

BOOK REVIEW

Suvobrata Sarkar, ed. *History of Science, Technology, Environment, and Medicine in India* (London: Routledge, 2022), xxi+328 pp.

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Thematically classified in four subsections, the volume is a collection of fifteen well-crafted essays, dedicated in the honor of Professor Deepak Kumar, who initiated and popularized the term HISTEM (History of Science, Technology, Environment, and Medicine) during his four decades of teaching and research in India and abroad. In his Foreword, Prakash Kumar rightly observes that Professor Kumar was not particularly interested in pressing hard the Kuhnian project in the Indian context, nor was he too keen in examining the Social Construction formulation in the history of technology. His was an orientation that motivated him to explore the colonial underpinning of science and technology in the south Asian context. Drawing on diverse fields of new knowledge, the present volume is a fitting tribute to Professor Kumar which showcases exciting new scholarship highlighting multiple dimensions and locations of HISTEM in modern South Asia. The volume testifies to the editor's claim that much of what we believe as Western science was indeed produced in the colonies rather than was exported to them.

In the opening essay of the first subsection Science and Society, John Mathew looks into medicine and natural history through the "curious" case of Soorjo Coomar Goodeve Chuckerbutty (1826–1874), one of the first Indians to be sent to England for a higher medical degree. Despite an enviable exposure to teacher like Robert Grant (who was a student of Charles Darwin), Chuckerbutty did not continue his studies in natural history, and on his return to India, he settled down as a professor of *Materia Medica* at the Calcutta Medical College. As India became part of the British Empire, most of the scientists, whom Mathew calls "translocators," were involved in botanical and zoological surveys. Yet the Indians were absent from this enterprise. Soorjo Coomar, Mathew argues, represents the dilemma of the newly emerged nineteenth century middleclass who looked to the West with admiration but ended up being at a settled profession.

Santanu Chacraverti examines the foundations of science through Ramendra Sundar Trivedi's epistemological inquiries. Trivedi's writings, Chacraverti observes,

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spanned a wide range of themes—from the history of astronomy, non-Euclidian geometry, electromagnetic waves, and the laws of thermodynamics to the nature of scientific knowledge, the sense of beauty, Bengali grammar, Buddhist philosophy, Vedic rituals and education policy. Though Trivedi's inquisitiveness landed him on an exchange mode of East-West traditions, he eventually privileged the Indian ones, combining the Brahmanical with the popular. Why was Trivedi not interested in the practical implications of scientific inquiry? Chacraverti has indeed raised the question, and explains that this aspect of science, Trivedi believed, was linked to power and worldly advancement, and would not necessarily lead to the reduction of violence and human suffering. Perhaps, Chacraverti would have asked: is science always a power-driven project to the extent that it precludes the matrix of human advancement?

Abhidha Dhumatkar engages in the life and works of Professor Balaji Prabhakar Modak (1847–1906), a propagator of science, who sought to create a scientific space in Maharashtra by spreading scientific knowledge through his books in Marathi language, public lectures and demonstrations, and annual scientific exhibitions in Kolhapur. He, Dhumatkar argues, was an avant-garde in many respects, being the first Indian to conduct an industrial survey as also to envisage a Marathi University. But he was a loner, died without followers to perpetuate his movement. He played no active part in the social and political movement, and this explains his relative invisibility in the discussion about a forerunner of Indian modernity as also in the scientific community. But why did Balaji Prabhakar fail to notice what the society had prioritized at a time when it did? Dhumatkar might have asked this question.

Situating the Kerala Sastra Sahitya Parishad's (KSSP) emergence in the 1960s and the 1970s within the larger history of debate on social relations of science in the twentieth century, Shiju Sam Varughese attempts to recast the story of KSSP from a new vantage point. Wedded to the idea of creating a "scientific-citizen public" in post-independent Kerala, the KSSP movement subsequently ended up developing new perspectives, blending Nehruvian socialism with a Marxist theory of science, which shunted out the "public" and attracted only the left-minded middle-class intellectuals. Thus, KSSP's endeavor to save science by offering a theory of science that had scientism at its core landed on a shifting field of politics that opened up new sites of public tryst with science and political imaginations of democratizing science in Kerala.

The section II on Technology and Culture opens with an essay by Y. Srinivasa Rao, explicating the interface between electricity and urbanization in Madras. The colonial government, Rao argues, was slow in providing electricity to towns as it did not deem it a government imperative, nor even a social necessity. Gradually however the mindset changed, and in the early years of the twentieth century, electricity, though thought to be a costly "new thing," was opened to public, and it fast became a public amenity. Electricity was considered to be the panacea for all basic urban problems. It also intersected with another element of scientific modernity introduced

by colonialism: modern science education and medicine. Rao has dealt at length the blessings of electricity in urban space as exemplified in the introduction of tramcar, motor bus, birth of “electric deities,” new “night culture” and many more wonders of electricity, but he is reticent about the “curse” it pronounced in the form of accentuating rich-poor divide to a new high. He is equally silent on how this newfound blessing impinged on the social relations once it is domesticated in an urban space.

Suvabrata Sarkar looks at engineering education and its colonial encounter through the lens of Bengal Engineering College, Sibpur. Sarkar begins with a pertinent question, why at all an engineering college was opened at Roorkee (1847) and subsequently at Calcutta (1856) at a time when Britain itself did not provide academic training to engineers save military purposes. He underscores some of the relevant agendas of academic engineering and its colonial linkages. The College, Sarkar notices, produced a huge number of civil engineers, but in the field of mechanical and electrical sciences, its performance was awfully pathetic. Entrepreneurship was conspicuously absent in the lexicon of Sibpur students. Why was it so? Sakar stays away from the conventional engagement with “centre-periphery” relationship, and contends on the production of varied archival sources that despite multiple situational constraints, the B. E. College survived and turned out to be a premier seat of higher education in the field of engineering and technology.

Kapil Subramanian narrates how interwar India became a global pioneer in the practice of tube-well irrigation which brought about huge changes in agricultural production and provided much of the inputs that went to inform the Green Revolution. Knowledge about groundwater, Subramanian argues, was a heavily contested concern in mid-twentieth century India when she opted out from British to American expertise in the development of water-diving science along with the role played by the Geological Survey of India. Sarandha Jain engages in the biography of oil, it's imperial and quotidian life in colonial and postcolonial India. The passage of petroleum from battlefields to homes, Jain argues, demonstrates that household items were not always outside the logic of empire and that big and small technology worked in tandem. Petroleum products were organized by big technology and imperial politics, but they also permeated into the private lives of common people through small everyday technologies like cars, mills, lamps etc. Thus, petroleum graduated from being a tool of colonial state to becoming a constituent of the contemporary state.

In the third subsection, dealing with environmental issues, Sahara Ahmed analyses the environmental cost of “scientific mining,” consequent upon unbridled technological interventions. Extensive mining in the watershed basins of Bengal Presidency resulted in erosion, sinkholes, loss of biodiversity, and contamination of soil and water by chemicals emitted from the mining process. Despite repeated warnings from numerous committees about grim future of fast depleting resources due to the misuse and abuse of mining, the independent government too is following the policy of their colonial masters with unflinching obedience.

Himanshu Upadhyaya explores the environmental implications of grazing lands and cultivated fodder. A constant refrain at numerous Board of Agriculture meetings was, Upadhyay argues, the diminishing grazing land. Despite this, the colonial experts and botanists were not adequately responsive to the improvement of cultivated fodder in India. The colonial bureaucrats privileged cultivated fodder crops over grazing and grassland, and thus sought to address the seasonal shortage of rainfalls with an agrarian and forest management approach. Even in contemporary discussions, Upadhyay laments, grazing and grassland are being evaluated from the lens that fails to engage with the complexity of typical Indian uses and the knowledge system shared by pastoral communities.

Nirmal Kumar Mahato explicates how “scientific forestry” was experimented in Purulia, West Bengal, on the principles of Dietrich Brandis, who sought to organize forestry in India on the basis of three principles of German forestry: “minimum diversity,” “balance sheet,” and “sustained yield.” Following minimum diversity, Brandis transformed the Barabhum Reserve Forest into a commercially marketable monoculture of teak, while the principle of balance sheet was reflected in the silviculture method followed in the area. The principle of sustained yield was observed more in breaches, for, Mahato argues, while the forest officials tried to desist themselves from overutilization of wood, the district authority tried to extract as much revenues as they could. The result was that sustainable economy of the region was permanently disabled and the district became perennially drought prone.

In the concluding subsection, Medical Encounters, Jayanta Bhattacharya reflects on Leo Tolstoy’s novel *The Death of Ivan Ilyich* (1886) and revisits medicine, health, body and disease with a refreshingly new look. Before the eighteenth century, medicine was based on subjective imagination of illness. During the eighteenth and nineteenth centuries, medical instrumentation extended the medical gaze and made the physician less dependent on subjective narration. Subsequently, surgical practice and technological innovations led to epistemological exclusion of body and mind from the purview of medicine. The body became a de-personalized corporeal machine, and illness was localized outside the corporeal space of the body. Ivan’s story thus poses before us multiple layers of questions regarding subjectivity, person, metaphors of life, and the body of a patient.

B. Eswara Rao addresses the multiple levels of medical encounters in the process of medical practice to understand how institutionalized western medicine and its “scientific” and medical ideas privileged over oriental practices in the domain of tuberculosis care in Madras Presidency. This, Rao observes, produced a counter medical discourse from indigenous medical practitioners who started a revival movement in Madras in the early twentieth century. But eventually western drugs and treatment methods predominated and claimed superiority contending that indigenous methods had no scientific value and extremely tardy in response. Dhruv Kumar Singh pleads for a serious engagement with the social history of homeopathic

medicine. We have a fair amount of work on the impact of western medical education within the matrix of east-west encounter in colonial India. But homeopathy, despite its western origin, Singh laments, still lacks a biographer to reframe in historical perspective its story of dispensaries and hospitals which have endured the test of times and become an integral part of India's plural medical traditions.

In the concluding essay of this anthology, Ch. Radha Gayatri focuses on the services of the Delhi female medical missionaries in late colonial India. Women missionaries, Gayatri argues, found space in the public domain and opportunities for achievement denied them at home. But they had to face tussles with their own male church hierarchies, and their struggle for autonomy of Christian women's organizations were significant indicators of their resistance to patriarchal control. There were, Gayatri notices, several layers in the interaction of the medical missionaries, and it was not just a colonial or religious enterprise. They realized that their education in medicine would be useless without practice, and so they took to the colonies as a site to learn and experiment.

There is no denying that most of the essays in this volume engage in the key conceptual modes that reinforce more clearly and succinctly the major components informing HISTEM. The novelty and richness of the book lies in its uniqueness to underpin a refrain for each subsection. The essays on environment, for example, attempt to show what happened when men cast off their intimate symbiosis with nature and sprinted towards greed and alienation. The essays on technology again demonstrate the alternative trajectories of Asian excellence over European, while others on medicine invoke complex networks of human and nonhuman actors, ethics and politics, for explaining the production of core people in metropolitan scientific and technological imagination. Overall, the book makes a refreshingly new read by complicating a better narrative for understanding Indian colonial modernity.