HOW JESUIT SOURCES AND HISTORIOGRAPHY SHAPED THE ENLIGHTENMENT HISTORY OF MATHEMATICS

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The history of sciences in the non-West and the history of the Jesuit sciences are rapidly growing fields of research. Before addressing the specific theme of the Jesuit sciences in India, the historiographical context within which historians of science in India have been working for the last couple of decades shall be briefly discussed. The 1970s and 1980s were decisive decades for both the sciences and the social sciences in India, as India graduated to a new stage in what political theorists have considered its experiment in democracy. The 1970s more or less commenced with a major crisis in development thinking. This was simultaneously a difficult period for Indian democracy, while on the scientific and technological front a perceived dysfunction of the science system triggered a crisis of legitimacy. These distinct developments alongside the failure of percolation and trickle-down models to deliver on economic and social development prompted new forms of social activism, crystallizing in the birth of new social movements. Within the academic sphere, the cognitive dimension of these social movements found reflection in rethinking the social relations of science and social theory. The 1980s could more or less be labelled the decade of alternate modernities, alternate sciences and alternate technologies.

One of these responses took the form of a neo-Gandhian civilisational critique of the West and modern science, ushering in a new era in the social studies of science as anthropologists, sociologists and historians flocked to a field hitherto dominated by physicists and retired scientists. My own career commenced at the fag end of the 1970s with the study of the philosophical foundations of quantum physics: but I found the climate in the social studies of science was far more intense and debate infinitely more interesting – what is more, a colleague and I discovered a mathematical text by a nineteenth-century Indian mathematician who had discovered a new approach to elementary calculus. The fundamental problem immediately confronting us was that of engaging with the work of this

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mathematician without being drawn towards some form of Eurocentric history of science. We were inspired by the new, sociologically oriented history of sciences, and on the other hand by the work of Joseph Needham on *Science and Civilization in China*. The Needham river metaphor had initiated a great deal of discussion among scholars working on the non-Western sciences. Despite its ecumenical vision, the metaphor was found to be highly problematic. In the first instance, it more or less considered modern science to be paradigmatic of what was considered to be science; and secondly, it was oblivious of all those streams of knowledge that did not connect up with the river of modern science. Nevertheless, if not by the detail of Needham's historiography, many of us were certainly attracted by his ecumenical vision of science. In any case, the Needham question had opened the gates to scholars from third-world countries to enter the history of science – so he remained an inspirational figure.

If in the 1980s we took a stance vis-à-vis Eurocentrism in history and theory, the 1990s was the decade of the political ascent of Hindu nationalism. Hindu-centrism in the history of science dated back to the last decade of the nineteenth century, never seeming to occupy centre stage. In the 1990s, it coruscated into the open and several journals fell prey to the onslaught of papers that argued that science actually commenced in the Vedic past or that many of the insights and theories of contemporary science were prefigured in Indian antiquity. This was a trifle unsettling for some of us, who didn't wish to spend a lifetime battling one centrism or the other. In order to acquire a better understanding of what was at stake, I approached the subject matter of the historiography of sciences in order to understand how history of science was and could be done. My book *Images and Contexts* was a product of that engagement with how Indians wrote the history of science and the contexts that shaped their historical writing.

By the late 1990s, scholars within Northern STS, such as the feminist philosopher of science Sandra Harding, announced a historiographic revolution that challenged the integrity of European science. This revolution occurred in the history of sciences at the conjuncture of three cognitive movements: 1) post-Kuhnian science studies, 2) feminist philosophy of science and 3) postcolonial history of science. Based on Harding's discussion, I have tried to distil what she means by a postcolonial theory of science. Though some versions of postcolonial theory of science could well turn out to be mirror images of Eurocentric theory of science, the table below provides a frame for the development of a cognitively just theory, albeit it may not exist at the moment.

It was in 1997 that I commenced work on the French Jesuit astronomers in India and became acquainted with their efforts through the *Lettres édifiantes et curieuses*, a collection of letters of French Jesuits who travelled to Latin America, India, China and other parts of the world between 1670 and 1761. This investigation took me to the Jesuit archives at Vanves, the Bibliothèque Nationale and a number of other libraries and archives. In the process I was pleasantly surprised to encounter an entire corpus of writing on the history of Indian mathematics produced by Le Gentil, Bailly, D'Alembert, Delambre, Laplace, Montucla, Biot, Chasles – all members of the Academie des Sciences, spread over a period of 70 years. The interest of these savants in Indian mathematics and astronomy needed to be understood. What approach was suited to the construction of this archive? While Raymond Schwab's classic *Oriental Renaissance* provided a context to this archive I attempted to construct, there appears to have been a degree of consensus concerning the place of India and China in the eighteenth-century European imagination.

Constitutive elements	*Eurocentric theory*	*Postcolonial theory*
Theory of history	Isolationist	Multicultural
Theory of science	Transcendent	Contextual
Theory of transmission	Arrow of influence points outward – away from Europe	Multidirectional arrows of influence constituting a network

Clark and others had pointed out that the eighteenth-century French Enlightenment was fascinated by China as a Utopia of a different polity. On the other hand, the German Romantics, at variance with the ideology of the Enlightenment, were drawn towards Indian philosophy and metaphysics. This aperçu overlooked the engagement of leading French astronomers and mathematicians from the last quarter of the seventeenth century to the end of the eighteenth with the mathematics and astronomy of India and China: an entire genealogy can be constructed that extends from Cassini I to Laplace, with whom ends a phase in the history of physics.

Scholars from Schwab to Said, from Cohen and Inden to Martin Bernal have chronicled the process that commenced in the closing decades of the eighteenth century as the period wherein the standard nineteenth- and twentieth-century Occidental representations of the Orient first began crystallizing. So much so that, by the end of the eighteenth century, the French gaze on India began to change from one of enchantment and fascination to one of

contempt. In an oft-quoted passage Said writes: "Taking the late eighteenth century as a very roughly defined starting point Orientalism can be discussed and analyzed as the corporate institution for dealing with the Orient – dealing with it by making statements about it, authorizing views of it, describing it, by teaching it, settling it, ruling it: in short, Orientalism is a Western style for dominating, restructuring, and having authority over the Orient" (Said, 1978).

The writings of the French savants on the history of astronomy and mathematics of India provided an opportunity to extend the critique of Orientalism to the least likely case: the history of science and mathematics or, to put it dramatically, the history of the a priori in particular as one other site for the institutionalization of Eurocentrism. Was this late eighteenth-century transformation that Said speaks off observed in the histories of mathematics, from the Enlightenment to the post-Enlightenment periods? The exploration of this corpus of writing revealed the unfolding of the standard historiography of mathematics of the non-West and India, beginning with the antediluvian theories of the origins of astronomy proposed by Jean-Sylvain Bailly. By the early decades of the eighteenth century, the binary dichotomies of the history of mathematics were well in place. This stabilized in the distinction drawn between Western and Indian mathematics as follows:

Western Mathematics	*Indian Mathematics*
Attentive to theoretical foundations	Developed for pragmatic ends
Geometric	Algebraic
Deductive	Intuitive

In this frame of the history of mathematics, the idea of proof was to be of prime significance in deciding whether a tradition had qualified for the status of being genuinely mathematical. The absence of deductive proofs in the Indian mathematical tradition was reflected in the historical construction of Indian mathematics as devoid of mathematical proof and the presentation of the idea that the tradition was essentially an algorithmic one. Later in the early nineteenth century, when Colebrooke published his translations of the works of Bhaskara and Brahmagupta, mathematical demonstrations were discussed, but these demonstrations were not considered proofs in the Euclidean sense.

The French savants who produced the first histories of mathematics and astronomy did not base their histories on original Sanskrit texts, but on the reports and a couple of man-

uscripts sent by the French Jesuits stationed in India. Abbe Guerin's translation of the *Surya Siddhanta* was the first French translation of a Sanskrit astronomical text, while the British Orientalists had obtained and translated a few mathematical and astronomical texts before the end of the eighteenth century. The French savants did read the English translations of these works and in the first decades of the nineteenth century expressed their strong disagreement with the interpretation of the British Orientalists. When and where do we begin to see a transformation of the manner in which European scholars looked at Indian and non-Western mathematics? In asking myself this question, I decided to resist the temptation to find any singular explanation for this transformation of the European imagination.

In the remaining portion of this essay, I briefly summarise some of my findings by returning to the sources of the Enlightenment and the beginnings of modern history and the history of science writing. This requires understanding why and how histories of science were written in the late eighteenth century. Evidently, this was a period of the most rapid institutionalization of science, and the sciences in turn were characterized by disciplinary differentiation. General histories of science were written in the early half of the eighteenth century, while towards the last decades of the eighteenth century specialist or disciplinary histories of the sciences began to be produced. These histories targeted multiple audiences: patrons who had to be convinced of the utility of the developments in the newer disciplines and colleagues in order to legitimate the new disciplines by stressing their antiquity and more importantly to demarcate the boundaries of new disciplines, e. g. where did astronomy begin to differ from mathematics. Since these histories were written by practicing savants, they also served as scientific review papers surveying the developments in the discipline, from a constructed antiquity and in a reverse teleological schema telescoping into their own work.

These histories of science were ensconced within the ideology of progress or unending improvement; and this was most evident in the strong claims to novelty made in favour of the recent developments in the sciences. The history of science as a Voltairean narrative of progress was marked by the discounting of the past with respect to the future; this itself was an additional incarnation of the long battle between the ancients and moderns that had raged since the previous century. The claims to novelty and originality in historical discourse were reflections of the new institutional features of science; nevertheless, there were other aspects quite specific to the history of mathematics in post-revolutionary France. Lorraine Daston has pointed out that there was a decline in the standing of the notion of cal-

culation in post-revolutionary France. Calculation, which had hitherto been considered a prodigious mental feat, was by the end of the eighteenth century considered a lower-order, mechanical activity. By the second decade of the nineteenth century, the circle of Laplacians had gone into decline, and the sibling rivalry between the geometers and algebraists saw the ascent again of the geometers. However, in the history of mathematics writing, the geometers and the algebraists had very different assessments of Indian mathematics and its procedures. Laplace had written in the previous century, "The ingenious method of expressing every possible number using a set of ten symbols (each symbol having a place value and an absolute value) emerged in India. The idea seems so simple nowadays that its significance and profound importance is no longer appreciated. Its simplicity lies in the way it facilitated calculation and placed arithmetic foremost amongst useful inventions. The importance of this invention is more readily appreciated when one considers that it was beyond the two greatest men of Antiquity, Archimedes and Apollonius."

The appendix at the end of Laplace's *Exposition* dealt with the history of celestial mechanics from Antiquity to his own work. This historical narrative is deeply indebted to the history of Bailly, as I have pointed out elsewhere. Though by the time the *Exposition* was published Voltaire and Laplace, who were open to Bailly's hypothesis that astronomy had possibly originated in India though the Indians had inherited it from another people, were now disgusted with his obsessiveness. Also evident were certain anxieties generated by the disruption of the narrative of progress – in other words, Le Gentil would take note of algorithms he encountered in the Indian mathematical tradition that predated Kepler by more than three hundred years. Furthermore, there were series representations of trigonometric functions and approximation procedures that fascinated Laplace and D'Alembert. These disruptions had to be accommodated within the narrative of progress that was emblematic of the history of science standing in for the history of human intelligence.

Do we observe similar changes towards the end of the eighteenth century in the historiography of Chinese and Arab mathematics? François Charette's work suggests a similar transformation of the historiography of Arab mathematics produced by practicing European mathematicians, when the Arabs no longer were seen as the "maîtres" of the European mathematicians and became mere repositories of the legacies of the different mathematical traditions of the ancient world. There is a departure from the Saidian picture with the rise of British history of Indian mathematics. British Indologists such as William Jones, Ruebens and others were deeply inspired by Bailly's antediluvian theory but subsequently departed from the spirit of his *Traité* and *Histoire*. In fact the histories of Montucla and

Delambre that subsequently followed the work of Bailly disagreed strongly not just with Bailly but with the spirit of the new Indology. This disagreement played itself out in the form of a controversy between the French savants and the English and Scottish mathematicians, such as John Player and Leslie. As I traced the controversy, I found that I was heading towards the beginnings of the modern disciplinary history of sciences or the history of the modern history of sciences. The concern of this essay is the sources employed by Enlightenment savants in reconstructing the history of the mathematics and astronomy of India. I have argued that the sections of Diderot's project dealing with the sciences and mathematics of India are inflected by the Jesuit historiography of the sciences of India. Furthermore, the writings of the savants transmute the ethnographic reports of the Jesuits in India into a diachrony of mathematical reason. A related question that has concerned historians of science working on the non-Western sciences concerns the influence of textual collections and manuscripts on non-Western mathematics and astronomy on the historiography of the non-Western sciences. The question could in fact be turned around and it could be proposed in an anti-inductivist fashion that there existed a prehistory that shaped the collections themselves.

As pointed out earlier, the sources for D'Alembert, Diderot and Bailly's histories of Indian science and mathematics were the Jesuit reports, though in all fairness it must be pointed out that Diderot did not know that. When the Académie des Sciences became interested in producing a history of the sciences of India, Diderot insisted that these accounts be uncontaminated by Christian prejudice and Jesuit sources. When the astronomer Le Gentil landed in India on an expedition to observe the transit of Venus, his *Memoirs* and *Voyages* refer to encounters with Indian astronomers who lived on the coast of Pondichery. It is evident that his interlocutors were none other than those of the Jesuits and that he was familiar with the Jesuit sources.

This brings us to the last but longest part of the present exposition dealing explicitly with the French Jesuits in India. The first set of Portuguese Jesuits set out from Lisbon and arrived in Goa on the western coast of India in the 16th century. Under the *padraodo* system, they embarked on a form of evangelization of the local population that Županov has called "slash-and-burn evangelization". By the beginning of the 17th century, French and Italian Jesuits arrived in India via Lisbon and proceeded to the eastern coast of India, the Coramandel coast. Very soon national rivalries within Europe surfaced as differences in the Jesuit order. The most telling of these controversies broke out over the liturgy of conversion. Roberto de Nobili of the Madurai mission prescribed accommodation to local ways as a

route to conversion. The ways of this Tamil-speaking Sanskrit-quoting sanyasi were contested by the Portuguese Jesuits. But in the end, the Collego Romano ruled in Nobili's favour and *accomodatio* became the path of the French and Italian Jesuits in India. With the passage of time, French and Italian Jesuits set out for India from Lorient in France.

However, the Jesuits arriving in India from the 1670s onwards were schooled in what the French traveller François Bernier – a student of Gassendi – wrote about Mughal court. Bernier's travelogues had set the aesthetic and more or less created the dominating images of Mughal India amidst the seventeenth-century French reading publics. But the first contingent of French Jesuits arrived from Siam following a political upheaval in the region. They landed then in the town of Pondichery in 1680. Some of these Jesuits were gradually enrolled into Cassini's grand cartographic project that had in turn been inspired by Louis XIV's visionary minister Colbert. The task set for the French Jesuits in India and China was to make a set of astronomical observations and calculate latitudes and longitudes that would enable the construction of an accurate map of the world. The second task was to probe the local astronomical traditions for celestial observations of past events that would facilitate the fine-tuning of astronomy in Europe – a project that today goes by the name of historical astronomy.

Evidently, in 17th-century France, astronomy and hydrology were Jesuit specialties – a tradition seeded by Pieresc de Tondutti. Had this not been the case, Cassini would not have tried to persuade a reluctant Colbert to enlist the Jesuits stationed outside France in his project. The tradition of Jesuit astronomy has been discussed in detail in Heilbron's book *The Sun in the Church*. Between 1680 and 1761, French Jesuit astronomers wrote letters and reports on their proto-ethnographic encounters with so-called Indian astronomers, built astronomical observatories, performed calculations, proceeded in delegations to the courts of astronomer-kings and debated with court astronomers. Based on these reports and letters, practicing French astronomers would revise their calculations or do them afresh in their attempt to resolve the problems left unresolved by Newton. Le Gentil, Bailly and others would transform the ethnography of Indian astronomy into a diachrony of astronomical and mathematical reason.

The first Europeans to probe the astronomy and mathematics of India in the eighteenth century were the French Jesuits. French Indology, according to Filliozat, emerged in the early decades of the eighteenth century, when the king's librarian asked Etienne Fourmont, of the Collège Royale, to draw up a list of works of note from India and Indo-China, to be purchased for the king's library. By 1739, a catalogue of about 250 Sanskrit works

had been prepared, and copies of the Vedas, epics, philosophical and linguistic texts and dictionaries had been procured. Curiously enough, very few, if any, scientific texts were included in the cargo to the king's library. In the words of Filliozat: "The Indian astronomical systems were among the first scientific or even cultural achievements of India studied by Europeans." (Filliozat, 1957). Of the 250 Sanskrit mathematical manuscripts sent to the Bibliothèque Royal in Paris, only about 8 were mathematical or astronomical manuscripts. The list of astronomical and mathematical works included in the collection is given below:

Siddhianta-Manzar
Zatak-arnava
Bhassuati
Jiôti-pradipa,
Suddhi-dipika
Krama-dipica
Samaï-pradipa
Sat-kritia-dipica

None of the texts included above were considered major scientific texts in the Indian mathematical tradition. Why the Jesuits didn't converge on a major Siddhantic work remains a mystery. Important manuscripts in other fields were collected, copied and cargoed, but this was not the case with any mathematical or astronomical manuscripts. And yet the Jesuit reports generated a great deal of interest in Indian sciences and mathematics.

According to Sylvia Murr, the eighteenth-century accounts of India penned by the Jesuits and the *philosophes* comprise combinations of three representations of India. In these representations, India figured as an *être-ailleurs*, as a Utopia and as *l'ici de l'autre*. As *être-ailleurs*, India simply designated the geographical reality of a place in time. In this optic, "here" was France, and "elsewhere" was a purely instrumental elsewhere. But, as elsewhere, India was transfigured by the climate, the supposed fertility of an Edenic country, the sagacity of the gymnosophists, the antiquity of its sciences and arts, the stoicism of its ascetics. These stereotypes were transformed into a "fantasmatic elsewhere" for the French – a sort of Utopia. And as *l'ici de l'autre*, the here of the Other – India was a place that can become here on the condition that the alterity of the other could be abolished. According to Murr this meant that the Indians were an ancient people with a language, religion, social

organization and customs that were different from those of the French, thus making it elsewhere. The eighteenth-century *philosophes* postulated that all differences were explicable, for difference was unimportant when encountering the unity of human nature and the universality of reason. These three representations were found superposed within the same discourse, whether it is in the correspondence of Voltaire or the letters of the Jesuit missionaries.

In order to appreciate why these Jesuit reports were considered authoritative, it is essential to explore the Jesuit writing practices or the narratology of the Jesuit reports and letters. Amongst other objectives, one of the motives for publishing the Jesuit letters was propagandistic; they served as publicity material to attract funds for the Society. The demand for funding and legitimacy increased as pressure mounted against the Jesuit order in Europe during the second half of the eighteenth century. The *Lettres* were also responding to the expectations and addictions of the reading public back in France. These expectations included "digressions and amplifications containing descriptions of foreign lands and peoples, peppered with eye-witness exaggerations, pious pathos and heroic adventures". Furthermore, from the early to the middle decades of the eighteenth century, the mounting criticism of the Jesuit order in France generated self-justificatory tropes that included the representation of their endeavours abroad as successful and their members as virtuous and untainted by idolatrous practices.

Beyond these influences that structured Jesuit writing was the prescribed form of Jesuit writing that Ignatius Loyola, the founder of the order, set down especially for those stationed outside Europe. Županov reminds us of the four components of Jesuit written composition and correspondence that were to be cast in a specified narrative form. The first included accounts of kings and nobles, and these were to be recorded as dramatic, theatrical vignettes. The second component covered the lives, habits and customs of the common people, and these virtually took the form of ethnographic descriptions. Thirdly, disputes within the order, when reported, were to be couched in dialogical or polemical terms. And finally, the individual ambitions of the Jesuits were to be sublimated in the rhetoric of sainthood and utopianism.

In this tightly cast and evidently doctored form, much of Jesuit writing was subject to freeloading and plagiarism (two anachronistic terms for the times). The advantage of location and engagement with local populations conferred on their descriptions of the new and old worlds a concrete authority that made them vulnerable to rampant literary piracy. In the case of the French Jesuit Coerdoux, stationed at Pondichery, this was doubly so. The

first time was at the hands of Abbé Dubois, whose classic *Hindu Manners, Customs and Ceremonies* was later discovered to be a plagiarized version of Coerdoux's work. The second time he was plagiarized, but less perniciously so, by the French astronomer Le Gentil. Two cognitive instruments in the Jesuit repertoire conferred their reports with an enviable robustness. These included, on the one hand, the natural faculties of reasoning, and personal experience, and, on the other, a healthy empiricism. Again, as Županov reminds us: "The other, the foreign, the strange was seen as a 'factum' to be surveyed, enumerated, described, explained, catalogued. The data thus produced and collected … remain a witness of various experiments in the methods of conversion, persuasion, surveillance and social engineering." (Županov, 1999, 22)

From the time of Nobili onwards, the Jesuits more or less considered the Brahmins interlocutors for Indian civilization. This legacy of the Jesuits was to survive in French Indology, and as Roland Lardinois has shown, the genealogy persisted well into Louis Dumont's work *Homo Hierarchicus*. One of the central preoccupations of the French Jesuits in the late seventeenth and nineteenth centuries was with Hindu chronology. It could even be suggested that a version of the antediluvian theory of Bailly was an inheritance of the Jesuit historiography that grappled with Hindu chronology to accommodate a non-Christian people into a Christian conception of time. Murr identifies the central propositions around which the Jesuit project of *accomodatio* was organized: 1) All the descendants of Noah had the same monotheistic religion. 2) Christendom had inherited the tradition of true religion from the Jews. 3) Like the Jews, the Indians were the recipients of the same heritage from Noah. 4) But contrary to the Jews, the Indians lost the true religion and tumbled into idolatry. The second stage of this process involved a historiographical operation that consisted in the invention of two tropes that I have elsewhere called the tropes of forgetting and disfigurement. These two tropes appear reformulated in the Enlightenment historiography of sciences of India; the table below attempts to summarise these perspectives.

Historiography	*Trope of Forgetting*	*Trope of Disfigurement*
Jesuit historiography of l'Inde carnatic	The Brahmins had forgotten the original true Noahic religion from which they had descended and fallen in to idolatry	The religion of the Brahmins had been disfigured over the centuries as they had tumbled into idolatry and superstition
Enlightenment historiography of Indian astronomy and mathematics	The Brahmins had forgotten the intelligence of the astronomical methods that had been their legacy from an ancient people	The Brahmins had disfigured the core of an ancient science that they had inherited from an ancient people

This Jesuit invention, in the hands of the Enlightenment historians, enabled the accommodation of historical episodes from non-Western contexts that disrupted the narrative of progress. From Bailly and Delambre via Cantor to Neugebauer and van der Waerden, these two tropes are constantly encountered in the study of the history of ancient and medieval Indian mathematics and astronomy. In a work published as recently as the 1980s, van der Waerden evokes, on lines similar to Bailly and Delambre, an earlier ancient mathematical wisdom that was apparently forgotten by the Indians. For van der Waerden, this wisdom was Euclid's algorithm: "I also suppose that *their methods of calculation were copied, without proof* … Jayadeva could learn the method of composition of solutions and of eliminating common factors of the 'roots' x and y, but the idea underlying the cyclic procedure, namely *the periodicity of the Euclidean algorithm, got lost.*" (van der Waerden, 1983, 154, italics added)

The Jesuit mystery, namely their inability to collect and send back Indian texts on astronomy and mathematics, needs explication. Over the last couple of decades, it could be suggested that the Jesuit historiography in South Asia has undergone a great deal of radicalization from within the Jesuit order. This maybe true for other parts of the world as well, but I know South Asia best. The Jesuit Francis Xavier Clooney recently published a biography of the eighteenth-century French Jesuit savant Bouchet (cartographer, astronomer, linguist and philologist), who lived in India. The biography undoes libraries of hagiography surrounding the life of Bouchet. Clooney begins by asking why the Jesuits left no signature on the mind of leading Tamil intellectuals of the time who lived in and around

the same region where Bouchet and members of the Jesuit order operated. For example, there is no mention of the Jesuits in the writings of a leading intellectual of the time, Vedanta Mahadesikan. It appears then that the Jesuits mixed with socially and politically important people, but rarely with scholars and certainly not scholars of the mathematical and astronomical high tradition. This became evident to me when I tried to discover the sources employed by the Jesuit Duchamp, whose manuscript, called the "Xavier manuscript", was an important source in the eighteenth century. It is clear that Duchamp had only met the *panchangamistes*, the calendar or almanac makers, not the Siddhantic astronomers; in fact he was possibly unfamiliar with the existence of the latter tradition.

In any case, both in historiographical terms and in their proto-ethnographic reports, the French Jesuits played a central role in structuring the history of Indian mathematics and astronomy and possibly even the history of Chinese mathematics, though it may well be premature to push the latter inference. The diversity of Western approaches to the study of the object called non-Western mathematics and astronomy and the optics available for their study suggest the existence of a more nuanced episteme than can be subsumed under the rubric of Orientalism. This would suggest that our view of the power relations between East and West and the discourse about the Orient need to be modified to accommodate the distinct nature of different kinds of knowledge-generation activities. The nested theses concerning the cosy relationship between knowledge and power are a bit too persuasive for one to declaim the end of the Orientalist episteme. And yet a more nuanced historical approach, wherein imperial domination of East by West is "only one of a number of factors in the East-West equation", would open windows onto the plural knowledge practices of varied communities. One of the merits of post-colonial scholarship has been to reveal the "… suppressed historical origins and … hidden ideological agendas" of the Occidental discourse about the Orient. The irony of the Enlightenment history of non-Western science was that the savants recognised that the Jesuit accounts of India might be clothed in Christian prejudice. They however failed to see that other prejudices could filter through scientific reports that they considered neutral and value-free. Those prejudices were possibly not of a religious nature, but were disguised by some of the ideological assumptions that underpinned their historical project.

Filliozat, Jean. 1957. "Ancient Relations Between India and Foreign Astronomical Systems." *The Journal of Oriental Research – Madras* XXV, I–IV, 1–8.

Habib, S. Irfan and Dhruv Raina, eds. 1999. *Situating the History of Sciences: Dialogues with Joseph Needham*. Oxford University Press.

Heilbron, J. L. 1999. *The Sun in the Church: Cathedrals as Solar Observatories*. Cambridge: Harvard University Press.

Khilnani, Sunil. 1997. *The Idea of India*. Farrar, Straus, Giroux: New York.

Murr, Sylvia. 1987. *L'indologie du Père Coeurdoux: stratégies, apologétique et scientificité*. Ecole Française d'Extrême-Orient, Paris.

Nandy, Ashis, ed. 1988. *Science, Hegemony and Violence: A Requiem for Modernity*. Oxford University Press, New Delhi.

Raina, Dhruv. 2003. *Images and Contexts: Studies in the Historiography of Science in India*. Oxford University Press.

Raina, Dhruv. 2003. "Betwixt Jesuit and Enlightenment Historiography: The Context of Jean-Sylvain Bailly's History of Indian Astronomy." *Revue d'Histoire de Mathématiques* (9): 101–153.

Raina, Dhruv and S. Irfan Habib. 2004. *Domesticating Modern Science: A Social History of Science and Culture in Colonial India*. New Delhi: Tulika Books.

Raina, Dhruv. 2008. "The French Jesuit Manuscripts on Indian Astronomy: The Narratology and Mystery Surrounding a Late Seventeenth Early Eighteenth Century Project." In *Bibliothèques, encyclopédies, musées, archives : la constitution des collections qui ont fourni ses sources à l'histoire des sciences, Boston Studies in the Philosophy of Science,* edited by Florence-Bretelle Establet, forthcoming.

Said, Edward W. 1978. *Orientalism*. Penguin, London.

Uberoi, J. P. S. 2002. *The European Modernity: Science, Truth and Method*. Oxford University Press: New Delhi.

Van der Waerden, Bartel. 1983. *Geometry and Algebra in Ancient Civilizations*. Berlin: Springer-Verlag.

Županov, Ines G. 1999. *Disputed Mission: Jesuit Experiments and Brahmanical Knowledge in Seventeenth-Century India*. Oxford University Press.