?), 2000 or 2001.]

Introduction

It is an honor to be asked to participate in a conference devoted to felicitating Dr. Parameswara Aithal. I have many fond memories of studying with Aithal Mahodaya on a DAAD grant here in Heidelberg in 1993, and also at the Indian Institute Library in Oxford. We have met at various conferences, and we have corresponded over the years. I am grateful to him for the benefits I have always received from his knowledge, and also from his personal qualities, especially his powerful work ethic and his balanced sense of what is important in academic work. I congratulate him on his successful career here in Heidelberg. The body of work he has produced is of unique value, proceeding as it does from his double training and double knowledge.

The Future of Sanskrit Learning.

I thank the conveners of the conference for inviting me, and for their choice of themes for this colloquium: the Future of Traditional Sanskrit Scholarship. The question raised by the topic revolves around an assumption something like the following: that modern, technocratic, American-style social and cultural forms are going to prevail and dominate, sweeping away, among many other things, traditional Indian learning. If it seems safe to assume an ever-technologizing future, then the question posed to us amounts to this: to what extent can other forms of being intellectual inherited from the past, even the deep past, adapt themselves to a technocratic future, or carve out an alternative space for themselves?

The implication of the question is that scholars of Sanskrit literature, especially 'traditionally trained' scholars, now find themselves in historical circumstances that have an impact on the sort of work they can do. Put this way the point might seem obvious, but it is not often stated as a starting place for intellectual inquiry, as opposed to a complaint in the hallways and offices of the university department/faculty/seminar.

Yet should we suppose that scholars today are in a radically different situation from scholars in the past? Is it only paṇḍits at the close of the 20th century who are subject to historical processes? One way to answer a question about how the Sanskrit learned will

fare in the future, is to consider how they fared in the past. It would be unsafe to assume that learned s̄āstrīs of the past lived out their intellectual lives according to patterns that did not change for all the centuries that precede our own.

One valuable result of this colloquium would be the beginning of a more comprehensive attempt to understand the history of the Sanskrit literati: to map out the relationship of scholarship and scholars to larger historical trends, social, economic, political, and to reexamine what we mean by 'traditional scholarship.' Is there in fact such a thing, in the sense of an unchanging, extrahistorical scholarly tradition?

Such a study would be in keeping with recent trends in Indian historiographical writing in English. Historians associated with these recent trends have stressed a concern with articulating the 'agency' of actual individuals, as opposed to articulating timeless structures and 'mentalities.' Of all the outcomes of the 'post-orientalist' critique of the last few decades, this at least is a point easily granted: that the authors of Sanskrit texts were men living in South Asia in particular historical moments, who were subject to their historical contexts at least to some extent as they wrote their work; and that recovering an understanding of their historical context would enhance our understanding of the meaning and significance of their work.

And yet, having granted the point, we must also point out that the attempt to reconstruct the historical position of the authors of Sanskrit literature is not trivial to accomplish. This is because of the historical depth of the literature, which extends into the deep past, beyond the period for which we have good data for doing history, even intellectual history. It is also because there are attitudes and practices active in Sanskrit literature that run counter to a focus on historicizing individual 'agents', and that are even designed to resist such historicism.¹ For example, one regularly sees the intentional effacement of the individual author from certain texts, which are instead attributed to great authors of the past, or to legendary sages, semidivine beings, or deities.

Given the obvious yearning of the Sanskrit world of letters to construct for itself a discursive universe that transcends the vicissitudes of history, given that the Sanskrit literatus actively seeks to enter this extrahistorical, non-localized imaginative world in reading and writing Sanskrit, to what extent is it meaningful to talk about the impact of his own times upon his work?² Certainly for authors in the remote past, for whom the sum of what we know about them is what they tell us in their works, the difficulties for historiography loom large. If, however, we turn attention to the more recent past, where the

¹ See e.g. Pollock 1989.

² For that matter, have we been convinced that historical forces are constitutive of authorial intention in any literature in any age or place?

historical data is better, it becomes more feasible to attempt to understand the work of learned Śāstrīs against their historical background.

I wish to speak today about some scholars active at the beginning of the 19th century, at a time when Sanskrit paṇḍits came into direct contact with the growing imperial presence of the British. It is in this period that some paṇḍits emerged, or rather reemerged, to become public intellectuals of a sort. The ways in which śāstrīs participated in the great transformations of 19th century India is a vast topic with many overarching narratives. Here I will focus on a particular controversy that attended what might be called the Indian version of the Copernican revolution, and consider the work of a handful of Indian astronomers who participated in the transformation of cosmological knowledge. Before I introduce the main characters and texts that I am presenting today, I need to give some general background of the historical situation of the schools of thought involved, and also some immediate background of the historical situation of the innovators whose works provoked the controversy.

Purāṇas³

The Purāṇas are consistent in presenting a model of the cosmos in which the earth is a flat horizontal disk in a vertical, egg-shaped universe, in which there are seven heavens above and seven underworlds below. Mount Meru stands at the center of this disk, and on an axle that rises from the top of Meru are suspended a series of wheels, with the Sun, Moon, nakṣatras, Mercury, Venus, Mars, Jupiter, Saturn, and the Saptarṣi stars, in that order, riding on them. Above the Saptarsi is the pole star. The rising and setting of the Sun, Moon, nakṣatras and planets is explained by the enormous height of Mt. Meru, behind which in their circular rotations above us the celestial bodies are blocked from our sight.

Viewed from above, the disk of the Earth is made up of seven concentric continents with seven intervening oceans. The central continent with Meru at its center is called the Jambūdvīpa, which is surrounded by the salt ocean. The southernmost portion of Jambūdvīpa is the location for the land of Bhārata. As far as distances are concerned, Mt. Meru is 84000 yojanas high, Jambūdvīpa is 100,000 yojanas in diameter, the Bhāratavarṣa is 9000 yojanas in extent, while the disk of the earth as a whole, including all seven continents and seven oceans, and what lies outside them, is 50 crores or 500 million yojanas in diameter.

³ The following account of Purāṇic and Siddhāntic models is a brief summary of views that follows very closely the work of Pingree 1990. See also Minkowski Forthcoming.

As Kirfel demonstrated, this account of the cosmos is found in a number of Purāṇas and can be traced to a common source, which Pingree has argued was probably completed in the latter half of the 2d century AD (Kirfel 1954:7-49; Pingree 1990:275).

Siddhāntas

In the Siddhāntic model of the cosmos the earth is a fixed, nonrotating sphere at the center of a series of interinteresting spheres on which the sun, moon, and the various planets and stars revolve around the earth. In this model the planets are ranged above the earth in this order: Moon, Mercury, Venus, Sun, Mars, Jupiter, Saturn, and all the Stars. In this model the diameter of the earth is calculated to be about 1600 yojanas, with a circumference of about 5000 yojanas. This is the model articulated already in the *Paitāmahasiddhānta* of the 5th Century, and it is the model taken up in all other astronomical Siddhāntas in India, regardless of their other differences (Pingree 1990: 276-78).⁴

The Siddhāntic model makes a better explanation available for celestial phenomena such as the rising and setting of the sun, moon, planets and stars, the eclipses of the Sun and Moon, the variation in length of the day through the course of the year, and the waxing and waning of the Moon.

Virodha?

It certainly appears to us that there are important inconsistencies between the Purāṇic and Siddhāntic cosmologies: to begin with in one the earth is flat, while in the other it is a globe; in one it has a huge size, while in the other it has a manageably small size. As far as we know, however, their mutual inconsistency passed largely undiscussed until the mid-9th Century, when the astronomer Lalla turned to a critique of the Purāṇic model in his Siddhānta, the *Śiṣyadhīvr̥ddhidatantra*. Lalla did attempt to accomodate some elements of the Purāṇic model to the globular earth of the Siddhāntas: Mt. Meru is made the axis inside the earth on which the earth revolves; all the other oceans and continents of the Purāṇic model are assumed to be south of the equator; and the power that drives the interinteresting spheres is still the Pravaha wind, which is the force that makes the planets and stars revolve around Meru in the Purāṇic model.

Nevertheless Lalla explicitly rejected the improbable Purāṇic assertions that eclipses are caused by Rāhu; that night is caused by Meru blocking the Sun; that the Moon wanes because the gods are drinking the Soma in the moon; that the Moon is higher in the heavens than the Sun is; and that the earth is flat and rests on a support. These criticisms

⁴ Note however that the astronomers of the Ḥryapakṣa assume the circumference of the earth to be distances in the vicinity of 3300 yojanas (Pingree 1978: 591, 593, 597, 609).

are repeated in later Siddhāntas, especially in Bhāskara II's very influential work, the *Siddhāntasīromani*, of the 12th Century (Pingree 1990:279).⁵

Avirodha?

At some point, Śāstrīs began to attempt to further reconcile the cosmological inconsistencies pointed out by Lalla and subsequent astronomers. The beginnings of this intellectual trend are difficult to locate, but are certainly evident in Sūrya's astronomical work of the 1530s, the *Siddhāntasamhitāsārasamuccaya*. The twelfth and final chapter of the text is devoted to jyotiḥśāstrapurāṇavirodhāparihāra, that is, removing the contradiction between the Jyotiḥśāstra and the Purāṇas.⁶

In the 1680's in Benares, Nīlakaṇṭha, the commentator on the *Mahābhārata*, wrote an independent work on the subject of noncontradiction, the *Saurapaurāṇikamatasamarthana*.⁷ Nīlakaṇṭha was not an astronomer, but he probably drew on the work of astronomers alive in Benares in his day, especially Kamalākara Bhaṭṭa.⁸

In the 1720's, Kevalarāma, the Jyotiṣarāya in the court of Amber, was commissioned by his lord, Sawāī Jaisingh, the celebrated astronomer-king, to write an independent work on the subject of noncontradiction, the *Bhāgavatajyotiṣayor Bhūgolavirodhāparihāra* (Pingree 1997).⁹ This work was expanded by Nandarāma Miśra in the 1780's in Kāmakavana in southern Rājputana.¹⁰

All of the works attempted in one way or another to demonstrate the non-contradiction between the Purāṇic and Siddhāntic models. For reasons of space I cannot discuss all the details of their arguments, and will confine myself to some general comments.¹¹ Aside from Nīlakaṇṭha the authors of these works were predominantly astronomers. Nevertheless they wrote primarily as defenders of Purāṇic authority and

⁵ See *Siddhāntasīromani*, *Golādhyāya*, Chapter 3 (*Bhuvanakośa*).

⁶ The text is as yet unedited and unpublished. Details of MSS of this text in CESS A6, (forthcoming). Sūrya Paṇḍita from Pārthapura on the banks of the Godāvarī, was the son of Jñānarāja, author of the *Siddhāntasundara*, from whom he might have derived his interest in avirodha. On the author and text (Sarma, K 1950); (Dikshit 1969, 2:144-45).

⁷ It has the alternative title of *Paurāṇikajyautiṣam*. Nīlakaṇṭha developed ideas he had already expressed in his commentary on the *Bhūkhaṇḍavirṇirmāṇaparva* of the *Mahābhārata* (Minkowski, Forthcoming).

⁸ Especially his *Siddhāntatattvaviveka*. Kamalākara in turn was probably influenced by the work of his father, Nṛsiṃha Daivajña, in particular his magisterial commentary on the *Siddhāntasīromani*, the *Vāsanāvārttika*.

⁹ For MSS see CESS A2, p. 63; A3, p. 23; A4, p. 63, and A5 p. 54.

¹⁰ The text is entitled *Goladarpana* or *Bhūgolakhagolavirodhāparihāra*. CESS A3, p.128-30; A5, p.156.

¹¹ An edition of these latter works, with translation and notes is in preparation.

validity.¹² The general approach of the argument is that faced with an apparent contradiction between Siddhānta and Purāṇa, the Purāṇa overrules the Siddhānta in its authority claim.¹³ This approach, therefore, relies on the hermeneutical stance toward sacred texts as pramāṇa found in the Mīmāṃsā and Vedānta, but as extended in later periods to include the pramāṇa of aitiḥya, or truth revealed by the Itihāsas and Purāṇas.

Since the Purāṇas must be true, therefore, it is in their proper interpretation, and in the proper construal of the Siddhāntas, that contradictions can be removed. Typically it is asserted that the Siddhāntas describe only some limited part of the real, Purāṇic world, or else that they describe some alternative, and less actual world, or that the Siddhāntic model is simply a convenient fiction, not literally believed even by the astronomers, but useful for making calendars and calculating the relative latitudes and longitudes of places in our local range of knowledge.

Why did these avirodha texts appear? Why was it astronomers who began to write them? Why did they write them in the historical moment that they did? So far no one has attempted an explanation of the appearance of the avirodha literature. It seems plausible to look to such historical factors as the rise of Bhāgavata worship and the towering importance of the Bhāgavata Purāṇa in the Moghul period; the patronage by Rajput princes, with the blessings of the Moghuls, of Braj / Mathurā as a religious site, and Vārāṇasī as an academic center; the rise also of the Maratha confederacy as alternative patrons of Brahminical religion and learning; and the presence in the Moghul cultural sphere of Islamicate models of cosmology and astronomy, which are explicitly discussed by some of the astronomers mentioned above, Kamalākara and Kevalarāma, for example, and which would exert a pressure on, or imply a critique of, internally conflicting indigenous cosmologies.¹⁴

The Immediate Background

¹² It was especially the *Bhāgavata Purāṇa* that Kevalarāma and Nandarāma were concerned to validate.

¹³ However, there are some authors who say that the ontological status of the two genres of texts is equivalent, both falling in the category of *smṛti*, and that therefore the way to determine the truth of them is entirely on the grounds of comparison with our own reason and experience. It was a common strategy of defenders of Jyotiṣ astronomy to find the authority of their texts not in their reasonableness or persuasive argumentation, but rather in divine authorship (Pingree 1978b:315, 328-30).

¹⁴ For discussion of the last factor see Pingree 1978b and Pingree 1996.

The immediate background of the manuscripts I wish to discuss today is the 'Sabhā,' or intellectual circle of Lancelot Wilkinson.¹⁵ Wilkinson had been appointed the British Political Agent to the court of Bhopal sometime before 1829, and continued there until his death in 1841. The Agent's residence was located in the nearby town of Sihore, and attached to the residence was a school, which Wilkinson made into a Sanskrit school with a special emphasis on the study of the astronomical Siddhāntas. Wilkinson was interested in the Siddhāntas, whose serious study, he felt, had largely vanished by the beginning of the 19th Century. In addition to learning Sanskrit and Jyotiḥśāstra himself, he promoted the study, edition and publication of various Indian astronomical texts.¹⁶ Wilkinson believed that the best way to introduce the modern Copernican system of astronomy to learned Indians, especially to the whole class of Indian astronomer / astrologers, was through the medium of Sanskrit, and in particular through the instrumentality of the Siddhāntic model of the cosmos. Since the Siddhāntas already rejected much of the Purāṇic cosmology, Wilkinson reasoned, and since they already made use of many of the necessary principles of geometry, trigonometry, and arithmetic, it would be a short step to move from the Siddhāntic to Copernican scientific models, which could be presented in a way that would not alarm the whole class of Jyotiṣa paṇḍits (Wilkinson 1834).

The two most talented of the Śāstrīs in Wilkinson's sabhā were Nṛsimhadeva Śāstri, a Citpāvan Brahmin from Ahmadnagar district, known as Bāpudeva Śāstri (CESS A4:241; Dvivedi 1933:126-29; Dikshit 1969:300-01), and the subject of my interest today, Subbāji Rāmacandra Śāstrī, also known as Subbāji Bāpu, a Telugu speaking Brahmin of Chandrapur in Berar who had been in Wilkinson's employ since the 1820's.

In 1836, Subbāji wrote a text in Marāṭhī called the *Siddhāntaśiromaṇiprakāśa* (or *Śiromaṇiprakāśa*,) 'Light of the Siddhānta-śiromaṇi,' which was published in lithograph form in Bombay under the auspices of Wilkinson (Young 1997:251). A version in Hindi was produced and published by Oṃkāra Bhaṭṭa, another paṇḍit in the Sihore sabhā.¹⁷ Since these texts so particularly fulfilled one of the ideals of the Asiatic Society, namely to revive ancient Indian learning as a vehicle for advancing European visions of scientific and

¹⁵ The information in these paragraphs about Wilkinson, Bāpudeva Śāstrī and Subbāji Bāpū is drawn from the following sources: Sarma, S. 1995-6, Young 1997, Dvivedi 1933:118ff. See also Prakash 1996.

¹⁶ For example Sastri and Wilkinson 1861. Further works are listed in Sarma, S. 1995-6.

¹⁷ *Bhūgolasāra*, or *Jyotiṣacandrikā*. Reprinted in 1840 and 1881 by the Agra School-book Society. Also reprinted in 1841 with an English title page: *A Comparison of the Puranic and Siddhantic Systems of Astronomy with that of Copernicus*.

social progress, a special prize was awarded to Subbāji and Oṃkāra Bhaṭṭa at the 1837 meeting of the Asiatick Society in Calcutta.¹⁸

I have not yet located a copy of the *Siddhāntasīromāṇiprakāśa*, but a summary of some of its arguments appears in an article by Young, who lays out the cultural-historical context in which the debate to be discussed today occurred (Young 1997:251-53). I have also been able to examine a copy of the Hindī version of the argument by Oṃkāra Bhaṭṭa, the *Bhūgolasāra*.¹⁹ In brief, the *Śīromāṇiprakāśa* assesses four different astronomical models: the Purāṇic, the Siddhāntic, the Jaina, and the 'English.' Subbāji and Oṃkāra endorse the English heliocentric model as the correct one. The earth is a globe with the continents located where they are found by modern sailors and explorers, who are seen as the pioneers of a modern, observation-based scientific geography. In general there is a certain awe of the English for their observational instruments and exploratory zeal. At the same time the title itself suggests the sense of continuity and revival of the Siddhāntic view, which Subbāji sees as basically in conformity with modern scientific models. Both Subbāji and Oṃkāra regularly cite the Siddhāntas as a basic and reliable source for arguments about such things as the reason for the days getting longer and shorter, the reason we know the earth is a globe, and so on. The Purāṇas are cited occasionally when they accord with the modern scientific view, but they generally come in for harsher treatment. The Purāṇic geography of the flat earth with its seven concentric oceans and continents is explicitly rejected. Yet Subbāji and Oṃkāra are careful to reject only those features of the cosmology that are demonstrably at odds with the English scientific model. And there is no question of these authors rejecting their basic faith in Vedic and Purāṇic theology. What is most striking about these works is the high valuation that they give to reasoning from direct observation, especially as aided by technologically advanced instruments, and the corresponding devaluation, within the sphere of what is observable, of textual authority.

With this as preliminary, then, I wish to turn to the three texts of today's presentation.

The Three Texts

Reaction to Subbāji's publication was immediate. Yajñeśvara Sadāśiva Roḍe, also known as Bābā Joshi Roḍe, a Puṇe Deśastha Brahmin, wrote a text in 67 verses called the *Avirodhaprakāśa*, 'Light on Non-contradiction,' which was a reply to, and refutation of,

¹⁸ A pair of engraved silver inkstands. See Macnaghten 1837.

¹⁹ Thanks to Gillian Evison of the Indian Institute Library, Oxford, I was able to obtain a copy of the 1881 printing. Note that the success of the text is suggested by its numerous reprintings.

Subbāji's *Śiromaṇiprakāśa* (CESS A5:318-19; Diksit 1969:299-300). There is one known manuscript of this text, held in the RORI Alwar.²⁰

The text of the *Avirodhaparakāśa* is more widely available than this single, difficult to reach MS might suggest, because it was published by Subbāji, together with a rejoinder to Yajñeśvara, a text called the *Avirodhaparakāśaviveka*, the 'Analysis of the Avirodhaparakāśa,' in 65 verses. The *Avirodhaparakāśa* and the *Avirodhaparakāśaviveka* were published in lithograph form in Bombay in 1837, again under the auspices of Wilkinson, along with a commentary by a pupil of Subbāji's whose name was also Rāmacandra (Subbāji 1837). There are numerous copies of this lithograph available in collections in India and also in England. Since Subbāji's reply to Yajñeśvara appeared in 1837, we must assume that Yajñeśvara's work, the *Avirodhaparakāśa*, must have appeared in the interval between Subbāji's works, and hence must also date to 1836 or 1837.

The rapid speed of the exchange between the *sāstrīs* continued, for Yajñeśvara in turn responded in a text of 72 verses called the *Virodhamardana*, the 'Crushing of Contradiction,' of which there are two known manuscripts, one in Jaipur, the other in Baroda.²¹ Yajñeśvara accompanied this text with a commentary in which he dates the work to 1837.

Avirodhaparakāśa

Yajñeśvara's purpose in the *Avirodhaparakāśa* is twofold: to show that there is no contradiction between the Siddhāntic and Purāṇic models, and to show that the European Copernican model is invalid.

To accomplish the first goal, Yajñeśvara adopts two intertwined strategies: he proposes new explanations of points of difference between the two models, and he asserts that the two models have different purposes and scopes of application. His challenge is to explain the apparent inconsistencies in geographical and astronomical models. As for geography, the small earth of 5000 *yojanas* in circumference assumed by the Siddhāntakāras is explained as being only a subsection of the Purāṇic *bhūmaṇḍala*; in fact it is a subportion of *Bhāratākhaṇḍa* which measures about 2000 *yojanas* on its longest side and 5000 *yojanas* in circumference (AP vss. 3-6).

²⁰ RORI (Alwar) 2682 = Alwar 1715. 4ff. copied in Saṃ 1912 = 1855 A.D. The MS described in Kielhorn 1874 (XXIII 2), is in fact a copy of the lithograph, as the date, foliation, and ownership show. The same owner also is listed as owning a copy of *Avirodhaparakāśaviveka* with the date and foliation of the lithograph.

²¹ Jaipur Museum 205. 16ff. with Marāṭhī autocommentary. Copied in Saṃvat 1894 = A.D. 1837. Baroda 10846. 26ff. with Sanskrit autocommentary. Copied in Śaka 1763 = 1841 A.D.

Moreover, even this small earth is flat. What of the old Siddhāntic argument in favor of the spherical earth based on the fact of the progressive elevation of the northern or southern pole stars for people traveling north or south? And what about the reports of sailors who have sailed around the earth, returning to the point where they began? Yajñeśvara replies that there is only one pole star, in fact situated above the Himālayas, with the southern pole star being only a reflection of the northern one in the southern ocean (AP vss. 13-17). And as for the reports of circumnavigation, Yajñeśvara explains these as resulting not from sailing around the spherical earth, but from sailing around the circular salt ocean that surrounds the abovementioned subportion of the Bhāratākhaṇḍa (AP vs. 25).

The other great inconsistency between Purāṇic and Siddhāntic cosmologies has to do with astronomical models. Yajñeśvara takes up the order of the planets and the explanations of eclipses, which differ between the Purāṇas and Siddhāntas. Yajñeśvara maintains the Purāṇic order of the planets, basically arguing from scriptural authority. As for the Siddhāntic explanation of eclipses, which would be impossible if the moon were higher than the sun and if the moon did not orbit a spherical earth, Yajñeśvara proposes an ingenious explanation that what appears to be the moon at the time of a solar eclipse is in fact the head of Rāhu, which has the same size as the moon. Rāhu is suspended from the wheel of the nakṣatras in such a way that his head hangs down to the level of the sun and blocks the sun's light from time to time, while meanwhile his body will block the light of the moon from time to time. Hence, Yajñeśvara reasons, the Siddhāntas predictions of eclipses can be used without rejecting the Purāṇic order of the planets (AP vss. 39-51). Appeal to scriptural authority also explains the phases of the moon as a filling and emptying of Soma.

In order to show that the Copernican and Siddhāntic models are in disagreement, Yajñeśvara focuses on the features of the Copernican model not found in the Siddhāntas. Thus the basic notion that the earth spins on its axis and rotates around the sun are non-Siddhāntic, Yajñeśvara points out, and so is the doctrine that gravitation is the force causing planets to move in their orbits, and so is the doctrine that every star is a sun with its own planetary system, including planetary satellites, and living beings inhabiting each planet. Furthermore the old concessions to the Purāṇas found in the Siddhāntas, the placing of the 6 other oceans in the southern hemisphere, the positing of Yamakoṭi and the other cities of the global quadrature, and so on, are rejected by European astronomy (AP vss. 24, 26-32).

For Yajñeśvara, this discrepancy between Siddhāntic and Copernican models reflects badly on the Copernican model. After all, the Siddhāntas are authored by gods and sages, while the European model is invalid for Yajñeśvara, because it is not supported by

any scripture, because it depends on an overvaluing of perception or observation, and because, after all, it is the work of mlecchas, whose arguments are only designed to deceive people (AP vss. 32, 66).

In the end, however, there are points where the two Indic systems do not coincide, as for example in the absolute size of the earth, and in the order of the planets above the earth. Thus Yajñeśvara ends by asserting that the two Indian systems have different purposes and scopes. So that while the Purāṇas are making true statements about the cosmos as a whole for the purpose of communicating the majesty of the Lord God, the Siddhāntas have adopted a model which is limited in scope to local phenomena, and whose purpose is merely for the generation of pañcāṅgas (AP vss. 61-65).

Now, while Yajñeśvara's arguments are on their face reactionary in nature, it is worth noting three things: Yajñeśvara understands the Copernican model and does not reject it out of incomprehension - indeed nearly a third of even his basic text is devoted to a description of the European model in some detail; many of his proposals are in fact his own innovations, and so he cannot be taken to be following a preexisting course; and further, his general proposal that the Siddhāntas and the Purāṇas must be understood as providing different models concerned with different kinds of truth can be understood in various ways, as a variation of the modernizing attitude, in which religious views of the past are removed from the arena of scientific inquiry and made metaphorical, or as an extension of the Vedāntic stance toward different levels of truth with different scopes of operations, or as an accommodation via the latter to a context that demands the former.

Avirodhaparakāśaviveka

Subbāji Rāmacandra replied to Yajñeśvara in his *Avirodhaparakāśaviveka*, which he published in 1837.²² Subbāji cites lengthy passages from the *Avirodhaparakāśa* in the body of his own work, and then subjects them to extended criticism. His polemical strategy to invalidate Yajñeśvara's arguments incorporates a variety of techniques, including appeals to reason, to perception and to scriptural authority. Subbāji can show that Yajñeśvara is self-contradictory, in that Yajñeśvara maintains in one place that there is no contradiction between the Siddhāntas and Purāṇas, while in another place he appears to imply a criticism of the Siddhāntic view, and at the end even asserts a fundamental difference in scope and purpose between them, as mentioned above (APV vss. 6-8).

²² Subbāji says in his preface in Marāṭhī that he has given the full text of Yajñeśvara's work before his own so that objective people can read both works and come to a reasoned conclusion about who is correct, but the tenor of Subbāji's text makes it clear that he has no doubt about what a reasonable person will conclude.

Subbāji can further argue that Yajñeśvara's innovative proposals that are intended to reconcile differences between the two models are in fact innovations supported by neither, and are therefore themselves exterior to, and not authoritative for, the schools of thought they purport to defend. In particular Subbāji can cite the Vedas and Purāṇas against Yajñeśvara when it comes to his explanation of eclipses. Subbāji also reads the Vedas against Yajñeśvara in such a way that the Siddhāntic explanation for the phases of the moon can be made consistent with the Purāṇic one (APV vs. 47-52).²³

Thus Subbāji has not rejected the authority of scriptural sources, but he does assert that pratyakṣa or observation is a legitimate means of gaining knowledge in its own right, and indeed, Subbāji at the close of his work does assert that even the statements of the śruti, when unsupported by logic and observation, can be wrong (APV vs. 63).²⁴

Subbāji again points out the improbable nature of the standard features of the Purāṇic cosmology. He also shows how in physical terms Yajñeśvara's proposals about the pole star do not work. Since, finally, the Siddhāntas are quite clearly designed for more than making pancāngas, Yajñeśvara's conclusion that the two models have different scopes and purposes must be rejected, and hence the virodha, or contradiction between them has not been resolved. The implication of this is that the Purāṇic model is simply incorrect.

One final point on which Subbāji exercises a particularly effective argument is Yajñeśvara's suggestion that the astronomy of the Europeans should be rejected simply because it is the product of foreigners. This was a battle that the Indian astronomers had fought before,²⁵ and Subbāji repeats the arguments about how the possibility of divine insight or revelation cannot for fundamental reasons be limited to Bhāratavarṣa. But he adds a further argument from orthodox Brahminical philosophical literature, in which seeing differences between people, instead of seeing sameness, is deplored (APV vss. 57-61).²⁶

Virodhamardana

²³ See especially Rāmacandra's commentary.

²⁴ nyāyopabr̥hito no cec chrutipakṣo 'pi duṣyati / śāstrapratyakṣaduṣṭe syāt kalpane katham ādaraḥ His commentator, Rāmacandra, however, softens the shock of this statement, by showing that passages in the philosophical śāstras already argue that the statements of the śruti do not overrule direct perception when it comes to accurate knowledge of the physical world.

²⁵ See for example the regularly cited verse of Varāhamihira, *Bṛhatsaṃhitā* 2, 14: mlecchā hi yavanās teṣu saṃyak śāstram idaṃ sthitam / ṛṣivat te 'pi pūjyante kiṃ punar daivavid dvijaḥ //

²⁶ The commentator is able to cite, among other texts, *Bhagavad Gītā* 5. 12: vidyāvinayasampanne, etc.

Yajñeśvara replied within a few months with the *Virodhamardana* and its commentary. For reasons of space I shall give only a summary. The *Virodhamardana* is approximately the same text as the earlier *Avirodhaparakāśa*, but with some pādas and lines replaced or inserted, so that the later text is five verses longer than the earlier one.²⁷ The changes to the text are exactly at places where it was criticized by Subbāji.

The most notable change is that the attempt to invalidate the views of foreigners as foreigners is dropped. Instead Yajñeśvara concedes that the foreigners' model might be useful, but asserts that it does not refute the truth of the Purāṇas (VM vs. 68).²⁸ Yajñeśvara moves more toward applying the layers-of-truth model inherited from Vedāntic and other Indian philosophical traditions as a way of differentiating the nature of astronomical truth from Purāṇic truth.²⁹

On the other hand, Yajñeśvara's defence of the Purāṇic order of the planets by appeal to his own ideas of the nature of Rāhu is kept intact. Elsewhere adjustments are less than total. The argument that the southern pole star is a reflection in the waters is quietly omitted. Instead it is just the great distance that prevents one from seeing the north star as one sails south.

In general Yajñeśvara stands by his explanations, and has a number of aspersions to cast on those who have criticized him, those who have the presumption to call themselves knowers of Jyotiṣ, as he makes clear at the end of his autocommentary.³⁰

Indeed the *Virodhamardanaṭīkā* constitutes the real sustained reply to the *Avirodhaparakāśaviveka*. Space does not permit a full consideration here of this densely argued work, but it is in this ṭīkā that Yajñeśvara demonstrates his more than passing comprehension of the Copernican model that he seeks to reject. He also reviews some of the attempts at establishing avirodha advanced in preceding centuries. Certainly he knows of the views that Nṛsiṃha discusses in his *Vāsanāvārttika* on the *Siddhāntasiromaṇi*.³¹

Conclusion

²⁷ The following verses and verse halves are replacements: 1, 2, 5cd, 11ab, 17abc, 26, 27, 28, 67cd, 69, 70. The following verses and verse halves are additions: 13cd, 19cd, 25ab, 36ab, 39cd, 57cd, 58cd, 69, 72.

²⁸ naitāvatā purāṇoktata(t)tvabādho bhaved iti / parilekhādi yan mlecchaiḥ kṛtaṃ tad api yujyate //

²⁹ e.g. vs. 58 in its revised form: ity āgamādisiddho 'rtha āstikair durapahnaḥ / vyavahārthakalpena vastvārthānām abādhanāt //

³⁰ In the first concluding verse of the ṭīkā he calls them jñānalavadurvidagdhapuruṣa- and jyotirvitpadalipsu- .

³¹ See Nṛsiṃha's comments on *Siddhāntasiromaṇi* II.3. 51, pp. 357-59 in the Sampūrṇānand edition. Nṛsiṃha completed this text in 1621. Yajñeśvara's comments appear on folios 11r - 12v.

Three points by way of conclusion: First there is the sheer speed of this flurry of literary activity, with four texts and countertexts being composed, published, circulated, and replied to in the space of less than two years - a pace faster than many exchanges of letters to the editor of learned journals today. Then again these 'pamphlets' were produced in various languages, beginning with Marāṭhī, then Hindī and English, and finally Sanskrit with Marāṭhī. The format of publication was itself various, with Wilkinson's paṇḍits having their works lithographed and 'mass produced,' while Yajñeśvara's were copied by hand. It is possible that Sanskrit texts had circulated at great speed in earlier periods,³² but in this context the speed is perhaps itself an indicator - as are the differential choices of languages and the availability of lithography - of the growing impact of the colonizing and modernizing presence on the Sanskrit intellectual establishments.

Second, the aftermath of the controversy: what became of the efforts of Wilkinson and his circle of paṇḍits? In his own writing Wilkinson depicted his pandits as embattled, and bemoaned the stiff opposition to his project emanating from "the learned in Poona, Nagpore, Oojain, Sagar, and Benares."³³ He further complained that the gosāins of Mathurā had placed a "bann of excommunication against all who study the Siddhants, and Astronomy" (Young 1997:253). Richard F. Young interprets Subbāji's later writings, especially his *Laghutaṅka* rejoinder to the caste-bashing *Vajrasūcī*, and his *Mataparīkṣāsīkṣā* - a reply to John Muir's critique in Sanskrit of Hindu religious and cultural ideologies - as a climbing down from the strong form of endorsement of European notions of science, modernity and progress found in the *Siddhāntasiromaṇiprakāśa* and *Avirodhaparakāśaviveka* (Young 1997:258-63). Furthermore, Young considers that the Sihore Siddhāntas project died along with Wilkinson when Wilkinson succumbed to an early death in 1841, while "real" science education in the later 19th century left the Siddhāntas behind (Young 1997:263).³⁴

This is not entirely true: Wilkinson's other chief protégé, Bāpudeva Śāstrī, went on to teach both Indian and European astronomy at the Benares Sanskrit College beginning in 1841. Bāpudeva published voluminously in Sanskrit and English, promoted a modernization of Indian astronomy and the knowledge of European astronomy in India. It was his pupils and intellectual descendants, including Sudhākara Dvivedi, who dominated

³² There are examples of Sanskrit texts circulating at great speed in early periods. See Pollock Forthcoming for examples, among them the speedy translation and circulation of the Persian *Yūsuf o Zulekhā* in the 15th Century.

³³ Cited by Young from Wilkinson's preface to his edition of the *Gunitadhia* (*Gaṇitādhyāya*) of the *Siddhāntasiromaṇi* (Young 1997:253).

³⁴ I reproduce Young's use of quotation marks around the word "real." See also the review of Wilkinson's proposal in the *JASB* of 1834 in the *Calcutta Review* 1 (1844): 286-90.

the intellectual scene in Benares for at least the rest of the century.³⁵ It could be said that via the pandits in Benares Wilkinson had a long term impact on the growth, in Indian intellectual movements, of an accommodation of science and scientific rationality which still enabled holding on to the context of traditional Sanskrit learning.

Furthermore, the controversy was still remembered among Indian astronomers for the rest of the century, even if not entirely accurately.³⁶ The histories of Sudhākara Dvivedi and S.B. Dikshit take note of the exchange between Yajñeśvara and Wilkinson's sabhā. Their accounts present a different picture of what happened by comparison to what Wilkinson recorded. In Sudhākara Dvivedi's *Gaṇakatarāṅginī*, 'Brief Lives of Indian Astronomers,' he records a correspondence between Wilkinson and two paṇḍits of Benares about this virodha / avirodha controversy.³⁷

It becomes clear from these letters, and from Sudhākara's account of them, that Wilkinson was actively promoting the acceptance of Subbāji's work and sending copies of the *Avirodhaprakāśa* and *Avirodhaprakāśaviveka* around to expert paṇḍits in hopes of gaining acceptance for them. It is also clear that at least some paṇḍits in Benares, far from mounting a resistance couched on orthodoxy, were quite worried about angering Wilkinson. After all Wilkinson was able to secure positions for paṇḍits he favored, for example at the Benares Sanskrit College.³⁸

Thus the portrait of this exchange as a dichotomous clash of modern and English, yet foreign and colonizing, science versus traditional and indigenous, yet reactionary and antirational, scholarship is already confused by the varying accounts of the events and their aftermath. It is further confused by the fact that Yajñeśvara, at the time of writing the *Avirodhaprakāśa* and the *Virodhamardana*, was also in the employ of the British, teaching at the Poona Sanskrit College. Then again, Yajñeśvara left his position, or perhaps lost it, in 1838, the year after the exchange of pamphlets, at the time that Thomas Candy took over

³⁵ Their impact on the Sanskrit world of letters in Benares and its satellites could be traced through a study, as yet to be done, of the Sanskrit journal, the *Paṇḍit*, in which the problems of "tradition vs. modernity" or perhaps "hybridity" are discussed in an open, published forum. In the first volume of the *Paṇḍit*, (1866/67), pp. 32-35, 82-84, for example, there are articles by Bāpudeva and his pupil Govindadeva that continue the Wilkinsonian project of interrelating the accounts of the Siddhāntas and modern science.

³⁶ Sudhākara Dvivedi, for example, considers the *Avirodhaprakāśaviveka* to be a reply to Nīlakaṇṭha's work, not Yajñeśvara's (Dvivedi 1933:123).

³⁷ See the letters of Durgāśaṅkara Pāṭhaka and Lajjāśaṅkara to Wilkinson (Dvivedi 1933:119, 123-24).

³⁸ Bāpudeva Śāstrī got his position there in 1841 as a result of Wilkinson's patronage; Lajjāśaṅkara also taught there; for others supported by Wilkinson, such as Sevārāma Śarma, see Dvivedi 1933.

administration of the Poona Sanskrit College (Dikshit 1969:176-77).³⁹ Then again, what is the evidence, aside from Wilkinson's mention of it, that the Gosāins of Mathurā were in the habit of pronouncing "banns of excommunication" in the 19th Century?

Third, I began with a general argument for reading the work of Sanskrit authors in their larger historical context, and suggested that the 19th Century presents to us for this purpose the lure of the recent past, a time when contextualizing information about individual authors and their contexts is more readily available. In this light, the exchange between Wilkinson and his paṇḍits and Yajñeśvara and other 'traditional' astronomers can be studied in some detail and can be seen as part of the great transformation that overtakes India in the 19th Century.

What is the role of the paṇḍits and śāstrīs in the history of this modernizing transformation? What influence does this transformation have on the intellectual life of the śāstrīs and paṇḍits? The foregoing discussion shows some examples of ways in which the Sanskrit literati adopted positions in relation to the modernizing or westernizing intellectual currents flowing in the period. Furthermore, at least two general points are supported by the preceding evidence. First, the Sanskrit astronomers of the modern period inherited intellectual traditions that were historically contingent, the result of ongoing debate, internal development, and reaction to external influences. Furthermore, as Young has already argued (Young 1997: 264-69), the Sanskrit śāstrī was in fact capable of functioning as a public intellectual, even in the 19th century, engaging from his own position the modernizing scientific teachings that were spreading around him. This latter point is not a trivial one if one considers the historiography of the 19th Century, and the role accorded to learned Brahmins in it.

For in one common version of that history, the learned traditions in Sanskrit that continue from the deep past are depicted as a traditional heritage whose main purpose is to underpin a static social and religious structure.⁴⁰ In another recent rendering the learned

³⁹ Candy is cited there as having characterized Yajñeśvara as "very intelligent and learned, but a very bigoted champion of the mythological doctrine." To make matters more interesting, the letters of Durgāśaṅkara and Lajjāśaṅkara nevertheless suggest that Yajñeśvara was in direct correspondence with the Sihore Sabha, and indeed agreed with Wilkinson in rejecting the work of Nīlakaṇṭha. For more on the Poona Sanskrit College or Poona Hindu College see Madhav Deshpande's article in this collection of essays.

⁴⁰ This account of the role of Brahmins has many reincarnations. Even a very recent work such as Bose and Jalal 1997, which is very much aware of every development in Indian historiography and the pitfalls that are faced, makes use of the term "brahmanical" exclusively in the following phrases: "brahmanical orthodoxy," "brahmanical social orthodoxy," "neo-brahmanical orthodoxy," "the high brahmanical tradition," and "brahmanical ruling ideology." I can find no definition of what "brahmanical" means except that it has to do with legitimation of power, p.19.

traditions in Sanskrit are only one of many features of a pre-Colonial past that are occluded from view by the colonial experience, elements of a past not knowable or recoverable except in the distorted form they gain at the hands of orientalists and other agents of empire.⁴¹ But surely it is not edifying to take the Sanskrit learning of the past as an unchanging body of conclusions and stances that are largely unconscious of contemporary events, whether this be a virtue or a vice. The Brahmins, given the dubious distinction of then being the hereditary custodians of this tradition, can appear in the history of the century only as they emerge or escape from their traditional world, or as they help orientalists learn about or 'imagine' it. Elsewhere in Indian history, 'traditional Brahmins' would be condemned to appear only in such generic circumstances as when they are deployed to the countryside *en masse* by rulers to 'Brahminize' lands being converted to a village-style agricultural economy, almost as if they were a species of beneficial, exotic plant or insect.

As a way of closing this talk, then, a consideration of virodha and avirodha, or inconsistency and consistency. Are inconsistencies present in an intellectual tradition even when no one is aware of them? Is consistency produced only by those who seek to find it? As I have mentioned, the problem of consistency / inconsistency in cosmological accounts had already been 'theorized' in the 8th Century. The problem had emerged from its settled state into active theorizing again in the 16th century, well before the British had asserted colonial / imperial power. It is in the language of virodha and avirodha that both Wilkinson's circle and Yajñeśvara choose to carry out their cosmological clash. Why?

We need to think further about this question, but I would suggest that the orientation toward logic and argumentation this language calls up provided a common ground for the two competing models. For Yajñeśvara, talk of avirodha and virodha activated the inherited methods of interpretation, argument and proof, which he hoped to use to remove the glamour of the European scientific method. For Subbājī and Wilkinson, talk of virodha and avirodha activated the inherent instabilities of the Brahminical cosmology, which they hoped to fragment and reassemble.

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⁴¹ The literature asserting the 'invention of Indian tradition' by 'colonial discourse' is now extensive well known. See for example, Inden 1990.

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{ Acknowledgement footnote: }

My thanks to Mrs. S. Sahasrabuddhe and the curators of the Sanskrit MSS collection at the Ḥnandāśrama in Poona; to R.I. Nanavati, curator of the Sanskrit MSS collection at the Oriental Institute, Baroda; to Y Sahai, curator of the Palace Museum in Jaipur; to Gillian Evison, curator of the Indian Institute Library, Oxford; to Peter Scharf, Brown University, and to the DHIRC, Columbia; all of whom provided invaluable help in obtaining copies of manuscripts and of rare books in preparing this paper. My thanks as always to David Pingree, Brown University, for extensive help with bibliography, and for commenting on several drafts of this paper. I am grateful to Asmita Hulyalkar for her help with reading

some of the relevant passages in Marāṭhī. Thanks also to Saurabh Dube, Thomas Trautmann, and to the participants at the Aithal Colloquium, for comments and suggestions.