

Historians of science are increasingly interested in the history of the Global South. Freitas's book matters, not only because it describes the circulation of knowledge in a way that is inclusive of the Global South, but also because it shows how the conduct of science in the Global South affects the planet.

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Lachlan Fleetwood, *Science on the Roof of the World: Empire and the Remaking of the Himalaya*

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In the first half of the nineteenth century, the largely uncharted and unfamiliar vertiginous landscapes of the Himalaya posed an unprecedented challenge to naturalists in Europe. This striking and now highly celebrated mountain range became a critical site that tested the limits of European instruments, bodies and knowledges, symbolizing both an increasing anxiety about East India Company control in South Asia and a greater insecurity about the 'blank spaces' at the edges of the British Empire. At the same time, the Himalaya became essential to the emergence of a 'vertical globe', a framework that reveals how naturalists and surveyors began to interpret the world both three-dimensionally and globally. Comparisons to the high peaks of the Alps and Andes, however, did not always result in the successful production of scientific knowledge about the mountain range. Lachlan Fleetwood's important new monograph skillfully reveals the uneven and contested process of mapping the Himalaya and shows how it was made commensurable within a 'new global scientific and imperial order' (p. 1).

Science on the Roof of the World is organized into six thematic chapters focusing on different scientific practices that fitted the Himalaya into supposedly 'universal' categories. The chapters are centred around case studies on altitude measurement, the (in-)efficiency of scientific instruments, altitude sickness, geology, botany and the then emerging field of biogeography. Rather than arranging his study chronologically or by the Himalaya's diverse geographical segments, Fleetwood, through this approach, presents some of the ways in which natural history and measurement contributed to new conceptualizations of mountain environments in the age of empire. The narrative is bookended by a strong historiographical introduction and a concluding epilogue on the atlases generated from the *in situ* observations of the book's European and indigenous protagonists. The atlases encapsulate Fleetwood's main arguments: they 'flattened the nuances of local observations' and disregarded the 'sheer laboriousness of doing science in the Himalaya', ultimately absorbing them into 'a broader story of global verticality' (pp. 5, 243).

Several lines of argumentation run through the book. First, Fleetwood rightly advocates for further decentring spaces of science, best exemplified through the 'northern' Saharanpur and Mussoorie botanic gardens. With its 'tropical' climate and considerable

distance from the mountains, the Calcutta garden – a historiographical favourite both in studies of colonial botanic gardens and as a ‘centre’ in the periphery – was limited in its ability to acclimatize and care for plants travelling from the Himalaya. To compensate for this, both gardens acted as staging grounds and clearing houses for expeditions in the high mountains, as well as stations for long-term meteorological observations. Though both independent and important in their own right, the ‘northern’ gardens were nonetheless uncomfortably (and sometimes unproductively) situated between the lowlands and uplands, demonstrating the ‘haphazardness of early attempts to mark the graduations of the vertical globe’ (p. 204). Thinking about Saharanpur and Mussoorie in this way averts our gaze away from Calcutta and convinces the reader of their centrality in the making of the Himalaya.

The author also engages with the role of disconnection and failure in imperial science: instruments and bodies broke down, distance and lack of resources undermined attempts to control, and global comparisons resulted in confusion. For example, Francis Hyde Wollaston’s ‘thermometrical barometer’ (or hypsometer), specifically designed for measuring altitude, was duly criticized by surveyors in the high mountains in the 1820s and 1830s. Fragile and initially tested only on Mount Snowdon in Wales, the instrument betrayed its metropolitan makers as out of touch with the realities inherent in surveying the upper reaches of the Himalaya. We see a similar rupture in one of the familiar threads throughout the book: the line of perpetual snow. As many surveyors recognized, the topographic limit of permanent snow cover did not follow the same pattern as in the Alps or the Andes. Theories that endeavoured to predict scientific phenomena collapsed in the Himalaya, casting doubt about whether its peaks were actually higher than Chimborazo or Mont Blanc. These moments were often effaced ‘in preference for an orderly and aesthetic sense of completeness’ and in order to show an alleged imperial mastery over the mountains (p. 251).

Not only did atlases erase the laboriousness of knowledge making, but they also fundamentally ignored the centrality of Himalayan expertise and labour, an omission that Fleetwood commendably works to amend. He pays keen attention to Himalayan histories and the pre-existing networks that made it possible for these expeditions to succeed in the first place, as well as the practical, ordinary aspects of doing science in remote locations. Thinking back to the ‘northern’ gardens, Saharanpur offers a shining example in this regard. Not only did it have a pre-colonial history as a Mughal garden, but its legacy was enshrined in both the preservation of infrastructure and the transfer of personnel, most notably Hari Singh. Saharanpur thus functioned as a space of co-production, one in which boundaries between knowledge traditions were ‘fluid and open to active renegotiation’ (p. 28). However much these gardens (and the colonial archive) were intended to advance European scientific and imperial ends, Fleetwood thoughtfully uncovers the traces of indigenous agency, labour, knowledge and resistance in this story of European attempts to understand the Himalaya.

Overall, *Science on the Roof of the World* presents a meticulously researched and persuasive take on imperial expeditions in the nineteenth century. Moving away from the great-men-of-science tradition, Fleetwood exposes the networks of mid-level East India Company employees, Himalayan brokers and guides and non-human agents coexisting and colliding in the high mountains, all of whom made it possible for those in the metropole to imperfectly superimpose ‘universal’ and ‘global’ categories onto the Himalaya. This book will be of keen interest to students and scholars of imperial history, the history of science and the environment, and historical geography.