

Imperial Technoscience: Transnational Histories of MRI in the United States, Britain, and India. Amit Prasad. The MIT Press, 55, Hayward Street, Cambridge, MA02142, USA. 2014. xi + 219 pp. Price: US\$ 37.95/£ 25.95. ISBN: 978-0-262-02695-6

Countless lives have been saved, thanks to the advent of magnetic resonance imaging (MRI), a painless, non-invasive method of observing the human body with amazing detail. MRI can be used to safely scan any disease. The first thing about this well brought out book on MRI is that it is relevant. It is a tale of three cultures of technoscience. The book also covers the trails and trajectories of technoscience. Through a study of MRI research in India, UK and the US, based on interviews (with scientists, government employees, and employees of multi-national companies), observations and analysis of academic/scientific papers, the book argues that the relationship between scientific knowledge, practice and culture is contingent upon particular historical and socio-technical contexts. In methodological terms, the book has sought to focus not only on the laboratories, but has also attempted to show how trajectories of research and strategies of actors are embedded within and affected by local and transnational political economies.

The author, Amit Prasad, does however want to delve into history – more specifically the history of MRI, a cutting-edge medical imaging technology, research and development in the US, UK, and India – to highlight two concerns and analyse their implications: (i) Even though there has been a surfeit of policy documents and analyses of scientific

researches in India on the basis of the number of technological instruments, papers published or patents made, little is known about the particular trajectories of techno-scientific researches. He argues that absence of such empirical data is the important reason for the construction of a West versus non-West techno-cultural divide, which continues to undergird our understanding of scientific research in India. (ii) There is little analysis of the political economy of inventions. Even when such analyses are conducted, they end up classifying scientific research in India, through the concepts of ‘lag’ or ‘lack’. However, we have to be careful. For example, lag is something in diffusion of knowledge, culture, rationality, etc. from the West. Lack of resources, although a seemingly self-evident explanation, is an artifact of a linked chain of hierarchical determinations. It often represents a lack of ‘hard currency’. It is linked to widely practised norm of the Indian Government’s funding of scientific research which was instituted during the British colonial rule. It is a result of cultural beliefs and is dependent upon a shift in the trajectory of MRI research and development to ‘big science’ that was propelled by big multinational companies. It emphasizes on high-strength magnets in the production of images (even though the debate over technical advantage of low versus high field magnets still continues), and so on. His three-nation comparison, through the example of MRI research and development, would put into focus the international political economy of inventions.

Science and technology (S&T) is now more important for the development of a country than ever before. At a time when there is continual celebration of India’s emergence as a ‘knowledge superpower’ and leading magazines are referring to ‘signs of an Indian technological invasion’, it may seem odd to start with a quote from Susantha Goonatilake’s book *‘Aborted Discovery: Science and Creativity in the Third World’* published in 1984, which discusses reasons for the lack of creativity in South Asia. Prasad’s intention in starting with this quote is not to remind us about the old cliché – ‘those who forget history are doomed to repeat it’. This book rather does merit consideration. It identifies various linkages, including cognitive components, and metaphysical values or beliefs that have been responsible in shaping the devel-

opment of this technoscience specialty in the US, UK and India. From the sociology of S&T perspective in the process of determining the factors that have been shaping the development of MRI specialty in India, at the centre of the book are two basic questions: (i) Did a shift towards innovations in India begin in the late 1990s? (ii) Can a study of MRI-related research shed some light on how to understand such changes in India and globally? Prasad’s response is that MRI history shows the important role of transnational flows. The reason for shift from the UK and India not being able to develop indigenous MRI was a shift of MRI to ‘big science’. What has changed in India is its loci and role in transnational flows. Spatial mobility is not only about professional cooperation; it is also a way to develop networks, learn new things and build experience. Research trails, more successful, also more collaboration and exchange.

In an analysis that is both theoretically nuanced and empirically robust, Prasad unravels the entangled genealogies of MRI research, practice and culture in three countries. He follows socio-technical trails in relation to five aspects of MRI research: invention, industrial development, market, history and culture. He first examines the well-known (scientific) controversies between American scientists Paul Lauterbur and Raymond Damadian over the invention of MRI, then describes the post-invention emergence of the technology, as the centre of MRI research shifted from the UK to the US; the marketing of MRI and the transformation of MRI research into a corporate-powered ‘big science’; and MRI research in India, beginning with work in the country’s nuclear magnetic resonance laboratories in the 1940s. The Euro/West-centrism relegates emergent practices elsewhere to the periphery, undergirding analyses of contemporary transnational S&T with traditional, but now untenable hierarchical categories. Finally, he explores the different dominant techno-cultures in each of the three countries, analysing scientific cultures as shifting products of transnational histories rather than static products of national scientific identities and cultures.

Prasad has utilized the opportunity to reflect on the medium of medical device as a means to deliver commentary on the cultures of technoscience that pervade our lives. At the same time, medical

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technology remains an intriguing vehicle that is designed to transmit powerful images and messages about economy, polity and society. Prasad's analysis offers not only an innovative contribution to current debates within S&T studies, but also an original post-colonial perspective on the history of cutting-edge medical technology.

Studying S&T realm is Prasad's vocation. In setting out this thesis, he provides a nuanced reading of alternative science in order to explore possibilities of a dialogue between the analyses of alternative sciences (by drawing insights from some of the proponents of alternative sciences like Ashish Nandy, J. P. S. Uberoi and Shiv Viswanathan) and the empirical studies of sciences. Prasad is concerned with putting into broad relief the role of location or transnational geography in machineries of knowledge production. He addresses how both the internal world of science and the external world of science and the interface between the two, influence (and have influenced) the development of MRI technology (an interdisciplinary technoscience specialty) in India. He has empirically investigated technoscientific practices with respect to MRI-related research by following particular trajectories; for instance, in India MRI-related research and development is critically affected by networks of power, bureaucracy and '...hierarchical organization', sometimes including policies of the government, laboratory practices and so on. The book has looked at the question of construction and legitimization of knowledge, and the relation between expert and other forms of knowledge. A way of life depends on the way knowledge and the relation between other forms of knowledge determines not only the hierarchies of power, but the fate of pluralism. It also raises issues about the nature of invention, innovation and regulation.

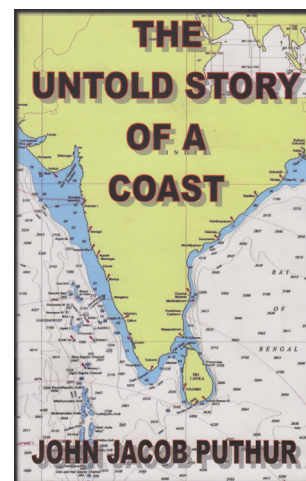
Invention of the method transforms the fate of knowledge. The scientization of knowledge, and of technology in particular, is crucial for understanding the nature of innovation in society. Innovation does not follow a linear path, but tends to follow complex feedback loops between research, processes development, design, engineering and production. Scientific (or innovative) work itself is a bricolage. The key to innovation is problem-solving, identifying ways of improving

the method to find answers to big problems. If one looks at the historical record, one finds that a source of inequality in the modern world (at least since the 1980s) has come from technological change. It can be threatening if it is mishandled, misused or misunderstood, because it can deskill people. This book provides a platform to study the roles of various actors and the form of influences/interactions they have on each other.

The book consists of five chapters in addition to introductory essay, concluding remarks and the postscript notes. A fascinating account is provided of how technological innovation happens in many different loci, but much of it goes unrecognized. Also, there are interesting accounts of how research agendas require a whole world of material things that are unequally accessible globally. One issue that Prasad did not delve in-depth is that the culture of technology transfer to the industry from academia is not a dominant trend in India as yet (although he spends more than reasonable amount of space towards the end of the book in the notes). The scientists, rather very much want the government to intervene in terms of policies of translational research within Indian academia. This book is a significant contribution in the field of history of technology, post-colonial science studies and current debates within S&T policy studies. A must for anyone who wants to think about innovation globally and as an accessible language, because of the histories it unloads as evidence.

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The Untold Story of a Coast. John Jacob Puthur. Star of Sea Publications, 95, Defence Layout, Vidyanarayapura, Bangalore 560 097. 2013. xviii + 294 pp. Price: Rs 400.

Since 1990, natural disasters in our country such as floods have claimed 35,035 lives, earthquakes have claimed 32,822 lives, storms have claimed 19,655 lives, 16,389 people lost their lives due to the December 2004 Indian ocean tsunami, and 10,373 people lost their lives due to extreme temperatures. Table 1 lists five natural events which have taken a high toll¹.

Can human beings in general be held responsible (to a certain extent) for a few of the aforementioned disasters? It may not be possible to give a correct answer (accompanied with a meaningful and scientific explanation) to this perturbing question without first gaining a deep understanding of nature, its ways and at least a few related natural phenomena.

Does wind pressure really act on the surface of the sea? Can wind make water

Table 1. Natural events (floods, earthquakes, storms, tsunami, extreme temperatures)

Month and year	Natural event	Casualties
September 1993	Latur earthquake	9,748
October 1999	Odisha cyclone	9,843
January 2001	Bhuj earthquake	20,005
December 2004	Indian Ocean tsunami	16,389
June 2013	North India floods	6,054