RESEARCH

Remembering Debiprasad Chattopadhyaya's Contribution to the History of Philosophical Thought and Scientific Ideas on His Birth Centenary [1]

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Abstract

Lokāyata is considered Debiprasad Chattopadhyaya's magnum opus, a pioneering exploration of the history of materialist thought in ancient India. This work not only established his reputation but subsequently provided a rationale for the need to re-position the schools of Indian philosophical thought in terms of their internal diversity, the range of philosophical problems addressed and the 'family resemblances' between the schools. He subsequently went on to pursue the study of the beginnings of scientific thought in ancient India between the period of what historians call the two urbanizations. On his birth centenary, this essay explores the issues discussed in his work, the reception of his ideas amongst historians of science, and their contemporary salience.

Keywords: Ancient India; materialism, idealism, urbanization, scientific thought.

[1] The paper is a modified version of a presentation at the National Seminar on Life and Works of Debiprasad Chattopadhyaya (1918-1993), 28–29th November, 2017 at Acharya Nagarjuna University.

`...irreverent defender of the best in the Indian tradition' (Ramakrishna 2017)

More than two decades have gone by, and yet it appears not too long ago that my colleague S. Irfan Habib and I had our last animated discussions with Debiprasad Chattopadhyaya (1918–1993). The arrival of his birth centenary is a reminder of the different rhythms of time and memory. I had the good fortune to have met him on many occasions between 1984 and 1993 on his visits to Delhi as a Guest Scientist associated with NISTADS. My exposure to the work of Debiprasad Cattopadhyaya [hereafter Debida] came from what might appear unlikely sources and commenced with his book on *Indian Atheism.* Although my work focuses on a later period of South Asian history, I have had to return to his substantial oeuvre whenever questions of the historiography of the sciences of South Asia arise.

This essay attempts to trace in brief the evolution of his work from the publication of his magnum opus *Lokāyata* to the history of sciences, while a more detailed review needs to be undertaken. As a student of philosophy in Kolkata, his teachers included leading Indian philosophers such as Surendranath Dasgupta, S. Radhakrishnan, Humayun Kabir, Sukumar Sen and many others. During the late 1930s he came under the influence of Marxist theory through his interactions with scholars that included Bankim Mukherjee, Radharaman Mitra and was mentored in the early years by Samar Sen. However, his career took a turn when he went to London in 1950 to work at the British Museum. There he met George Thomson from whom he acquired the disciplinary tools for the study and interpretation of totems in ancient societies. Thomson was the author of the classic *Studies in Ancient Greece: The Prehistoric Aegean.* Though trained as a philosopher, Chattopadhyaya began to draw upon the methods and insights of anthropologists and archaeologists.[2] The outcome of the time spent at the British Museum was *Lokāyata,* the first of his books to highlight the existence and significance of materialist thought in ancient India, that he subsequently elaborated upon in several other works such as *Materialism in Ancient India*, *Two Trends in Indian Philosophy*, *What is Living and What is Dead in Indian Philosophy* and *A Popular Introduction to Indian Philosophy.*[3] The task was a difficult one because there was no textual source explicitly dedicated to the subject. The challenge was to consolidate our understanding of the materialist school from stray references in the *Mahabharata*, *Arthashastra*, and allusions in works from the other *darsanas.* Chattopadhyaya subsequently went on to publish three volumes on the history of science and technology in ancient India, not to mention a substantial corpus of writing in Bengali on science, history and literature [Acharya 2017].

[2] More specifically, this was reflected in his struggle to make sense of a passage from the Chandogya Upanishad, where anthropology came to his rescue in providing a new reading. As G. Ramakrishna, a close associate and collaborator for many years points out that Debida traced the names of many of the seers mentioned in the Rg Veda to their totemic names such as Kashyapas, Mandukeyas, Shaunakas, Kaushikas [Ramakrishna 2015].

[3] Chattopadhyaya was also assisted by and collaborated with the Sanskritist and Nyayika Mrinal Kanti Gangopadhyaya whose response to Vedanta was that of a Nyayika. The latter went on to author several works on the history of Indian philosophy.

The following paragraphs make a modest attempt to situate this corpus of writing in the light of the historiographic revolution that globally marked the history and philosophy of science since the 1980s [Harding 1998] (or HPS as the interdisciplinary field is designated) as well as the reception of his work within the larger corpus of the history of science in South Asia – again a domain of research that has exploded over the last two decades both in India and abroad [Habib and Raina 2007]. In other words, where does this body of work stand in relation to the developments in postcolonial studies of science and technology? It is not likely that justice will be done to all these issues, but this could be seen as travail en cours.

Within the world of HPS scholarship on South Asia, if one encounters little discussion today among researchers about the work of Debiprasad Chattopadhyaya then this is attributable in part to the eclipse of the Marxist imagination and its methods, tasks and goals by a post-industrial knowledge economy. A second development possibly explains the lack of engagement with this important corpus of scholarship. Most effort over the last fifty years in the history of sciences in South Asia has been devoted to a fairly recent segment of its history, basically addressing the period of colonial rule and extending backwards perhaps a century or so into the pre-colonial period. While this work into the politics of knowledge has been very insightful it has drawn more on post-structuralism and its social theoretic resources, to the neglect of the older Marxian tradition. But more importantly, it has posed a major challenge to Eurocentrism in history and theory or what Sandra Harding referred to as the `integrity of modern science' [Harding 1998; Raina 2003]. As a result, the study of the social history of science in ancient India has indeed been neglected [Raina 2015].

A cursory inspection of the complete writings of Chattopadhyaya would indicate that his attention perceptibly shifted from the history of philosophical thought to the history of sciences in the 1970s- but the two domains remained comprehensively and conceptually entangled. The philosophical work endeavoured to substantially elaborate upon the idea that the Indian philosophical tradition was rich and diverse but had been over characterized by the late nineteenth and early twentieth-century philosophers as solely idealist and transcendental. The publication of *Science and Society in Ancient India* in 1977 marked the shift to the study of the history of sciences [Chattopadhyaya 1977]. In 1982, *History of Science in India* appeared in 2 volumes [Chattopadhyaya 1982]. These were edited volumes comprising classics and highly cited articles authored by Indologists and by other scholars from different parts of the world on diverse aspects of Indian science and culture over historical time. Several of these articles had been published in the nineteenth century and as many were of a more contemporary provenance. The volumes dealt largely with the sciences in ancient India, with two papers by A. Rahman and Irfan Habib dealing with science and technology during the medieval period [Chattopadhyaya 1982 vol. 2]. Colonial science was clearly not an issue he addressed. The first volume covered philosophy and science, raising issues of the nature of science in ancient India, the elements of atomistic thought and causal thinking – both essential to any argument for the existence of protomaterialism as well as on the scientific method [Chattopadhyaya 1982 vol. 1]. The rest of the book dealt with papers addressing the history of medicine, alchemy, chemistry and botany. The second volume had a comprehensive collection of papers

on the history of astrology, astronomy and mathematics including the classics by Thibaut, Sengupta, Colebrooke, Datta etc.; followed by a section on interaction and exchange [Chattopadhyaya 1982 vol. 2].

One could look at the publication of these volumes as preparatory for the volumes that were published under a NISTADS supported project a couple of years later. This last decade was devoted exclusively to the study of the history of sciences in ancient India and though he worked out of Kolkata, he began visiting New Delhi often and entered into discussions with a younger generation of scholars in New Delhi. In 1984, NISTADS organized an important workshop on the history of sciences to commemorate its foundation. The proceedings of the workshop appeared as *Science and Technology in Indian Culture: A Historical Perspective* [Rahman 1984]. Not all the papers appearing in the volume were about the history of sciences, but Chattopadhyaya's paper entitled 'Science in Ancient India; Materials for Reopening Some Old Questions,' set the tone for the massive project he had just embarked upon.

The first of the publications of the project on the *History of Science and Technology in Ancient India: The Beginnings* appeared in 1986 [Chattopadhyaya 1986]. The core of the book dealt with material culture between the period of the two urbanizations. This broad exploratory attempt sought to pin down the manifestations of science between the urbanization dating back to Harappa and Mohenjo-Daro and the second urbanization of the Mauryan period. Only Chapter 13 that dealt with the linguistic and oral traditions during this period was authored by the recently deceased Navjyoti Singh. The other chapters dealt with the beginnings of material culture – metal technology, pottery, textiles, transport etc.- from the first urbanization and the relationship between material culture and the first appearance of conceptual categories representing the rudiments of scientific thought and practice. The second volume appeared in 1991, and this was subtitled *Formation of the Theoretical Fundamentals of Natural Science* [Chattopadhyaya 1991]. This work begins with a discussion of the emergence of the different philosophical schools, the conceptual vocabulary of the schools and their progression towards scientific thought followed by a chapter on medicine and magic during early antiquity. [4] This discussion is elaborated in nine chapters followed by ten appendices comprising articles of historians, including some classic articles and expositions of ancient Jaina logics or Syadvada in contemporary terms – authored by leading scientists such as the biologist J.B.S. Haldane, the astrophysicist D.S. Kothari, etc. A third, slim volume published posthumously, dealt with astronomy, science and society in ancient India [Chattopadhyaya 1996]. This must have been envisaged as a larger work but was not to be.

Regarding the organization of the chapters and the orientation of the work, I have discussed the influence of Needham's volumes on *Science and Civilization in China* on

[4] The book was reviewed by Robert Temple in the journal Nature in 1991, where he remarked rather prophetically that the book `...grapples directly with the issue whether India is to have any future or not. Chattopadhyaya is a brave man, and he has tackled the fundamental problem head on; he shows the history of Hindu obscurantism that has oppressed the rise of science in India through the ages; [Temple 1991]. But there were many critical reviews of the book as well.

Chattopadhyaya's project in my *Needham's Indian Network* [Raina 2015]. This influence I have tried to trace in the chapter of the book on `The Marxist History of Science,' where his work is discussed alongside that of Irfan Habib, D. D. Kosambi and Abdur Rahman. But the influence of Needham can be identified at several levels. Departing from the Eurocentric frame of the history of science, *Science and Civilization in China* itself became both an icon and an exemplar to be replicated in Asia and the Arab world and nations liberated from the yoke of colonial rule. The work inspired several national and civilizational projects on the history of science particularly during the first decade of decolonisation [Raina 2015]. Secondly, in the comparative context, Needham provided a template for benchmarking developments in China vis-à-vis European developments and thereby provided analogies and exemplars in the Kuhnian sense for framing and unpacking the evolution of science in India [Raina and Habib 1999]. Clearly, comparative history provided a key for investigating the history of sciences in these other regions. And lastly, Needham's methodological Marxism provided a bonding for scholars so oriented from across the globe, who shared the image of science as a cultural universal and for what one of Needham's collaborators, the global historian Gregory Blue called epistemological egalitarianism [Blue 1999].

In a Preface to a posthumously published work, Prof. Ramakrishna Bhattacharya points out the several influences on Debida's work [Chattopadhyaya 2013]. I have been following the influence of three scholars - Walter Ruben, P. C. Ray and Joseph Needham on Chattopadhyaya. As hinted in my book *Needham's Indian Network*, I was fortunate enough to meet the students of the German Indologist Walter Ruben and trace some of their correspondence [Raina 2015]. All three had substantial contributions to make in the discussion on science in the ancient world – Needham focussing upon China; Ruben himself as a leading German Indologist had contributed extensively to the study of ancient India, but in this specific context we need to mention his particular focus on hylozoism in the early Upanisadic literature that inspired Chattpadhyaya's reading of Uddalaka Aruni as the first Indian empiricist; and Acharya Prafulla Chandra Ray provided the template for looking at the relationship between alchemy and tantric knowledge, the relationship between artisanal and tribal knowledge with Ayurvedic pharmacology. The important point that Ruben was making and that was elaborated upon in *Lokāyata* and other works was the recognition of the archaeological layers in the Upanishadic corpus, and of the several strains of thought present within it. G. Ramakrishna remarked that the *Lokāyata* `...catalogues the variety of forms in which materialist thought expressed itself and the way it evolved through the ages...The customs and modes of worship in the form of rituals have evolved likewise - these served as an embryo for later manifestations of materialism' [Ramakrishna 2017, p. 19]. Chattopadhyaya designated these forms of materialism as proto-materialism. In fact, the standard classification of the different *darsanas* or schools of Indian philosophy is questioned and a family resemblance between Sāmkhya, Vaishesikha, Buddhism and the Lokāyata is recognised, leading Chattopadhyaya to argue for a different classification rather than one based on Vedic authority. For philosophical purposes, this classification would be derived from how the schools thought about objective reality and subjective consciousness [Ramakrishna 2017 p.22].

Furthermore, he was a member of a `visible college' of researchers – call them the Needhamians – which included J. D. Bernal, physicist, science policy analyst and author of the popular *Science in History* and the bible of Science Policy namely *The Social Function of Science* [Bernal 1939; Bernal 1954]. As pointed out in an article a colleague and I wrote several decades ago, within these networks the influence of Bernal's *Science in History* was more widespread within the low church of science studies, for reasons that are detailed in the review Jerome Ravetz did of the book - two of which being that the work was possibly outdated by the time it was published. Secondly, despite Bernal's brave effort it could not overcome its Eurocentric premises [Ravetz 1992; Raina and Habib 1999]. Needham's ecumenical history of science had taken the first step in that direction, but even that was problematic although it was the first step all the same. [5]

In short, an inventory of Chattopadhyaya's contributions would include the history of sciences in the Indian tradition, technological skills in ancient India, the history of philosophical thought, the history of Ayurveda, Marxist theory, the history of folk traditions and the popularization of the sciences - mention must also be made of the books he wrote for children. This enormous corpus of writing sought to present the different streams of materialist thought in the Indian tradition. Though other scholars had presented Vedanta until the first half of the twentieth century as the crest jewel of Indian philosophy, it was now argued that Indian materialism was a viable philosophy for scientists as much as for the toiling classes. [6] Though he chronicled in detail the marginalisation of materialist thought in Indian philosophy, he argued that this primitive materialism had left its signature in the folk traditions [Ramakrishna 2017 p.19].

We return to the initial concern with the reception of this immense body of work in his time and its salience to contemporary trends in the history of science. In other words, the question posed is the following: what has survived the juggernaut of the world of intensified and highly institutionalised domains of knowledge production? What is it that has been surpassed by the changing frames and metanarratives of history and what is in need of revision? This is what we can ask of his scholarly contributions over a period of half a century. Let us begin by recapitulating a point made earlier, namely that the field of the history and philosophy of science underwent a formidable upheaval first with the historicist turn in the philosophy of sciences ushered in by the critiques of both positivism and the Vienna circle, and subsequently spearheaded by the work of Popper, Kuhn, Lakatos and Feyerabend [Newton-Smith 2000]. This radically revised both the philosophy of science and imparted a new self-confidence to the philosophy of social sciences. In the process, these developments destabilised the pre-Cold War and Cold War imaginary of science [Fuller 1997; Dennis 1997].

[5] For a detailed discussion on the same see the essays in Raina and Habib (Eds), Situating the History of Science: Dialogues with Joseph Needham, 1999.

[6] In the second half of the twentieth century, other Indian philosophers too began to revisit the central questions and concerns of Indian philosophy – shifting the focus of interest from Vedanta, for example. to problems of philosophical realism etc. These philosophers included .P.T. Raju. Daya Krishna, B.K. Matilal, J.N. Mohanty too name a few.

This transformation prepared the way for the emergence of the social turn in the form of the ascent of the sociology of knowledge and epitomised in a cognitive movement referred to as social constructivism or the social construction of scientific knowledge [Bloor 1976, Knorr-Cetina and Mulkay 1983]. What did this mean for the history of science? As far back as 1931, the Marxist history of science had announced its arrival at the IUHS conference held in Cambridge [Chilvers 2003]. The Cambridge left consolidated itself around this historiographic conjuncture – Joseph Needham, J. D. Bernal, J. B. S. Haldane and others. We do know that Debida had an active correspondence with two of these three members of the Cambridge left – namely Needham and Haldane. The Marxist history of sciences was premised on a clear-cut distinction between the internal conceptual core of science and the external context of science that provided a medium for the emergence of science or obstructed its development [Werskey 1978]. The boundary between the two was not permeable; and this distinction ensured the universality of science, that scientific concepts and theories transcended cultural context – that science was a cultural universal [Cunningham and Williams 1993]. Gary Werskey, author of *The Visible College* presented a paper at the IUHS Congress held in Beijing in in 2005, where he argued that by refusing to confront the internal-external dichotomy Marxism could not radicalize itself [Werskey 2007].

Inspired by the work of Karl Mannheim, and Wittgenstein of the *Philosophical Investigations* the new sociology of knowledge redrew the boundary between the external and the internal, postulating something that may have been blasphemous to the old Marxist philosophy of science, namely that the internal core of science was socially conditioned. This recognition transformed an impermeable boundary into a more porous one [Bloor 1976]. Universal knowledge now became situated knowledge, and the positivist conception of science was outflanked by a contextualist theory of knowledge. It took philosophically predisposed sociologists some effort to explain why contextualism did not breed relativism, and thereby arrested the collapse of contextualism into relativism. One could not have been a student of the history and philosophy of science through those decades and been immune or indifferent to these developments. These developments posed a serious intellectual challenge for Marxism and its different Marxologies and a great deal of conceptual work had to be done to engage with these issues in other fields as well [Chibber 2013].

Chattopadhyaya completely sidestepped these concerns or preferred to remain silent. S. Irfan Habib and I in 1991 or 1992 asked him what he thought of these developments that had so deeply engaged our energies and he said that he was not a historian of science in that sense, but was in intellectual combat with the recidivist and upper caste reconstructions of an imagined Indian past.[7] By the 1980s and 1990s, the landscape of social science research had changed and there was a radical critique of science and the enlightenment project that captivated the new generation of social scientists [Fuller 1993]. Yes, there was a paradigm shift and it was the older generation that continued to be drawn towards the concerns that animated *Lokāyata* and related writings. The next generation had moved on in terms of their

concerns and methodologies even as these volumes on the history of sciences of ancient India were published.

Two conceptual dichotomies that appear in his work were being thoroughly examined during this very period and that altered the terms of discussion in the philosophy of science. These were <<religion – science>> and << idealism – materialism>>. In Chattopadhyaya's view what brings Shankara and Plato together is the ideological convergence between the denial of the reality of the physical world and the viewpoints of the lawgivers. And though Ramanuja and Madhava did accept the reality of the external world their viewpoints were not too distant from that of the conservative lawgivers [Ramakrishna 2017, p. p. 30–32]. The premise underlying this dichotomy was that the roots of science in India as in other parts of the world were in materialism.

The enormous amount of work that went into the history of science during the immediate post World War II years was beginning to produce a major transformation of the field. The philosophers had already posited that the philosophy of science without the history of science was empty [Lakatos 1978]. In addition, while trained physicists continued to jump into the field, by this time trained historians were the newcomers. As early as 1937, the sociologist of science Robert K. Merton had submitted his doctoral thesis on English Protestantism and the Rise of the Sciences, which had already begun to reshape our understanding of the relationship between science and religion that was hitherto considered to be an antagonistic one. Merton's work suggested that both in the case of German Pietism and English Protestantism, the Protestant ethos provided an appropriate medium for the emergence of bureaucratic rationality and modern science [Merton 1970].

A couple of decades later even the most powerful origin myth of modern science was rejected on historical grounds. The Galileo affair, in the light of the new historiucal evidence, was far more complex than hitherto portrayed and had more to do with other aspects of his work than with his avowal of heliocentrism per se, the most important consideration was whether he was just proposing a model of the universe or ontologically revising the idea of God's creation [Drake 1990; Redondi 1987]. As Richard Tarnas points out a grand cosmological compromise was worked out between science and religion [Tarnas 1991]. Galileo as Dava Sobel points out would have been deeply disturbed if he had been accused of being anti-Christian [Sobel 1999]. Similarly, the great Newton, framed by the revolutionary historiography of the eighteenth century as the father of materialism and mechanics, and seen within Marxist historiography as the flag bearer of atheism, was revealed to be both a practicing alchemist and spent the latter portion of his life engaging with a discussion on the Christian trinity [Westfall 1971]. And then in the 1990s Heilbron's work *The Sun in the Church* mapped the rise of Jesuit sciences or Jesuit astronomy in particular [Heilbron 1999]. These

[7] One could cite any number of scholars whose researches on the sciences of ancient Indian medicine and astronomy is truly encyclopaedic. In passing, we cannot enter the field of astronomy in ancient India without engaging with the work of the legendary David Pingree [Pingree 1978]. In like manner, the Indologist Gerrit Jan Meulenbeld's 5 volumes on the history of Ayurveda are indeed a remarkable contribution to the field [Meulenbeld 1999]. This corpus of scholarship falls squarely within the history of sciences.

developments complicated our understanding of the relationship between science and religion rather than the purely reductive one that emerged from formulaic readings of the history of science. Today the historiographies of `science and religion' offer a nuanced understanding of the relationship between the two and reveal how this is manifested in diverse and complex geographies of knowledge [Brooke 1996].

Where did this historiography of conflict come from and how did it acquire such a hegemonic place in scholarly discourse. The historian of science Rivka Feldhay points out that one of its many genealogies is traceable to the French revolution, wherein the relationship between the monarchy and the Church was different from that in the Protestant countries [Feldhay 2001]. A very specific political and cultural construction of revolutionary France stabilised in scholarly and disciplinary discourses as a deeply antithetical relationship [Cohen 1994]. Chattopadhyaya's reading carried much of the burden of that relationship. However, in all fairness, he was also influenced by Needham's own reading of the relationship between the scientific and the noumenal, and that Needham saw himself as an honorary Daoist [Needham 1973]. As far as the reception of the work is concerned the fine text of Chattopadhyaya's writing on specific historical moments is lost sight off by the broader overdetermined frame of the science-religion conflict.

Despite the passage of time what does remain is his extension of the frame first proposed by P. C. Ray that I somewhere labelled as the proto-Zilsel hypothesis [Raina 1997]. Zilsel's hypothesis appears in his much-discussed work `The Social Origins of Science' and attempts to explain the rise of the modern sciences in 17 th century Europe. The explanation offered through a deep historical investigation of the period was that modern science arose at the conjuncture of two traditions, that of technical and artisanal knowledge and practices and that of the theoretical or formal disciplines [Zilsel 1942]. Within the Indian context, Acharya P. C. Ray had proposed a similar explanation for the phenomenon of the non-emergence of modern science – the separation between artisanal and theoretical knowledge due to the proscriptions of caste played a significant role in impeding the development of the sciences [8] [Ray 1902; Ray 1906; Ray 1907]. This hypothesis is elaborated upon in the corpus of Chattopadhya's writing, and as every reader can identify, the relationship between theoretical knowledge and tacit, uncodified technical practices is fundamental to his work. This aspect of his work has withstood the logic of development characterising the world of knowledge.

I come now to the second of the dichotomies that could well be seen as the intellectual conflict between idealism and materialism which could be reduced to a conflict of social classes. Here too the history of scientific ideas confirms the hypothesis that science at all times or at any one time is the arena for the unfolding of several philosophical positions, which is

[8] In an oft quoted passage from the History of Hindu Chemistry Ray argued that: '...certain forces extraneous to the world of science had stunted the growth of science and scientific endeavours... Such forces were the social order in prevalence which was discriminatory and those who nurtured that order...The caste division in society reduced our artisans, technicians and others involved in manual labour to a lowly position in society. Their dignity was hurled to the winds and their extraordinary abilities were marginalised...This happened after the Buddhists were marginalized and the Brahmins gained ascendancy' [Ray 1902].

what gives rise to competing theories [Lakatos 1978]. The rise of the mechanical worldview did not entail the elimination of the field theoretical notions as Needham appropriately pointed out [Needham 1969]. As far as the rise of the modern sciences is concerned, it is not possible to discuss their ascent without referring to the rise of neo-Platonic thinking and the mathematisation of nature [Koyre 1939].

Furthermore, other than the philosophical critique of this dichotomy there is a lesson to be learned from the famous 1931 meeting. At the meeting, Boris Hessen presented his classic paper on 'The Socio-economic Roots of Newton's Principia' that subsequently inaugurated the Marxist history of science [Hessen 1931]. In Loren Graham's reading of the paper, Hessen was also signalling to the audiences back home in the Soviet Union, that if they considered Einstein's physics and quantum theory as bourgeois physics or idealist physics, then one has to factor in the rise of Newtonian physics within the larger emergence of the capitalist economy [Graham 1985]. Hessen, as Graham shows was cautioning the Soviet regime that the new physics was not bourgeois physics and cautioning his readership against the strong social conditioning of philosophical and scientific ideas by social class. As Althusser once wrote: `Philosophy in the last instance is class struggle in the field of theory' [Althusser 1971]. The relative autonomy of science in social theory has to be explained by even the most reductive sociology of knowledge.

These ideas echo in Debida's discussion and there are advantages of not running with the mainstream but running in parallel. But an opportunity is lost in consideration of what the other system anticipated and how one's own conclusions could measure up to the theoretical gaze of another system. This apercu has another significance, for if the histories of knowledge have benefitted from the comparative methods employed in studying the past, then comparativism has an equally important role to play in triangulating our contemporary metanarratives. We need to ask ourselves in the second decade of the twenty-first century what is it that we draw into our contemporary discussion and what is it in a Lakatosian fashion that awaits another interpretation.

If Kosambi departed from traditional Marxism by inventing another Marxology, in demonstrating that the evolution of material culture and material cultural practices indicates that India has a history, then Chattopadhyaya extended the argument into the realm of the superstructure by highlighting not just the presence but the development of materialist thought on the sub-continent. The latter ran contrary to the nineteenth-century constructions of India as a spiritual civilization. The discovery of the roots of philosophical materialism was indeed very significant in its own times and continues to do so today, as a counterweight to the distortion of the history of philosophical thought in Indian antiquity. Secondly, while the social theoretic and philosophical developments that I have highlighted might run contrary to some of the core framings of this immense project, Chattopadhyaya would still have concurred with some of the insights of the sociology of philosophy in its version of conflict theory. The history of philosophy like the history of science, like history in general, is a history of contesting ideas and knowledge communities. This conflict in the realm of ideas cannot be reduced to the opposition between rationalism and irrationalism alone. The

churchmen who raised objections about what Galileo saw through the telescope were not being entirely irrational – there were also rational and scientific objections [Feyerabend 1975]. This does not deny the existence of irrational forces within society but brackets the rivalry between idealism and realism. Clashes in theory, can extend over a variety of positions, and even so-called metaphysically overloaded theories, as Popper pointed out can over the passage of time become scientifically falsifiable – and as Lakatos reminds us that even a scientifically progressive programme can enter a degenerating phase. I could not but help remember the discussion on the early Nyāya and the Nyāya after Udayana in the work of Chattopadhyaya.

This body of work maintains its relevance for the rich historical detail that will open itself to radical re-readings of new themes and problematics in Indian philosophical thought in the light of the parallel evolution of social theory and the work of numerous historians and philosophers of science. Philosophers and historians of philosophy have continued to engage with the Lokāyata. Some recent works include Ramakrishna Bhattacharya, *Studies on the Cārvaka/Lokāyata* (2010); Pradeep P. Gokhale, *Lokāyata/Cārvaka: A Philosophical Inquiry* (2015); Bhupendra Heera, *Uniqueness of Cārvaka Philosophy in Indian Traditional Thought* (2011). Debida emphasised a handful of themes which he felt were the central intellectual and political problematics of his generation. But that does not exhaust the richness of his contribution, and it is time to turn back and read him through our contemporary problematics and the lenses of a highly revised social theory and philosophy of science.

In brief, if we were to summarize his intellectual journey, Debiparsad Chattopadhyaya commenced his research career with the study of the origins of materialist thought in ancient India, proceeded to the history of the evolution of the conflict between idealism and materialism, drew out the consequences of this conflict for the history of sciences in ancient India and finally transited to the study of history of science and techniques between the two urbanizations. Commencing in philosophy proper, he turned to the study of archaeology and anthropology and then the history of sciences and techniques. In the latter case, he was deeply influenced by the writings of Joseph Needham and P. C. Ray, and finally ended up collaborating with astronomers from Bangalore, introduced to him by G. Ramakrishna in order to embark on a `retrospective probing' of the history of astronomy in ancient India.

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