

Mountains matter

Lachlan Fleetwood

LMU Munich, Germany

As a recap for those unfamiliar, *Science on the Roof of the World* is framed around developing the case for geographical features like mountains as scales for new histories of science, geography, empire, and environment. Also central to the book are questions of how ‘the global’ was developed and deployed as powerful tool of empire, and how this involved the erasure of South Asian cosmologies and labour, as well as uncertainties around everyday scientific practice. At its broadest level, *Science on the Roof of the World* is interested in tracing the imperial origins of categories which still shape our environmental and geographical imaginations today in often pervasive ways. Before reflecting on these themes, however, I want to extend my sincere gratitude to all five commentators for their thoughtful and generous readings. When absorbed in the writing and editing of a book, it is surprisingly easy to forget that at some point people might actually read it. It is thus immensely satisfying, albeit also mildly terrifying, to know that it has not only been read, but read with such care.

It is particularly gratifying to have the opportunity to discuss *Science on the Roof of the World* in a forum dedicated to geography. Along with global and imperial history, the history of science, environmental history, and South Asian studies, a key audience that I hoped to reach was geographers – and indeed, I consider myself deeply influenced by insights from historical geography, whether in relation to indigenous labour and exploration, or empire and geographical imaginaries. Simon Naylor is nevertheless correct to note that ‘this is not primarily a book of historical geography,’ and that it emerges more explicitly from debates in the history of science – circulation, practice, and so forth. Naylor goes on identify that it remains ‘a book

with questions of geography at its heart,’ and this forum thus provides a very welcome opportunity to bring some of these geographical preoccupations to the fore. This question of disciplinarity also illustrates, I would suggest, two things: *Firstly*, the way history of science methodologies and debates, including about labour, practice, scaling, and commensurability have come in recent years to be influential and adopted widely, by both historical geographers and global historians; and *Secondly*, that this form of interdisciplinarity is ultimately the only way to tell stories about science, environment, and geography at the edges of empires – and explaining, for example, how Everest came to be something people now queue to climb when for most of human history it was just another mountain.

A key argument in *Science on the Roof of the World* is that mountains (in ways both alike and different to other geographical features) can serve as scales that disrupt traditional national or area studies framings. As Galen Murton notes, this approach is relevant not only for the history of science but ‘more importantly (and especially for readers of this journal) demonstrates how the value of geographical scale works to disrupt dominant histories and epistemologies of other sciences too’. As Murton continues, this has broader resonances for ‘a discipline like geography so deeply entangled with legacies of empire, colonialism, and extraction’ and this approach thus ‘does critical work for advancing broader projects

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Corresponding author:

Lachlan Fleetwood, LMU Munich, 80539 München, Germany.
Email: lachlan.fleetwood@lmu.de

of decolonizing and disrupting normative framings of the geographical sciences'. Indeed, these legacies inform and underpin the rationale of the book in fundamental ways. Here Thomas Simpson helpfully highlights my use of 'aberrance' as an analytical category, and his re-statement encapsulates the importance of this perhaps better and certainly more succinctly than I managed in the book itself: 'the Himalaya were materially different in consequential ways; but the peculiar array of value judgements that attached to their differences were distinctly colonial'. In imperial imaginaries, aberrance took multiple forms (as compared to the norms of the lowlands, of temperate Europe, and of better known mountain ranges, especially the Alps and the Andes). Ultimately, the value of tracing the imposition of aberrance is that it provides a window into the way that European norms – for example, what counts as an 'extreme' environment – continue to underpin our geographical imaginations today in ways that problematically echo their imperial origins.

The question of how to write a global history of science (or geography for that matter), what this means practically, and for whom it might speak nevertheless remains very much a live issue. There have been very different ways to approach this (I would argue there must be). *Science on the Roof of the World* offers just one way, though by no means the only or the most important. In the book I focus on how 'the global' itself was developed as a powerful scale and tool for (European) empires, and show across a range of scientific practices how making mountains commensurable was an intensely imperial form of globality. Here the global and imperial are understood – however unevenly, haphazardly, and incompletely – as co-constitutive. There is of course a danger to this argument; namely, that it risks relegating South Asian imaginaries of mountains to merely 'local' or 'regional' scales, with the global reserved as an imaginative domain only accessible by imperial administrators and scientists. But this is also precisely what imperial science did, reshaping the world to consolidate and expand control. Relatedly, Tapsi Mathur's felicitous comment that *Science on the Roof of the World* aims to show 'the continuing relevance of globalizing science,

not for the sake of connections, but for disconnections' seems to be me even more significant now than I appreciated when I was writing the book. The persistence of the idea of colonial science as all about circulation and connection (not dissimilar questions have been raised about global history), seems to me to obscure the extent to which things did not, could not, or were made not to move in an ostensibly globalising and globalised world wrought by imperialism. (As an aside, it is thus perhaps apt that I am now affiliated with the interdisciplinary Käte Hamburger Kolleg, 'Dis:connectivity in Processes of Globalisation' at LMU Munich, which aims to address just these concerns.)

As several of the commentators pick up on, looming throughout *Science on the Roof of the World* is the historical and historiographical prominence of Prussian naturalist Alexander von Humboldt. When researching the book, I found – to my probably inappropriate annoyance – that Humboldt was everywhere and inescapable. The decision to subvert the long history of 'Humboldtian science' was, as I explain in the book, in part due to the complex ways Humboldt's absence from the Himalaya inflected science there, but also very much a conscious one. Here Simpson's note that the argument Humboldt's gravitas could actually be 'an "impediment" to those doing science on the roof of the world is a powerfully iconoclastic interpretation,' is to me both true and important. Biographical approaches to 'lone geniuses' like Humboldt (almost always, of course, 'great men') remain particularly strong in the history of science and geography. The archival pull – and the contemporary political and budgetary realities of whose archives are preserved, catalogued, and digitised – is of course a factor. However, in *Science on the Roof of the World* one of my key aims was to reiterate exactly why these 'great man' approaches are insufficient to tell many of the stories we might want to about imperial scientific practices. Ed Armston-Sheret notes this is similar for the history of exploration, and 'how we choose to study, remember, and write about such journeys has an important bearing on how we conceptualise our discipline and who counts in its history'. While in many ways an obvious point,

whose stories we choose to focus on does ultimately matter. It is of course impossible to write about mountains, science, and empire in the 19th century without talking about Alexander von Humboldt. But if Humboldt becomes the story then we lose too much, not only in terms of the everyday aspects of how science was practiced, but the many and varied actors that made science happen.

In reflecting on *Science on the Roof of the World's* attempt to tell the stories of this diverse set of actors, it is particularly apropos that Thomas Simpson has chosen to focus his commentary on the book's images (not least also because Simpson's own important work on colonial imagery has been of no small influence). The many images in the book are indeed no mere illustrations, but integral to the argument. They reveal much about how science was practiced and geographical knowledge made, as well as where, and – importantly – by whom. Indeed, they allow for the recovery of a wide range of actors, from the subjects of the images themselves, be that the unnamed 'women coolies of Kanawar' or the herbarian Murdan Ali, as well as revealing traces of their production, from the laboriousness of rocks collected and carried to the expertise of the so-called 'Company School' artists. It is also for this reason, although it initially caused some structural headaches, that I wanted to avoid resorting to a single chapter dedicated to the roles and contributions of South Asian brokers, guides, and go-betweens. Rather, I felt that it was important to weave these through each of the book's chapters and the different sciences and scientific practices they addressed – in effect, both a demonstration and an argument that these should not, and cannot, be separated. Of course, the limitations of working with and within colonial archives still haunt this book, as others like it. I am nevertheless adamant that the possibilities for recovering those involved in imperial science and geography are greater than sometimes assumed, and this is a debate I have tried to engage with in both practical and philosophical terms. Simpson's assertion that 'contrary to conventional postcolonial wisdom, colonial archives – especially visual ones – contain multitudes' is thus an essential reminder. There are and will always

be limits, but the South Asian actors can be recovered, and their stories can be told, however incomplete and even unsatisfactory the results often are. They also must be told, otherwise it is impossible to show how imperial science was actually done in the Himalaya and imperial knowledge of mountains was made in the 19th century.

Ed Armston-Sheret meanwhile picks up on two related themes in the book, one fashionable and relatively new (the role of bodies in scientific practice) the other old and in some ways unfashionable (the history of exploration). The role of bodies, both European and South Asian, in experiences of the mountains and the making of environmental and scientific knowledge is a thread that does particular work in the book. Like focusing on the visual, this provides opportunities to chip away at and sidestep some of the archival limits. As Armston-Sheret argues 'even when we do not know much about an individual in question, we can still recover traces of their contributions through focusing on the work they did' (here Armston-Sheret's own contributions on 'body work' point to a promising way forwards). Throughout, I have also tried to parse the imperial sources for the rhetorical moves surveyors and naturalists made to establish their accounts as credible, in which bodies played a key role. Ultimately, this self-fashioning reveals as much about what they thought they were doing (or should be doing) as what they actually did. Such questions nevertheless also highlight a key tension in this project of recovering indigenous labour in scientific surveys, in that one must never lose sight of the way these expeditions ultimately facilitated imperial expansion, domination, and exploitation. A key part of my approach has been showing the sheer absurdity of many imperial claims, and the way explorers, surveyors, and naturalists were often out of their depth in the mountains and utterly dependent on local expertise. But the question remains how to reconcile this with the reality that they were also pursuing an epistemologically and often also physically violent project of imperial expansion. In other words, how to undercut imperial claims about mastery without undercutting the violence of empire. This tension is something I continue to grapple with. By showing explorers

were often limited in agency, and deconstructing the stories they told about themselves, I ultimately aim to show the pervasiveness of these imperial appropriations of epistemologies, landscapes, and peoples. This too echoes in Galen Murton's salient discussion of the present, and the long shadow of colonial extractivism and scientific expertise over contemporary development schemes in the Himalaya. As Murton notes, understanding the 'place of science in the making of historical – and in turn also contemporary and postcolonial – geopolitics' is essential in recognising 'how new forms of "Great Power" geopolitics play out in the Himalaya region today'.

Having such a range of insightful interlocutors provides opportunities to look back on things that I did not or could not do in the book. Lacunae remain, some I am conscious of, others I am no doubt unaware of still. Books require choices, and in this case some of those I made have consigned entire regions to the tangential (as Simpson notes, particularly the Eastern Himalaya) or put fields of imperial knowledge production to the side (notably colonial ethnography). Naylor also notes, quite fairly, that my assertions about how mapping altitude borrowed from the language of latitude and the horizontal are sometimes more assumed than demonstrated, and there remains scope for much more to be said about cartography and the visual representation of altitude over time. Meanwhile, Tapsi Mathur's suggestion that an 'examination of South Asian travellers and their self-fashioning in the Himalaya would have added another layer to understanding the complexity of the universal category of the Himalaya as vertical, as mountain' is perhaps the most important of all, and I would argue the most salient in terms of pointing to where we go next (here Mathur's own innovative work on South Asian surveyors suggests one promising way forwards).

Let me finish by returning to one of my key motivations for telling the story of the imperial remaking of the Himalaya in the first half of the 19th century. Namely, that it offers an opportunity for a sustained interrogation of the imperial categories that still shape our imaginations today (this is demonstrated not least by the book's ironic title, which reflects the imperial appropriation of the evocative imaginary of the 'Roof of the World' from the Pamir mountains to the Himalaya). More widely, this is apparent in the imperial implications of the 'advent of altitude' (as Murton neatly summarises) and the bigger question of why and how Everest came to be important, when for most of human history other mountains mattered more, including in South Asian cosmologies of the Himalaya. As I show in the book, these reconfigurations came about in particular moments, both facilitated by and for imperial ends, and these processes need to be denaturalised and historicised. This is of course not the only way to approach the global history of science and geography as a method and means, but one I believe is productive. Ultimately, historicising the remaking of the Himalaya opens a window into the way imperial categories around altitude continue to inflect our modern understandings of mountains and global geography. In tracing these categories it is thus my hope to open up space to rethink them – as indeed we must, not least in our relationship to mountain environments in an era of accelerating climate change.

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