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Find the river: discovering the Tsangpo-Brahmaputra in the age of empire

Short title: Find the river

Thomas Simpson, University of Warwick. tomsimpson1987@gmail.com

Abstract

Despite the enormous size and economic and scientific significance of the Tsangpo-Brahmaputra River, questions of *where* and *what* it was generated successive waves of dispute from the mid-eighteenth to early twentieth centuries. Geographical discovery in the eastern Himalayan borderlands neither entailed the application of fixed theories and techniques, nor resulted from consistent flows of information along established channels. Europeans instead understood the region's rivers in many different ways, influenced by sporadic deluges of data, competing forms of expertise, shifting imperatives of colonial political economy, unsettling encounters with various bodies of water, and heterogeneous Asian knowledge structures. Informants, infrastructures, and cosmologies of often-overlooked communities at imperial margins fundamentally reshaped European knowledge. Under these conditions, practitioners of spatial sciences came to thrive upon the proliferation of models and objects of discovery rather than seeking definitive closure.

Introduction: fluid discoveries

Morphing, massive, and—unusually—masculine in both its Tibetan and Indian names,¹ the river flows east across the Tibetan plateau before tumbling southwards through a deep gorge at the eastern fringe of the Himalaya. By the time it performs another right angle to tumble westward through Assam, it has transitioned from Tibet's Tsangpo to

¹ John A. Ardussi, 'The Quest for the Brahmaputra River and its Course According to Tibetan Sources', *The Tibet Journal*, vol. 2, no. 1, 1977, pp. 35-49, here pp. 41-2.

India's Brahmaputra.² In the mid-eighteenth century, however, all of this seemed different—to Europeans, at least. Away from the toponymically crowded coasts and plains of the Subcontinent and towards its sparsely labelled fringes, the 'East Indies' sheet of a Paris-published atlas showed the 'Baramputri' river emanating from a vast lake, labelled 'Chemay' (figure 1). Further north, above the colour-tinted peaks of the eastern Himalaya, a wiggly black line appreciably thicker than that denoting the Brahmaputra represented the Tsangpo, gushing eastwards to become Burma's Irrawaddy and discharge water from the high Tibetan plateau into the Bay of Bengal hundreds of miles east of the shared mouth of the Brahmaputra and Ganges.

[INSERT FIGURE 1 NEAR HERE. LEGEND: Figure 1. Detail of R. Vaugondi, 'Presqu' Isle des Indes Orientales' (1758). Source: R. Vaugondi, supplement to *Atlas Universel* (Paris, 1758).]

It is now understood that Chemay was a chimera and the confidently plotted Tsangpo does not become the Irrawaddy—and has not for the past 20 million years.³ But the work required to establish these topographical truths was every bit as convoluted and mutable as the landscape it sought to describe. The river was not discovered to Europeans in progressive increments over time nor in a revelatory moment. Where and what the river was generated waves of dispute for an unusually

² On the history of the Brahmaputra in Assam, see Arupjyoti Saikia, *The Unquiet River: A Biography of the Brahmaputra* (New Delhi: Oxford University Press, 2019).

³ On the 'capture' of the Tsangpo by the Brahmaputra during the Early Miocene, see Ruth A. J. Robinson, et al, 'Large rivers and orogens: The evolution of the Yarlung Tsangpo-Irrawaddy system and the eastern Himalaya syntaxis', *Gondwana Research*, vol. 26, 2014, pp. 112-21.

long period.⁴ To equate the Tsangpo-Brahmaputra's discovery with the Royal Geographical Society's (RGS) award of its prestigious Gold Medal to the British officer Frederick Bailey following his exploration of part of the river's course through the Himalaya in 1913 is not only to accept a reductive myth of imperial geography. It is also to overlook how the objects and discoveries of field sciences violated dichotomies of colonial and indigenous, and of culture and nature. Attempts to know riverine space at the outskirts of empire comprised unruly mixtures of European and Asian men, periodicals and institutions, visual instruments and representations, and the active presence of rivers and mountains.

This article outlines how assemblages of these elements constructed and conveyed knowledge in very different ways during three extended moments between the 1820s and 1910s.⁵ Each phase related to a burst of British military and economic expansion into a different portion of 'Zomia', the recently coined region of high mountains and deep valleys encompassing Assam, northern Burma, Tibet, and southwest China.⁶ The

⁴ On British riverine discovery in nineteenth-century Africa see David Lambert, *Mastering the Niger: James MacQueen's African Geography and the Struggle over Atlantic Slavery* (Chicago: University of Chicago Press, 2013); Lawrence Drietsas, 'Expeditionary Science: Conflicts of method in mid-nineteenth-century geographical discovery', in *Geographies of Nineteenth-Century Science*, (eds) Charles W. J. Withers and David N. Livingstone (Chicago: University of Chicago Press, 2011), pp. 255-78.

⁵ This contrasts with two recent overviews of British surveys of the Brahmaputra, which characterize British geographical knowledge of the river as a unitary enterprise from the 1760s to the 1910s: Ritupan Goswami, *Rivers and History: Brahmaputra Valley in the Last Two Centuries* (Unpublished PhD dissertation: Jawaharlal Nehru University, Delhi, 2010), pp. 30-85, especially p. 62; Saikia, *Unquiet*, pp. 202-46.

⁶ Willem van Schendel, 'Geographies of knowing, geographies of ignorance: jumping scale in Southeast Asia', *Environment and Planning D: Society and Space*, vol. 20, 2002, pp. 647-68.

unsettled political dynamics of this space went hand-in-hand with unsettled knowledge of water and rock. In their lower courses the region's huge rivers became both invaluable energy sources for cash crop agriculture and crucial channels of communication, allowing states including British India to thrive. Their usefulness, coupled with astonishment at their vast scale, drew a range of imperial agents against the flow, upstream and uphill into terrain resistant to conventional ways of garnering knowledge, accruing profits, and entrenching sovereignty. These watercourses blurred boundaries between lowland and upland, confusing the categories not only of nineteenth-century geographers and bureaucrats but also twenty-first-century scholars prone to asserting the distinctiveness and detachment of Zomia's hills.⁷

Rivers in and around the eastern Himalaya have agency not only in geological terms; they have been active and fickle presences in the processes that generated spatial knowledge. Rivers spoke to many of the humans who sought to understand and to use them; ascertaining what they had to say was a major preoccupation of European geographers and surveyors.⁸ Richard White's famous thesis regarding salmon fishing on the River Columbia—'precisely where the river expended its greatest energy, humans had to expend the most labor'—also provides a reasonable model of how

⁷ James C. Scott, *The Art of Not Being Governed: An Anarchist History of Upland Southeast Asia* (New Haven: Yale University Press, 2009). For a critique of this element of Scott's work, see Sara Shneiderman, 'Are the Central Himalayas in Zomia? Some scholarly and political considerations across time and space', *Journal of Global History*, vol. 5, no. 2, 2010, pp. 289-312. On boundary-breaking flows in river historiography, see Goswami, *Rivers*, p. 18; Matthew Evenden, 'Beyond the Organic Machine? New Approaches in River Historiography', *Environmental History*, vol. 23, no. 4, 2018, pp. 698-720, here p. 700.

⁸ On the liveliness and communicative capacities of rivers, see Peter Coates, *A Story of Six Rivers: History, Culture and Ecology* (London: Reaktion, 2013), pp. 23-7.

revelatory experiences of particular portions of vast streams gave impetus to geographical discovery.⁹ Especially when unusually broad, frothing, or in spate, bodies of water presented as uncanny presences that eroded extant ways of knowing and allowed new ideas to bubble up. As Jessica Lehman recently suggested, sciences dealing with large bodies of water are ‘shaped through affective encounters with material forces’ that set ‘productive limits’ on what can be known.¹⁰ I accordingly deploy an expanded range of watery metaphors, including ‘deluge’, ‘wave’, and ‘gush’, alongside the limited liquid lexicon of ‘flow’ and ‘circulation’ used without sufficient reflection in much global history.¹¹ Heeding anthropologist Stefan Helmreich’s call to ‘think critically about [the] turn to water’ in humanities scholarship,¹² this terminology better represents the uneven rhythms, patchy spatiality, and laborious processes of riverine discovery in Zomia.

The lingering notion that Europeans in the age of empire perceived the natural and nonhuman as passive objects to be comprehended, dominated, and exploited simply does not hold in the case of their encounters with great rivers in this part of Asia. Coupled with diverse epistemological frameworks, information sources, and political economic goals, vivid experiences of gigantic flows of water prompted varied ways of

⁹ Richard White, *The Organic Machine* (New York: Hill and Wang, 1995), p. 12.

¹⁰ Jessica Lehman, ‘Sea Change: The World Ocean Circulation Experiment and the Productive Limits of Ocean Variability’, *Science, Technology, & Human Values*, vol. 46, no. 4, 2021, pp. 839-62, here p. 856.

¹¹ Fa-ti Fan, ‘The Global Turn in the History of Science’, *East Asian Science, Technology and Society: An International Journal*, vol. 6, 2012, pp. 249-58, here pp. 252-3; Stefanie Gänger, ‘Circulation: reflections on circularity, entity, and liquidity in the language of global history’, *Journal of Global History*, vol. 12, 2017, pp. 303-18.

¹² Stefan Helmreich, ‘Nature/Culture/Seawater’, *American Anthropologist*, vol. 113, no. 1, 2011, pp. 132-44, here p. 137.

comprehending not only *where* rivers are, but *what* rivers are. In riverine geography, distinctions between epistemology and ontology were murky at best.¹³ The various men, maps, and measurements that claimed to discover the Tsangpo brought into being a range of rivers. This article extends to historical actors insights from the ‘ontological turn’ in anthropology, conceiving of different ways of describing and doing as ‘not so much a matter of “seeing differently”” but rather ‘a matter of seeing *different things*’.¹⁴ European geographers and their interlocutors in the liminal spaces of Asia posited and acted upon what, drawing on Annemarie Mol, we might think of as the ‘river multiple’.¹⁵ Differing notions of what a river is existed not only between European and Asian communities, but also between distinct groups of imperial personnel.

There were times when the Tsangpo-Brahmaputra seemed less surely known and less unitary. Like the objects of laboratory sciences discussed by Bruno Latour, no definitive moment of discovery rendered the river ‘impervious to history’.¹⁶ Maintaining particular versions of the Tsangpo-Brahmaputra was laborious and prone to failure. Rather than focusing exclusively on the factors that enable initial moments of discovery, this article investigates how claims of discovery are reinforced or eroded

¹³ On this point in STS more generally, see Steve Woolgar and Javier Lezaun, ‘The wrong bin bag: A turn to ontology in science and technology studies?’, *Social Studies of Science*, vol. 43, no. 3, 2013, pp. 321-40, here p. 336.

¹⁴ Martin Holbraad and Morten Axel Pedersen, *The Ontological Turn: An Anthropological Exposition* (Cambridge: Cambridge University Press, 2017), pp. 5-6.

¹⁵ Annemarie Mol, *The body multiple: Ontology in medical practice* (Durham, NC: Duke University Press, 2002).

¹⁶ Bruno Latour, *Pandora’s Hope: Essays on the Reality of Science Studies* (Cambridge, MA: Harvard University Press, 1999), p. 168.

over time. Finding the river was ‘a continuing event’.¹⁷ As Simon Schaffer reminds us, discovery is also ‘made up’ of many components that can only appear simple and singular through the work of retrospective narratives.¹⁸ In competing European versions of the Tsangpo-Brahmaputra, networks of personal trust, the growing authority of particular learned institutions (notably the Survey of India and the RGS), and the perceived credibility of particular modes of inscription and representation were all vital.¹⁹ However, these elements were also, to a substantial extent, negotiated through proposed discoveries rather than exercising a fixed influence.

Learned and interested communities in Tibet and the Indian subcontinent understood long before their European counterparts that the Tsangpo joined the Brahmaputra.²⁰ What counted as geography in colonial India and Burma, and also metropolitan Britain and continental Europe, developed through encounters with and appropriations from various Asian cosmologies. Historians of geography have recently highlighted the essential role of non-European information and labour in imperial

¹⁷ Ibid.

¹⁸ Simon Schaffer, ‘Making Up Discovery’, in *Dimensions of Creativity*, (ed) Margaret A. Boden (Cambridge, MA: MIT Press, 1994), pp. 13-51.

¹⁹ On the growing significance of the RGS, see Felix Driver, *Geography Militant: Cultures of Exploration and Empire* (Oxford: Blackwell, 2001). On inscription, see Simon Schaffer, ‘“On Seeing Me Write”: Inscription Devices in the South Seas’, *Representations*, vol. 97, no. 1, 2007, pp. 90-122; Marie-Noëlle Bourguet, ‘A Portable World: The Notebooks of European Travellers (Eighteenth to Nineteenth Centuries)’, *Intellectual History Review*, vol. 20, no. 3, 2010, pp. 377-400; Innes M. Keighren, Charles W. J. Withers, and Bill Bell, *Travels into Print: Exploration, Writing, and Publishing with John Murray, 1773-1859* (Chicago: University of Chicago Press, 2015), pp. 68-99.

²⁰ Ardussi, ‘Quest’, pp. 42-4.

exploration and surveying.²¹ It nonetheless remains widely assumed that Europeans largely effaced traces of this reliance in rendering their findings for audiences in colonial hubs and imperial metropolises.²² In addition, non-Europeans are often supposed to have been confined to providing labour and, on occasion, information to populate frameworks set by Europeans.²³ Even Kapil Raj's work on sciences as products of 'circulation' and 'encounter' in South Asia suggests that the active and 'varied roles' of 'indigenes' during the precolonial and early colonial periods gave way to circumscribed and heavily 'disciplined' roles in the age of high imperialism.²⁴

In the case of the rivers of the eastern Himalaya, the work and thought of various Asian communities was vital not only to Europeans' acquisition of knowledge but also to the specific content and structure of that knowledge. Agents of empire and imperial

²¹ D. Graham Burnett, "It is impossible to make a step without the Indians": Nineteenth-century geographical exploration and the Amerindians of British Guiana', *Ethnohistory*, vol. 49, no. 1, 2002, pp. 3-40; Moritz von Brescius, *German Science in the Age of Empire: Enterprise, Opportunity and the Schlagintweit Brothers* (Cambridge: Cambridge University Press, 2018); Lachlan Fleetwood, 'Bodies in high places: Exploration, altitude sickness and the problem of bodily comparison in the Himalaya, 1800-1850', *Itinerario*, vol. 43, no. 3, 2019, pp. 489-515.

²² On this point see Felix Driver, 'Hidden histories made visible? Reflection on a geographical exhibition', *Transactions of the Institute of British Geographers*, vol. 38, 2013, pp. 420-35, here p. 423.

²³ Two notable exceptions concern Western natural history and botany in China, a zone of 'informal empire': Fa-ti Fan, *British Naturalists in Qing China* (Cambridge, MA: Harvard University Press, 2004), pp. 143-53; Erik Mueggler, *The Paper Road: Archive and Experience in the Botanical Expedition of West China and Tibet* (Berkeley: University of California Press, 2011).

²⁴ Kapil Raj, *Relocating Modern Science: Circulation and the Construction of Knowledge in South Asia and Europe, 1650-1900* (Basingstoke: Palgrave Macmillan, 2007); Kapil Raj, 'Beyond Postcolonialism ... and Postpositivism: Circulation and the Global History of Science', *Isis*, vol. 104, no. 2, 2013, pp. 337-47.

geographers often mangled and derided Asian ways of comprehending water and earth, but their reliance on these traditions nonetheless left lasting residues on their written tracts, images, and data compilations. Terraqueous locales at the fringes of South, Central, and Southeast Asia—where land, water, and atmosphere mutually transformed through constant interplay²⁵—enabled often-juxtaposed categories of ‘indigenous’ and ‘colonial’ knowledge to overspill and mingle.²⁶ The concept of indigenous knowledge seems still more questionable when we consider Europeans’ particular reliance on interlocutors who moved across mountains and valleys, in many cases after being displaced by imperial expansion.²⁷ Various Asian ways of construing and constructing space fundamentally shaped European discoveries of the Tsangpo-Brahmaputra.

A spate of riverine histories of South Asia published during the past couple of decades has tended to posit that colonial knowledge of, and interventions in, India’s water systems hewed to a single, sustained logic of control and exploitation.²⁸ Dilip da Cunha, for example, suggests that British rule ‘survived and thrived on keeping water

²⁵ Alison Bashford, ‘Terraqueous histories’, *The Historical Journal*, vol. 60, no. 2, 2017, pp. 253-72.

²⁶ On ‘Western’ and ‘indigenous’ knowledge, see ‘Focus: Global Histories of Science’, (ed) Sujit Sivasundaram, *Isis*, vol. 101, no. 1, 2010, pp. 95-158; Raj, ‘Beyond Postcolonialism’, pp. 345-7.

²⁷ Felix Driver, ‘Face to Face with Nain Singh: the Schlagintweit Collections and Their Uses’, in *Naturalists in the Field: Collecting, Recording, and Preserving the Natural World from Fifteenth to the Twenty-First Century*, (ed) Arthur MacGregor (Leiden: Brill, 2018), pp. 441-69, here pp. 455-6.

²⁸ Rohan D’Souza, ‘Water in British India: The Making of a “Colonial Hydrology”’, *History Compass* vol. 4, no. 4, 2006, pp. 621-8; Rohan D’Souza, *Drowned and Dammed: Colonial Capitalism and Flood Control in Eastern India* (Delhi: Oxford University Press, 2006); Sunil Amrith, *Unruly waters: How mountain rivers and monsoons have shaped South Asia’s history* (London: Allen Lane, 2018); Sudipta Sen, *Ganges: The Many Pasts of an Indian River* (New Haven: Yale University Press, 2019), pp. 298-341.

contained with a line'.²⁹ Building on but moving beyond this scholarship, I suggest that colonial scientific approaches to rivers were not limited to efforts to define, contain, and render economically productive. 'Untamed' portions of rivers could be valuable in an alternative way, as a source of scientific and imaginative intrigue. Above all, British understandings and uses of watercourses were multiple and mutable. Instead of 'inventing' singular rivers, as da Cunha has it, agents of empire constructed numerous Tsangpos—and each new or revisited river involved the denial of other rivers. 'River colonialism' was not a unitary project but myriad ways of seeing and acting.³⁰ Individuals and institutions with varied expertise and methodologies, situated in varied locations, drawing on varied Asian knowledge structures, and influenced by varied imperatives of political economy, perceived very different river systems in Zomia. At no stage—including the present day—has there been a settled understanding of how these tumultuous flows of water could be definitively known.

Sourcing knowledge

During the mid-1820s, a British military venture to remove Burmese forces from Assam quickly turned into full-scale annexation of the Brahmaputra valley.³¹ This was among the early acts of the East India Company-State's turn to focus on expansion at its external frontiers under the guise of security, having defeated its last major internal opponent in South Asia in 1818. The invasion saw unsettled politics mix with unsettled

²⁹ Dilip da Cunha, *The Invention of Rivers: Alexander's Eye and Ganga's Descent* (Philadelphia: University of Pennsylvania Press, 2019), xi.

³⁰ *Ibid.*, pp. 273-94.

³¹ British Library, London, India Office Records (hereafter 'IOR/') H/660-680.

topography.³² Among the skirmishes between Burmese and British forces that precipitated the invasion was a dispute over river islands in the Brahmaputra, which formed a section of the boundary between Assam and colonial Bengal.³³ The Brahmaputra was the key means of wayfinding and travelling for British soldiers and administrators in Assam and, accordingly, the primary focus of their surveys and maps (figure 2).³⁴ Simultaneously, it was a fickle entity that agents of empire struggled to master. The main channel and its numerous feeders shifted course, flooded fields, and overwhelmed conventional strategies for settling and taxing agrarian land.³⁵ The lack of river traffic and swathes of ‘inhospitable jungle’ along the banks often led to disorientation.³⁶ Experienced against the flow, as the British did in approaching from the west, the Brahmaputra’s formidable braided stream unravelled into elusive threads at the strategically sensitive eastern end of the valley (figure 3).

[INSERT FIGURE 2 NEAR HERE. LEGEND: Figure 2. Portion of Survey of India, ‘Geographical plan of the N.E. Frontier of Bengal with part of Assam’ (March 1824).

³² On rivers as political objects in twentieth-century South Asia, see Daniel Haines, *Rivers Divided: Indus Basin Waters in the Making of India and Pakistan* (Oxford: Oxford University Press, 2017).

³³ Anon., ‘Transactions with the Burmese anterior to the present war’, *Asiatic Journal*, vol. 20, 1825, p. 144.

³⁴ R. Wilcox, ‘Memoir of a Survey of Asam and the Neighbouring Countries, executed in 1825-6-7-8’, *Asiatic Researches*, vol. 17, 1832, pp. 314-469, here pp. 356-7.

³⁵ Saikia, *Unquiet*, xxxi; Gunnel Cederlöf, *Founding an Empire on India’s North-Eastern Frontiers, 1790-1840: Climate, Commerce, Polity* (New Delhi: Oxford University Press, 2014), p. 5.

³⁶ *Government Gazette*, undated, quoted in Anon., ‘Asiatic intelligence—Calcutta: Inland navigation’, *Asiatic Journal*, vol. 23, 1827, p. 849.

Source: India Office Records, British Library, London, H/678, map 3. © British Library Board.]

[INSERT FIGURE 3 NEAR HERE. LEGEND: Figure 3. Survey of India, ‘Sketch of the Country bordering on the Burmapooter above Rungpoor’ (June 1825). Source: India Office Records, British Library, London, H/678, map 10. © British Library Board.]

Imperial interest in the rivers of this region was about more than administration and geopolitics. Senior officials in Calcutta tasked soldier-surveyors in the invading party with resolving a long-established geographical problem. The Tsangpo had first become known in Europe in the 1720s through translations of the atlases commissioned by the Kangxi emperor, based on surveys jointly undertaken by Qing Chinese court personnel and French Jesuits.³⁷ From his study in Paris, the geographer to the French court Jean-Baptiste-Bourguignon D’Anville concluded from these surveys that the Tsangpo joined the Irrawaddy.³⁸ The advent of colonial rule in Bengal in the 1750s and 1760s took European inquiries on this region into the field. Encountering the Brahmaputra first-hand in 1765 was a revelatory experience for James Rennell, the leading geographer of early colonial India. Rennell pronounced himself ‘surprized [*sic.*]’ that the Brahmaputra near its junction with the Ganges in northern Bengal was

³⁷ Mario Cams, *Companions in Geography: East-West Collaboration in the Mapping of Qing China (c. 1685-1735)* (Leiden: Brill, 2017); Laura Hostetler, *Qing Colonial Enterprise: Ethnography and Cartography in Early Modern China* (Chicago: University of Chicago Press, 2001), pp. 51-80.

³⁸ Ardussi, ‘Quest’, p.35; Lucile Haguët, ‘J.-B. d’Anville as Armchair Mapmaker: The Impact of Production Contexts on His Work’, *Imago Mundi*, vol. 63, no. 1, 2011, pp. 88-105.

enormous—‘rather larger than the Ganges’.³⁹ Coupled with what he termed ‘the positive assurances of the Assamers, “that their river came from the north-west, through the Bootan mountains”’, Rennell opposed D’Anville and stated that the Tsangpo became the Brahmaputra (figure 4).⁴⁰

[INSERT FIGURE 4 NEAR HERE. LEGEND: Figure 4. Portion of James Rennell, ‘Map of Hindoostan’ (1788). Source: James Rennell, ‘A Map of Hindoostan, or the Mogul Empire’ (London: J. Rennell, 1788).]

The approximately concurrent British invasion of Assam and establishment of key learned societies and journals in Europe and British India combined to reinvigorate the contest between Rennell and D’Anville’s competing Tsangpos. The incumbent Surveyor-General of India at the time of the British invasion of Assam, Valentine Blacker, was a firm supporter of Rennell’s conjecture and instructed surveyors attached to the invading force to seek out relevant information. Assamese interlocutors suggested that the Brahmaputra’s source was a pilgrimage site in the mountains east of Upper Assam, known as the ‘Brahmakund’.⁴¹ This conjecture guided the first British surveys into the foothills at the northeastern corner of the Assam valley in early 1825, which seemed to confirm that Rennell and Blacker were mistaken and D’Anville was

³⁹ James Rennell, *Memoir of a map of Hindoostan; or the Mogul Empire* (London: J. Rennell, 1788), p. 276.

⁴⁰ *Ibid.*, p. 277.

⁴¹ Wilcox, ‘Memoir’, p. 316.

correct.⁴² The Survey of India map of June 1825 (figure 3) stated plainly that ‘the Brama Khoond’ was ‘the Source of the Brahmaputra’.

One of the surveyors, Richard Wilcox, later couched this datum as a conspiracy of local mis-informants and environmental challenges—a fiction sustained because ‘the Natives knew well that the boats of Bengal could not pass more than one day’s journey beyond Sadiya’, the eastern-most British outpost in the Assam valley.⁴³ In fact, for Assamese Hindus the Brahmakund was dedicated to an avatar of Vishnu and the essential source of the Brahmaputra. The influence of Hindu cosmology on British imperial geography lingered even after doubt was cast on the notion that the Brahmakund branch was the largest tributary of the upper Brahmaputra.⁴⁴ The first British surveyor to see the Brahmakund complained of ‘so many discrepancies between the Hindu legends, and facts’, but retained the idea that it was a spiritually significant feature, recounting for his European audience that the landscape contained ‘gothic pinnacles and spires’.⁴⁵ Like many later imperial geographers interested in the Tsangpo question, he drained the contents of Asian cosmologies but refilled them with material that also mixed the physical and metaphysical. We can understand this as a reversal of the flow of spiritual-spatial categories from European metropolises to South Asia that Sumathi Ramaswamy identifies in the case of the ‘lost land of Lemuria’ during the late nineteenth century.⁴⁶ To Assamese Hindus of the 1820s, the Brahmaputra was defined

⁴² Anon., ‘The Burrampooter, or Brahmaputra’, *Asiatic Journal*, vol. 21, 1826, pp. 52-3.

⁴³ Wilcox, ‘Memoir’, p. 316.

⁴⁴ Anon., ‘Asiatic intelligence—Calcutta: Rivers of Assam’, *Asiatic Journal*, vol. 22, 1826, p. 713.

⁴⁵ Bedford, quoted in Wilcox, ‘Memoir’, pp. 353-4.

⁴⁶ Sumathi Ramaswamy, *The Lost Land of Lemuria: Fabulous Geographies, Catastrophic Histories* (Berkeley: University of California Press, 2004).

by its flowing from the Brahmakund, and the residue of this ostensibly ‘fabulous geography’ took some time to be fully washed off of British conceptions of the river’s source.

In 1827 and 1828, interested parties in Calcutta and London largely swung behind Rennell’s hypothesis. Information from surveys of the Brahmaputra’s northern tributaries appeared in the Calcutta *Government Gazette* and the London-based *Asiatic Journal*, which reprinted the *Gazette*’s articles with a lag of around seven months. Print mattered in geographical discovery,⁴⁷ and these publications actively drummed up public intrigue in colony and metropole in the geographical ‘mystery’ of these distant rivers. The *Government Gazette* even gave its own rendering of the importance of sensationalist narrative strategies to the search for river courses. ‘The progress of geographical discovery on our north-east frontier,’ it told its readers in November 1826, ‘has assimilated itself to the development of a well-wrought tale, in which expectation is kept alive by a succession of incidents, promising, yet retarding, the denouement, and disappointing expectation only to excite curiosity’.⁴⁸

Meanwhile, the British surveyors in Assam sought ‘ocular and incontrovertible demonstration’ of the Irrawaddy and Brahmaputra issuing from the eastern fringes of the Himalaya.⁴⁹ They admitted, however, that the region’s intractable terrain and inhabitants essentially ruled out the possibility of obtaining such evidence.⁵⁰ Even

⁴⁷ See especially Lambert, *Mastering*. On print and geography more generally, see Keighren, Withers, and Bell, *Travels*.

⁴⁸ Quoted in Anon., ‘The Brahmaputra River’, *Asiatic Journal* 23 (1827), pp. 495-9, here p. 498.

⁴⁹ Wilcox, ‘Memoir’, p. 439.

⁵⁰ On clashes with uplanders, see R. H. Phillimore, *Historical Records of the Survey of India. Vol. III, 1815-1830* (Dehra Dun: Survey of India, 1954), pp. 54-6.

when threats and inducements led locals to proffer information, topography often seemed to surveyors to become lively and malevolent. Wilcox felt that the ‘rugged precipices’ beyond the Brahmakund attacked his instruments—‘derang[ing]’ a thermometric barometer—while the ‘crookedness’ of the ‘chasm of the Brahmaputra’ itself occluded the view of the river he desired.⁵¹ As winding channels and steep-sided valleys seemed set on evading their gazes, the surveyors turned to other forms of data. Multiple information sources were both a response to and driver of the multiplication of possible riverine sources.⁵²

Retrospective accounts of the surveys attempted to purify messy methods of discovery by implying that quantified discharge measurements of the Brahmaputra’s tributaries were the decisive means of establishing the Tsangpo-Brahmaputra as a single object.⁵³ In the 1832 ‘Memoir’ of his work in Assam, Wilcox admitted: ‘the question immediately occurs *now* why we did not take a [discharge measurement] of the river [Dihang]’, by that stage the tributary deemed the most likely candidate for joining the Tsangpo and Brahmaputra. ‘We had not the means,’ he continued, ‘and the utility of providing them was not so obvious *then*’.⁵⁴ To surveyors in the field, the question of how to establish the Tsangpo’s course seemed every bit as unsettled and elusive as the terraqueous landscape itself.

⁵¹ Wilcox, ‘Memoir’, pp. 365-7.

⁵² The *Government Gazette* noted in November 1826 that ‘we have been constantly coming upon the sources of the Brahmaputra, without attaining them, and at the same time, determining a variety of new and interesting points’: quoted in ‘The Brahmaputra River’, *Asiatic Journal*, vol. 23, 1827, p. 498.

⁵³ Phillimore, *Historical Records Vol. III*, p. 56; Ardussi, ‘Quest’, p. 39.

⁵⁴ Wilcox, ‘Memoir’, footnote p. 407.

These men placed great value on tales and toponyms gleaned from inhabitants of the uplands fringing Assam, a very different form of information to quantitative flow data. These communities did not share lowland Hindus' fixation on the Brahmakund, and the British also believed that they were in contact with Tibetans possessing empirical knowledge of the Tsangpo's course. Wilcox's colleague John Neufville gleaned the single most influential piece of oral evidence, telling of 'a sudden and overwhelming flood [that] poured from the Dihong [*sic.*] ... little more than half a century ago'.⁵⁵ Rather than seeing it as an unusually severe example of the kind of destructive riverine agency that vexed imperial administrators in Assam, Neufville spun the episode as a vital geographical clue. 'Various agricultural and household implements, elephant trappings, and numerous articles belonging to a race, evidently social and civilized, of pastoral and agricultural habits, were washed down in the stream', provided, he claimed, a material link between the Tibetan plateau and the Assam plains via the Dihang.⁵⁶ Uplanders' oral narratives allowed a deluge of water and material artefacts to become a new stream of geographical knowledge.

The cascade of missives and maps out of Assam during the 1820s that made a splash in Calcutta and Europe was a product of more than the physical and political contours of the region: clashing theories also contributed a great deal of energy. The colonial surveyors' primary antagonist was Julius von Klaproth, renowned German orientalist and founder-editor of the journal *Asiatisches Magazin*.⁵⁷ Klaproth

⁵⁵ John Bryan Neufville, 'On the Geography and Population of Asam', *Asiatic Researches*, vol. 16, 1828, pp. 331-52, here pp. 335-6.

⁵⁶ *Ibid.*, p. 336.

⁵⁷ Hartmut Walravens, 'Julius Klaproth: His Life and Works with Special Emphasis on Japan', *Japonica Humboldtiana*, vol. 10, 2006, pp. 177-91, here pp. 178-80.

approached riverine geography as a specialist on Central and East Asia with a keen interest in cartography, especially the Qing-Jesuit surveys.⁵⁸ His interest in the Tsangpo sprang up in 1825, prompted by a combination of the British surveys in Assam, which he followed in the *Asiatic Journal*, and the founding of a French-language version of his periodical, *Magasin Asiatique*.⁵⁹ In the first of only two issues before publication ceased, Klaproth vouched for the accuracy of Jesuit cartography and reinvigorated the Tsangpo-Irrawaddy theory. His field experience in Asia in the employ of the Russian imperial state and association with scientific explorer Alexander von Humboldt meant that Klaproth initially found favour in some journals in Calcutta and London, creating channels for his intervention to flow back to British surveyors at the fringes of Assam.⁶⁰ From late 1826 onwards, they couched their attempted discovery of the Brahmaputra's sources as a nationalistic venture to discredit Klaproth and verify the conjectures of the Survey of India.⁶¹

After colonial surveyors withdrew from the northeastern fringes of Assam in 1828, the deluge of information that fed the dispute slowed to a trickle, although not for lack

⁵⁸ *Ibid.*, p. 183; Anon., 'M. von Klaproth', *Asiatic Journal*, Vol. 19, 1836, pp. 65-71, here p. 66.

⁵⁹ J. Klaproth, 'Mémoire sur le cours du Yarou Dzangbo Tchou, ou du grand fleuve du Tübet; suivi de notices sur la source du Burrampouter', *Magasin Asiatique*, vol. 1, 1825-6, pp. 302-29.

⁶⁰ Anon., 'Asiatic intelligence—Calcutta: New map of Asia', *Asiatic Journal*, vol. 21, 1826, p. 621; Anon., 'The Brahmaputra River', *Asiatic Journal*, vol. 24, 1827, pp. 44-6; Anon., 'The Brahmaputra River', *Asiatic Journal*, vol. 24, 1827, pp. 430-34; Anon., 'Memoire sur le cours du Yarou Dzangbo-Tchou', *Quarterly Oriental Magazine*, vol. 6, 1826, pp. 179-209.

⁶¹ Anon., 'Review of Books', *Asiatic Journal*, vol. 25, 1828, pp. 472-7, here p. 473; Hodgson to Wilcox, 17 November 1826, quoted in Phillimore, *Historical Records Vol. III*, p. 57; Henry Yule, commentary in Thomine D'Mazure, 'Memorandum on the countries between Thibet, Yunan and Burmah', *Journal of the Asiatic Society of Bengal*, vol. 30, 1861, pp. 367-83, here p. 376.

of effort on the part of the Calcutta periodical press. Early in 1830, *Gleanings in Science*, established the previous year and aimed at a broad public audience, reported that Richard Wilcox's account of the Assam surveys was 'in the course of publication, and will, doubtless, ere long, put the finishing stroke to this controversy'.⁶² It took advantage of this brief window before discovery was projected to be complete to publish a 'sketch' commissioned by an unnamed 'gentleman' from 'a fine young Chinese priest' who had journeyed along the banks of the Tsangpo from Lhasa to Bengal (figure 5).⁶³ Notwithstanding the correspondent's guarantee that his informant 'seemed ingenious and candid',⁶⁴ the Tsangpo-Brahmaputra's reduction to a wavy line accompanied by four scant toponyms met with less acclaim among European men of science than Wilcox's 155-page 'Memoir' to which *Gleanings* had alluded. Published in 1832, it concluded with a lengthy attempt to demolish Klaproth's logic and Chinese sources, for which purpose Wilcox specially altered the Survey of India map of 1828 based on British surveys in Assam.⁶⁵ Besides reducing the scale, he made only a single, highly significant, change (figure 6). A thin line labelled 'M. Klaproth's river' joined the Irrawaddy, conspicuously separate from the authoritative, double line labelled 'Tsanpo R"', which joined the Brahmaputra via the Dihang. Historian of cartography Brian Harley famously claimed that 'as much as guns as warships, maps have been the

⁶² Anon., 'On the Identity of the Sanpu and Irawadi Rivers', *Gleanings in Science*, vol. 2, 1830, pp. 66-7, here p. 66.

⁶³ Ibid.

⁶⁴ Ibid., pp. 66-7.

⁶⁵ For the 1828 map see IOR/X/2140.

weapons of imperialism'.⁶⁶ During the Tsangpo debates of the 1820s, maps were weapons less in processes of dispossession—which in northeast India tended instead to operate through written treaties and practices on the ground rather than authoritative cartographic images—and more in internecine disputes within European geography.

[INSERT FIGURE 5 NEAR HERE. LEGEND: Figure 5. Anon., 'Course of the Erichangbo' (1830). Source: *Gleanings in Science*, vol. 2, 1830, p. 67. Reproduced by kind permission of the Syndics of Cambridge University Library.]

[INSERT FIGURE 6 NEAR HERE. LEGEND: Figure 6. Detail of Richard Wilcox, 'Map of the countries lying between the 20½ & 30 of N. Lat. & 90½ & 99 E. Longitude' (1832). Source: *Asiatic Researches*, vol. 17, 1832, facing p. 314. Reproduced by kind permission of the Syndics of Cambridge University Library.]

This is not only a retrospective claim: some of the men embroiled in these debates recognized that maps of Asia's rivers were primarily powerful in expressing dissensus between geographers. Bemoaning the continued controversy over the Tsangpo's route, British administrator-scholar Henry Yule argued in 1882 that the 'beautiful French and German maps ... founded on Klaproth's theory' had exercised 'a curious effect' on the question of river courses. French missionaries, he conjectured, carried these 'erroneous maps' to Tibet, where the images influenced the information that they communicated

⁶⁶ J. B. Harley, *The New Nature of Maps: Essays in the History of Cartography*, (ed) Paul Laxton (Baltimore: Johns Hopkins University Press, 2001), p. 57.

back to Europe.⁶⁷ Among British circles, however, Wilcox's victory was assured—at least for the following four decades—and maps played an important part. Klaproth's paper Tsangpo, although aesthetically appealing, admitted uncertainty as its blue-tinted channel gave way to an uncoloured double-track of dashed lines where the Qing-Jesuit data stopped in the eastern Tibetan plateau (figure 7). Wilcox's reduction of 'Klaproth's river' to a frail line that petered out without joining a major river channel, let alone reaching the Bay of Bengal, exploited this hesitation while admitting no equivalent visual indeterminacy in his own Tsangpo.

[INSERT FIGURE 7 NEAR HERE. LEGEND: Figure 7. Detail of Julius von Klaproth, 'Carte du cours inférieur du Yarou Dzangbo Tchou' (1828). Source: *Magasin Asiatique*, vol. 1, 1825-6, facing p. 304. © British Library Board.]

This phase of finding the river was not defined by knowledge 'circulating' through a complete spatial circuit or 'flowing' consistently through already extant channels. Like the apparently unruly and fragmented river system they represented, texts and maps travelled various courses, and information gushed for brief periods before ebbing. Just as the substance of scientific dispute was a torrent of invective unleashed by the shifting terrains of colonial geopolitics and scholarly publications, so the stilling of the waters in the 1830s constituted discovery.

Data deluges

⁶⁷ Henry Yule, in J. E. Sandeman, 'The River Irawadi and its Sources', *Proceedings of the Royal Geographical Society and Monthly Record of Geography*, vol. 4, no. 5, 1882, pp. 257-73, here pp. 269-70.

Through the middle decades of the nineteenth century, the Tsangpo-Brahmaputra rose and fell with monsoon rains and Himalayan meltwater, subtly reshaping its own course through mountains and valleys. For institutions of British imperial geography, though, it remained a static object as established in the late 1820s and early 1830s. The imagined fixity of the Tsangpo-Brahmaputra was mostly passive rather than active, constituted by the absence of discussion rather than rehearsals of its upper course in print or on boats. An important factor in stabilizing discovery during this period was colonial Assam's tea industry, which rapidly advanced during the middle decades of the nineteenth century thanks to water from the Brahmaputra's feeders, leading to rapid demographic and ecological changes. The plantation economy shifted hydrological focus away from the mountain streams that fed the Brahmaputra and towards the watercourses in the valley that were harnessed to European capital.⁶⁸ The river's main channel in lowland Assam became less mysterious and foreboding to the British as traffic increased, banks were stabilized, and ever more of the 'jungle' that had cloaked its floodplains was destroyed to make way for tea 'gardens'.⁶⁹

The most significant challenge to the assumption of the river's stability prior to the late 1860s came from an alternative framing of the Brahmaputra as an unusually capricious geological agent, bearing sufficient power to spill over the divide between temporalities of natural and human history.⁷⁰ In a 1863 paper to the Geological Society

⁶⁸ Saikia, *Unquiet*, pp. 101-4.

⁶⁹ Jayeeta Sharma, *Empire's Garden: Assam and the Making of India* (Durham, NC: Duke University Press, 2011), pp. 25-48.

⁷⁰ On the interplay between natural historical and human historical temporalities, see Dipesh Chakrabarty, 'Anthropocene Time', *History and Theory*, vol. 57, no. 1, 2018, pp. 5-32. On geology,

of London, the Bengal-based indigo planter James Fergusson conceptualized and depicted (figure 8) the ‘young and active, and roaming’ lower Brahmaputra as conducting an ongoing ‘invasion of Gangetic territory’.⁷¹ The lexicon of intentionality and sovereign power persisted as colonial geologists’ focus on the Brahmaputra migrated upstream over subsequent decades. It reappeared early in the twentieth century in the conjecture that the Tsangpo had ‘until quite recent times’ streamed westwards across the Tibetan Plateau, before being ‘beheaded’ and having its flow reversed by the Dihang.⁷²

[INSERT FIGURE 8 NEAR HERE. LEGEND: Figure 8. James Fergusson, ‘Map of the Rivers of Bengal’ (1863). Source: *Quarterly Journal of the Geological Society of London*, vol. 19, 1863, facing p. 321. Reproduced by kind permission of the Syndics of Cambridge University Library.]

Although British geographers largely overlooked geologists’ addition of a temporal dimension to the Brahmaputra’s instability, a deluge of data and debates from

water, and temporality in colonial India, see Pratik Chakrabarti, *Inscriptions of Nature: Geology and the Naturalization of Antiquity* (Baltimore: Johns Hopkins University Press, 2020).

⁷¹ James Fergusson, ‘On Recent Changes in the Delta of the Ganges’, *Quarterly Journal of the Geological Society of London*, vol. 19, 1863, pp. 321-54, here p. 334. On Fergusson’s riverine geology as generative of colonial law as well as science, see Debjani Bhattacharyya, ‘A River Is Not a Pendulum: Sediments of Science in the World of Tides’, *Isis*, vol. 112, no. 1 (2021), pp. 141-9, here pp. 141-2.

⁷² T. H. D. La Touche, ‘Relics of the Great Ice Age in the Plains of Northern India’, *The Geological Magazine*, vol. 7, no. 5, 1910, pp. 193-201, here pp. 199-201; S. G. Burrard and H. H. Hayden, *A Sketch of the Geography and Geology of the Himalayan Mountains and Tibet* (Calcutta: Government Printing, 1907), pp. 155-6.

the late 1870s rendered their own version of the river a little less discovered than it had been for the preceding fifty years. This was a tumultuous phase of British economic and military adventuring. The geographical debates of the 1820s related to annexations and strategic concerns east of Bengal; those of the later period intertwined with commercial and territorial expansion to the north of India and Burma. Growing security concerns for British India's highly profitable tea frontier in Assam prompted the dispatch of survey parties to the region in the 1860s and 1870s.⁷³ Instead of the narrow field of vision of the route surveys of Wilcox and his colleagues in the 1820s, these larger trigonometrical surveys took long-range theodolite sightings from prominent hilltops.⁷⁴ This alternative visual technology allowed for renewed doubts about the Tsangpo-Brahmaputra connection. 'After looking north into the mountain region from the two highest peaks', the senior surveyor was 'impressed with this idea' that the Subansiri, not the Dihang further to the east, connected the Tsangpo to the Brahmaputra.⁷⁵

Dismissing river discharge data obtained fifty years earlier as unreliable, surveyors of the 1870s conducted their own flow measurements of the Brahmaputra's four major northern feeders.⁷⁶ As with many other attempts to know capricious and changeable

⁷³ Thomas Simpson, "'Clean out of the map": knowing and doubting space at India's high imperial frontiers', *History of Science*, vol. 55, no. 1, 2017, pp. 3-36, here p. 18.

⁷⁴ On distinctions between traverse and trigonometrical surveying, see D. Graham Burnett, *Masters of All They Surveyed: Exploration, Geography, and a British El Dorado* (Chicago: University of Chicago Press, 2000).

⁷⁵ H. H. Godwin-Austen, 'On the Lower Course of the Brahmaputra or Tsanpo', *Report of the British Association for the Advancement of Science*, vol. 47, 1877, p.144.

⁷⁶ J. T. Walker, *General report on the Operations of the Survey of India during 1877-78* (Calcutta: Survey of India, 1879), p. 16.

bodies of water, these men found that attempts to achieve precision quickly gave way to efforts merely to ‘estimate truth’.⁷⁷ Their supposedly authoritative devices for measuring stream velocity failed to survive either the journey to, or riverine conditions in, Assam. Instead, they had to resort to a hastily assembled instrumental repertoire including Assamese canoes and wooden discs and tin tubes topped with cotton wool (figures 9.1 and 9.2).⁷⁸ After adjusting the measurements on the basis of nearby residents’ information on the rivers’ annual fluctuations and then feeding the data into an avowedly ‘clumsy’ mathematical formula,⁷⁹ the surveyors pronounced the Dihang’s discharge to be approximately triple that of the Subansiri.⁸⁰ On this basis they ruled out the possibility that the latter was the continuation of Tibet’s Tsangpo. However, the Surveyor-General of India John Walker was concerned that surveyors had not travelled far into the uplands owing to fears of violence with local inhabitants and claimed that these streams of numbers did not establish discovery.⁸¹ What he termed the ‘main question’ of whether the Tsangpo entered the Irrawaddy or the Brahmaputra remained unresolved in the absence of a full survey of the river course.⁸²

⁷⁷ Giacomo Parrinello, Etienne S. Benson, and Wilko Graf von Hardenberg, ‘Estimated truths: water, science, and the politics of approximation’, *Journal of Historical Geography*, vol. 68, 2020, pp. 3-10.

⁷⁸ H. J. Harman, ‘On the Operations for obtaining the Discharges of the large Rivers in Upper Assam, during Season 1877-78’, *Journal of the Asiatic Society of Bengal*, vol. 48, no. 2, 1879, pp. 4-36, here pp. 5-6.

⁷⁹ *Ibid.*, p. 8.

⁸⁰ *Ibid.*, pp. 16-17.

⁸¹ National Archives of India, New Delhi, Foreign Department, Political Consultations A, December 1877, Nos. 270-285.

⁸² Walker, *General report 1877-78*, p. 17.

[INSERT FIGURES 9.1 and 9.2 NEAR HERE. LEGEND: Figures 9.1 and 9.2. H. J. Harman, sketches of instruments used to measure stream velocity (1879). Source: *Journal of the Asiatic Society of Bengal*, vol. 48, no. 2, 1879, p. 6. Reproduced by kind permission of the Syndics of Cambridge University Library.]

As surveyors in Assam worked on discharge measurements, another version of questioning and rediscovering the river was underway in southern Burma. A mid-ranking government hydraulic engineer working on embankment projects in the Irrawaddy delta, Robert Gordon, produced a lengthy report in 1879.⁸³ His core contention appeared on the opening page: ‘the Irrawaddy is continuous with the Sanpo of Thibet’.⁸⁴ Gordon drew extensively on accounts of British traders and soldiers who had sought during the preceding two decades to extract teak, minerals, and metals from Upper Burma and tap commercial routes into southwestern China.⁸⁵ T. T. Cooper, one of the most prominent of these trade advocates used ‘Chinese maps’ to argue for the identity of the Tsangpo and the Irrawaddy, and thereby to naturalize the flow of goods

⁸³ R. Gordon, *Report on the Irrawaddy River* (Rangoon: P.W. Secretariat Press, 1879). On the publication of Gordon’s 1879 report, see Sandeman, ‘River Irawadi’, p. 257.

⁸⁴ Gordon, *Report*, part I, p. 1.

⁸⁵ Clement Williams, *Through Burmah to Western China* (Edinburgh: William Blackwood, 1868); T. T. Cooper, *Travels of a Pioneer of Commerce in Pigtail and Petticoats: or, an Overland Journey from China towards India* (London: John Murray, 1871), p. 411; J. Coryton, ‘Trade Routes between British Burmah and Western China’, *Proceedings of the Royal Geographical Society of London*, vol. 19, no. 4, 1874-75, pp. 264-91; John Anderson, *Mandalay to Momein: A narrative of the two expeditions to western China of 1868 and 1875* (London: Macmillan, 1876); E. B. Sladen, ‘Burma: Exploration via the Irrawaddy and Bhamo to South-Western China’, *Proceedings of the Royal Geographical Society*, vol. 15, no. 5, 1870-71, pp. 343-64.

from the continental interior to the Bay of Bengal (figure 10).⁸⁶ Gordon emphasized that Cooper and ‘all who have visited the upper part of the Irrawaddy’ had experienced ‘astonishment’ at the river’s size and lack of tributaries.⁸⁷ This evidence corroborated Gordon’s own engagement with the floods and erosive power of the lower Irrawaddy. From his vantage points by, on, and sometimes in the river, the Irrawaddy’s vastness was striking, evoking a distant source. This echoed Rennell’s experience of the Brahmaputra a century earlier: witnessed in person, Himalayan rivers appeared to many British observers so gigantic and potent that they must emanate from deep in the heart of the continent. In such cases, what Johannes Fabian terms ‘ecstatic’ moments in the field precipitated data-intensive discovery claims.⁸⁸

[INSERT FIGURE 10 NEAR HERE. LEGEND: Figure 10. Portion of T. T. Cooper, ‘Map of the head waters of the Kin Char Kiang, Lan Tsan Kiang, Now Kiang, and Great River of Tibet’ (1869). Source: *Proceedings of the Royal Geographical Society of London*, vol. 13, no. 5, 1868-69, facing p. 392. Reproduced by kind permission of the Syndics of Cambridge University Library.]

⁸⁶ ‘Letter from Mr. T. T. Cooper, on the course of the Tsan-po and Irrawaddy and on Tibet’, *Proceedings of the Royal Geographical Society of London*, vol. 13, no. 5, 1868-69, pp. 392-5. On imagined connections through rivers in colonial southern Asia during this period, see Sunil Amrith, *Unruly waters: How mountain rivers and monsoons have shaped South Asia’s history* (London: Allen Lane, 2018), pp. 110-11.

⁸⁷ Gordon, *Report*, part I., p. 10.

⁸⁸ Johannes Fabian, *Out Of Our Minds: Reason and Madness in the Exploration of Central Africa* (Berkeley: University of California Press, 2000), p. 8.

Gordon couched his Tsangpo-Irrawaddy in direct opposition to the Survey of India establishment that sustained and bolstered Rennell's Tsangpo-Brahmaputra. Latching onto the Survey's recent reopening of the Tsangpo question, he contrasted the complex array of feeders into the Brahmaputra in Upper Assam with the simplicity and singularity of the Irrawaddy's main channel. By considering each of the Subansiri, Dihang, Dibang, and Brahmakund as potential connectors of Tsangpo and Brahmaputra, British Indian surveyors had, Gordon charged, confusingly placed 'four Sanpos in the field of conjecture'.⁸⁹ He also foregrounded his hydraulic expertise, proclaiming the accuracy and comprehensiveness of his year-round discharge measurements at various locations on the Irrawaddy relative to the hasty and improvised efforts of surveyors in Assam.⁹⁰ Gordon's floats, flow graphs, and discharge basin maps all arose from Burma's specific version of the colonial efforts across the subcontinent to 'tame' river systems, which became more ambitious and destructive during the middle decades of the nineteenth century.⁹¹ Gordon aimed to master the Irrawaddy's 'yearly inundat[ions]' in the service of 'reclaiming a large tract of fertile ground' for rice cultivation.⁹² At the same time, he was sharply aware of the enormous challenge of making the Irrawaddy fit for colonial purposes, fearing potential 'disaster' and large-scale human suffering if the embankments proved unequal to surging water.⁹³ This acute sense of riverine agency encouraged imaginative leaps northwards, far beyond the gauge dials and earthworks that lay in his quotidian field of

⁸⁹ Gordon, *Report*, part I, p. 51.

⁹⁰ *Ibid.*, pp. 2, 48-9.

⁹¹ *Ibid.*, pp. 39-57; D'Souza, *Drowned*.

⁹² Gordon. *Report*, part III, pp. 1-2.

⁹³ *Ibid.*, p. 6.

view and into what he termed ‘the vexed question of the geography of its upper sources’.⁹⁴ The fraught terraqueous commitments of colonial Burma’s political economy in the 1870s made possible Gordon’s Tsangpo-Irrawaddy just as the fluvial entanglements of the colonial invaders of Assam in the 1820s allowed for the Survey of India’s Tsangpo-Brahmaputra.

These divergent forms of imperial possession and extraction did not, however, wholly determine riverine geographies. In contrast to the Survey of India, Gordon placed his work within a global framework of the latest attempts to comprehend and control large river systems, especially work on the Mississippi by United States Army engineers.⁹⁵ He also deployed a spatial logic that had not been in play among surveyors of the 1820s: watersheds and drainage basins.⁹⁶ This distinct framing of how the Tsangpo question might be answered was also a distinct framing of what a river *is*. The discharge of the river in isolation signified little; the river channel was not the significant object. Instead, the outflow of water had to be considered in tandem with inputs: the area that fed the river and the rainfall that fed that area. Drawing on the rapid increase in data production, accumulation, and processing with the advent of the Indian

⁹⁴ Ibid., pp. 7-8.

⁹⁵ Gordon, *Report*, part I, pp. 3-8; Robert Gordon, ‘The Irawadi River’, *Proceedings of the Royal Geographical Society and Monthly Record of Geography*, vol. 7, no. 5, 1885, pp. 292-331, here pp. 297-300; A. A. Humphries and H. L. Abbot, *Report upon the physics and hydraulics of the Mississippi River* (Washington: Government Printing Office, 1867); Martin Reuss, ‘Andrew A. Humphries and the Development of Hydraulic Engineering: Politics and Technology in the Army Corps of Engineers, 1850-1950’, *Technology and Culture*, vol. 26, no. 1, 1985, pp. 1-33.

⁹⁶ On the development of this logic, see Kyle Gardner, ‘Moving watersheds, borderless maps, and imperial geography in India’s northwestern Himalaya’, *The Historical Journal*, vol. 62, no. 1, 2019, pp. 149-70.

Meteorological Department in 1875,⁹⁷ Gordon conceptualized rivers as complex systems comprising hydrography, climate, and topography. On this basis, he mapped hypothetical drainage basins (figure 11) and extrapolated rainfall measurements (figure 12) that could account for the discharge of the Brahmaputra's tributaries without having them connect to the Tsangpo.

[INSERT FIGURE 11 NEAR HERE. LEGEND: Figure 11. Portion of Robert Gordon, 'Sketch map showing the probable course of the Sanpo of Tibet to the Irawadi of Burma according to native authorities' (1885). Source: *Proceedings of the Royal Geographical Society and Monthly Record of Geography*, vol. 7, no. 5, 1885, facing p. 352. Reproduced by kind permission of the Syndics of Cambridge University Library.]

[INSERT FIGURE 12 NEAR HERE. LEGEND: Figure 12. Robert Gordon, 'Hyetographical map of India' (1879). Source: R. Gordon, *Report on the Irrawaddy River*, part I (Rangoon: P.W. Secretariat Press, 1879), facing p. 76. © British Library Board.]

Although innovative hydrological theories and technologies were integral to his argument, Gordon recognized that discovering the Tsangpo's route entailed winning over geographers rather than irrigation engineers. In turn, this required relating his contentions to older sources—both informational and riverine. Although an increasingly sharp divide between 'armchair' and 'field' geographers was emerging in

⁹⁷ Katherine Anderson, *Predicting the Weather: Victorians and the science of meteorology* (Chicago: University of Chicago Press, 2005), pp. 235-84; Amrith, *Unruly*, pp. 91-112.

London around this time,⁹⁸ incorporating interpretations of past texts and maps alongside first-hand observations remained essential to establishing credibility in colonial South Asia. Gordon cartographically compared the river courses in the eastern Himalaya postulated by each significant past contributor to Tsangpo geography (figure 13). He also sought to rehabilitate Qing Chinese and French Jesuit accounts.⁹⁹ When criticized by key players in British imperial geography (by this stage concentrated at the RGS rather than distributed across various institutions and journals as in the 1820s), Gordon calibrated his contentions with upland communities' toponyms just as Wilcox had.¹⁰⁰ In his paper to the RGS in 1885 Gordon added further information from Alaga, a Burmese man trained by a British surveyor and dispatched to track the upper Irrawaddy.¹⁰¹ The map accompanying the published version of this paper prominently stated that the Tsangpo's course was rendered 'according to native authorities'.¹⁰²

Gordon's marriage of quantification and oral testimony harked back to British attempts to discover the Tsangpo's course in the 1820s. It nevertheless failed to advance his cause among the gatekeepers at the RGS. He was undoubtedly swimming against the stream: the key authority on the subject in the Society and respondent to his paper was John Walker, erstwhile Surveyor-General of India and overseer of the very surveys in 1870s Assam that Gordon critiqued.¹⁰³ Although his key claims failed to gain

⁹⁸ Driver, *Geography Militant*, pp. 47-8; Dritsas, 'Expeditionary Science', p. 255.

⁹⁹ Gordon, *Report*, part I, pp. 25-6. See also 'Letter from T.T. Cooper', pp. 392-3.

¹⁰⁰ R. Gordon, 'The Irawadi and the Sanpo', *Proceedings of the Royal Geographical Society and Monthly Record of Geography*, vol. 4, no. 9, 1882, pp. 559-63, here p. 559.

¹⁰¹ Gordon, 'The Irawadi River', pp. 303-20. On Alaga's training and exploration, see Sandeman, 'River Irawadi', pp. 260-66; Waller, *The Pundits*, pp. 225-6.

¹⁰² Gordon, 'The Irawadi River', pp. 322-3.

¹⁰³ Walker, quoted in *ibid.*, pp. 326-31.

traction, Gordon's intervention altered the framing of the Tsangpo question. His platform at the RGS forced the Survey of India to take discharge basins and climate seriously when they theorized river routes. While hewing to a distinct notion of discovery (as discussed below), Walker felt compelled to make the case that heavy precipitation in Burma caused by 'vast exhalations of moisture' from the Indian Ocean could account for the Irrawaddy's substantial volume.¹⁰⁴

[INSERT FIGURE 13 NEAR HERE. LEGEND: Figure 13: 'Maps illustrating Mr R. Gordon's paper' (1885). Source: *Proceedings of the Royal Geographical Society and Monthly Record of Geography*, vol. 7, no. 5, 1885, facing p. 352. Reproduced by kind permission of the Syndics of Cambridge University Library.]

Gordon also contributed to the Survey of India's reorientation of southern Asia's riverine geography towards the Tibetan plateau. Prohibited from entering Tibet, Europeans' narratives filled a void of reliable information with visions of the region as immensely significant in spiritual, spatial, and ethnographic terms.¹⁰⁵ Like their predecessors' critical uptake of Hindu ideas of the Brahmakund, British imperial agents in the late nineteenth century disparaged Tibet's centrality within some Buddhist cosmologies while retaining the notion that this was an extraordinary space. Gordon's

¹⁰⁴ Walker, quoted in *ibid.*, p. 331.

¹⁰⁵ Peter Bishop, *The Myth of Shangri-La: Tibet, Travel Writing and the Western Creation of Sacred Landscape* (London: The Athlone Press, 1989). Gordon's notion of Tibet as the climatic and riverine hub of southern Asia drew on an analogy with the French biologist Armand de Quatrefages's identification of Tibet as 'the cradle of the human species': Gordon, *Report*, part I, pp. 21-2; A. de Quatrefages, *L'Espèce Humaine* (Paris: Librairie Germer Baillière, 1877), p. 131.

proposal that the orography of Tibet structured the hydrography and climate of central and southern Asia (figure 14), constituting ‘the great permanent centre of the monsoon’, was part of this broader trend.¹⁰⁶ He also contended that ‘the great [Tibetan] plateau itself can be made to yield indications of its [climatic] action by the great rivers issuing from it and entering British territory’.¹⁰⁷ For Gordon, then, the Irrawaddy’s fluctuations spoke of natural processes in Tibet that would otherwise have remained inaudible.

[INSERT FIGURE 14 NEAR HERE. LEGEND: Figure 14. Robert Gordon, ‘Orographical map of Tibet and neighbouring regions’ (1879). Source: R. Gordon, *Report on the Irrawaddy River*, part I (Rangoon: P.W. Secretariat Press, 1879), facing p. 18. © British Library Board.]

Walker understood the capacity of the rivers on the southern side of the Himalayan range to convey information about their upper courses to the north of the range in directly opposing terms to Gordon: they did not communicate nearly enough. He accordingly believed that the answer to the Tsangpo question would come from ‘native explorers’ trained by the Survey of India to glean geographical information in regions of burgeoning imperial rivalry with Russia and China.¹⁰⁸ The journeys of these men beyond British India’s frontiers were even more shrouded in colonial mythmaking than

¹⁰⁶ Gordon, *Report*, part I, p. 60.

¹⁰⁷ *Ibid.*, p. 71

¹⁰⁸ Derek Waller, *The Pundits: British Exploration of Tibet and Central Asia* (Lexington: The University Press of Kentucky, 1990).

most acts of imperial exploration.¹⁰⁹ This is especially the case for Kinthup, the Sikkimese man who undertook an expedition from 1880 to 1884 that focused on the Tsangpo's course through the eastern Himalaya. Kinthup was illiterate and his account of the river was delivered verbally to a Survey of India translator two years after he returned to colonial territory. His transcribed and translated recollections were then refracted again when 'compiled' by a senior British Survey of India official.¹¹⁰ Certain features of this multi-authored account became iconic through subsequent retellings, including in recent public-facing histories.¹¹¹ Particularly celebrated was Kinthup's attempt to float cut logs down the Tsangpo with the intention that they would be collected from the Brahmaputra in Assam, neatly proving by their passage the identity of the two rivers.¹¹² This attempt to use the flow of water to facilitate the flow of geographical information failed: the logs were not picked up.¹¹³ However, the information that Kinthup provided to the Survey of India in 1886 bolstered the theory

¹⁰⁹ On mythmaking and exploration, see Keighren, Withers, and Bell, *Travels*; Dane Kennedy, *The Last Blank Spaces: Exploring Africa and Australia* (Cambridge, MA: Harvard University Press, 2013), pp. 233-60; Fabian, *Out Of Our Minds*, pp. 240-70.

¹¹⁰ G. Strahan, *Report on the Explorations of Lama Serap Gyatsho, 1856-68, Explorer K—P., 1880-84, Lama U.G., 1883, Explorer R.N., 1885-86, Explorer P.A., 1885-86, in Sikkim, Bhutan, and Tibet* (Dehra Dun: Trigonometrical Survey, 1889), p. 3.

¹¹¹ For example, Charles Allen, *A Mountain in Tibet: The Search for Mount Kailas and the Sources of the Great Rivers of India* (London: Abacus, 2003 [1982]), pp. 150-54.

¹¹² 'K.P's Narrative of a Journey from Darjeeling to Gyala Sindong, Tsari, and the Lower Tsangpo. Translated by Norpu', in Strahan, *Report*, pp. 7-17, here pp. 11-16.

¹¹³ F. M. Bailey, *China – Tibet – Assam: A Journey, 1911* (London: Jonathan Cape, 1945), pp. 10-13

that the Dihang connected the river of the Tibetan plateau with that in the Assam valley (figure 15).¹¹⁴

[INSERT FIGURE 15 NEAR HERE. LEGEND: Figure 15. Survey of India, 'Sketch map to illustrate Colonel Tanner's memorandum on the course of the Sangpo from information supplied by K. P. in 1886-87' (1887). Source: G. Strahan, *Report on the Explorations of Lama Serap Gyatsho, 1856-68, Explorer K—P., 1880-84, Lama U.G., 1883, Explorer R.N., 1885-86, Explorer P.A., 1885-86, in Sikkim, Bhutan, and Tibet* (Dehra Dun: Trigonometrical Survey, 1889), inside back cover. © British Library Board.]

Among leading figures and institutions of British imperial geography, doubts persisted about Kinthup's trustworthiness on account of his race, limited training, and lack of records rendered in the field. As late as 1913, the President of the RGS opined that Kinthup's 'character for veracity still lies in the womb of the future'.¹¹⁵ The Tibetan government's violent reprisals when it learned in the late 1880s that some of its subjects had assisted British India's 'native explorers' led the Survey of India to stop its programme of clandestine journeys into Tibet.¹¹⁶ Against this backdrop, the written and visual products of Kinthup's travels were not a means of closure but instead opened

¹¹⁴ H. R. Thullier, *General Report on the Operations of the Survey of India During 1888-89* (Calcutta: Government Press, 1890), p. 71.

¹¹⁵ George Curzon, quoted in A. Bentinck, 'The Abor Expedition: Geographical Results', *The Geographical Journal*, vol. 41, no. 2, 1913, pp. 97-113, here p. 113.

¹¹⁶ Clare E. Harris, *The Museum on the Roof of the World: Art, Politics, and the Representation of Tibet* (Chicago: University of Chicago Press, 2012), p. 97.

a new Tsangpo question. The narrative of his journey stated that around the point that the river enters the Himalayan range it ‘falls over a cliff called Sinji-Chogyal from a height of about 150 feet. There is a big lake at the foot of the falls where rainbows are always observable’.¹¹⁷ Appearing in the map as ‘Falls of the Sangpo’, this feature became a point of intense focus for imperial surveyors and geographers over the subsequent decades, as discussed in the next section. Having once again washed away the Tsangpo-Irrawaddy from the high places of British imperial geography, the deluge of information and conjectures on the Tsangpo during the 1870s and 1880s abruptly slowed to an intermittent trickle. In its wake the Tsangpo-Brahmaputra remained less than fully discovered.

Maintaining mystery

Tsangpo theories during 1870s and 1880s invoked different rivers to those in the 1820s, replacing fluvial channels with a complex hydrological system. Over the following decades, another new object of discovery came into focus. Like in previous iterations of the Tsangpo question, this version lay at the confluence of debates over what counted as geographical knowledge, new horizons of British colonial expansion, and input from specific Asian cosmologies. During the decades either side of the turn of the twentieth century, geography as an exploratory endeavour had become a victim of its own supposed success. ‘Geography triumphant’, as Joseph Conrad termed the era in which the major features of the earth’s surface had been established, was a time of anxiety as

¹¹⁷ ‘K.P.’s Narrative’, p. 11.

much as of celebration.¹¹⁸ Discovering the Tsangpo was bound up with the desire among many involved in British imperial geography for exploration to retain its capacity for substantial breakthroughs. Europeans counted Tibet among the world's last places of 'mystery'—ripe for, but resistant to, knowledge gathering.¹¹⁹ The British invasion of Tibet in 1903-4 precipitated a flood of objects and information, which, along with the tumult induced by Chinese expansion into eastern Tibet over the following decade, set the stage for a revised version of riverine discovery.¹²⁰

The older question of whether the Tsangpo joined the Brahmaputra resurfaced occasionally after the turn of the twentieth century. Important here was that would-be contributors to the hydrography of frontier India and Burma still felt that their objects of study were unusually capricious. Like predecessors from Rennell to Gordon, the surveyor L. A. Bethell found that encountering rivers in person could swamp expectations generated by paper rivers in previously consulted texts and maps. Whilst with the Tibet invasion party in 1903, Bethell 'got to know the river [Tsangpo] rather well' and was 'struck' by the fact that 'it was a very big river indeed, and wherever it came out in India it must be a thing well worth looking at'.¹²¹ His subsequent experience of the Dihang in northern Assam fell short of his anticipation to such an extent that he refused to believe it linked the Tsangpo and Brahmaputra. Bethell's justification of these doubts intermingled the quantitative logic of hydrological systems

¹¹⁸ Joseph Conrad, 'Geography and Some Explorers', *National Geographic Magazine*, vol. 45, no. 3, 1924, pp. 241-74. See also Driver, *Geography Militant*.

¹¹⁹ Thomas Holdich, *Tibet, The Mysterious* (London: Alston Rivers, 1904); Laurence Waddell, *Lhasa and Its Mysteries: With a record of the expedition of 1903-1904* (London: John Murray, 1905).

¹²⁰ Harris, *Museum*, pp. 17-78; Bishop, *Myth*, pp. 136-90.

¹²¹ L. A. Bethell, quoted in Bentinck, 'Abor Expedition', p. 111.

and claims of extraordinary fluvial agency: ‘Rivers do marvellous things in that part of the world. They twist and screw themselves between barriers into unexpected places’.¹²² In keeping with ‘geography triumphant’ more broadly, Bethell also saw value in overturning an established discovery. ‘If the Dihong and the Tsang-po are not one,’ he told the RGS, ‘then it remains to us to find out where the Tsang-po does go to. That is a problem worth having in these days when unsolved geographical questions are rare’.¹²³

Like Gordon thirty years earlier, Bethell received short shrift from the gatekeepers of imperial geography. They had by this stage largely turned towards the new Tsangpo question. During the interstitial period between the route surveys of ‘native explorers’ in the 1880s and the invasion of 1903-4, various agents of empire continued to seek corroborating evidence of Kintup’s falls. Tibetan traders and monks in and around the colonial hill station of Darjeeling were central to this knowledge-gathering effort.¹²⁴ This new channel of information through Sikkim combined with the new object of riverine discovery—an extraordinary topographical feature rather than an entire hydrological system—to allow Tibetan images and texts a role in British geographical debates. Among this new evidence was a sketch by a man who resided in the vicinity

¹²² Ibid., p. 112.

¹²³ Ibid.

¹²⁴ Emma Martin, ‘Translating Tibet in the Borderlands: Networks, Dictionaries, and Knowledge Production in Himalayan Hill Stations’, *The Journal of Transcultural Studies*, vol. 1, 2016, pp. 86-120.

of the falls (figure 16), collected (and probably commissioned) by Darjeeling-based surgeon Laurence Waddell.¹²⁵

[INSERT FIGURE 16 NEAR HERE. LEGEND: Figure 16. Anon., ‘Falls of the Tsang-po (San-Pu)’ (1895). Source: *The Geographical Journal*, vol. 5, no. 3, 1895, p. 259. Reproduced by kind permission of the Syndics of Cambridge University Library.]

Waddell positioned the image as pertinent both to imperial geography and to his vitriolic critique of Tibetan Buddhism as analogous to Catholicism in the venality of its monastic elite.¹²⁶ Forwarding it to the RGS in 1895, he parsed the depiction of a divine figure in the rock behind the falls as representing the tyranny and opportunism of ‘local Lamas’, who told ‘awestruck pilgrims’ that the carving was ‘a king-devil’ that they had ‘placed under a spell’.¹²⁷ As discussed below, British imperial personnel with a less sceptical attitude towards Tibetan Buddhism soon produced alternatives to this fundamentally inaccurate reading of the falls’ spiritual significance. Even those British geographers who considered the Tibetan sketch and Kinthup’s narrative to be valid contributions to discussions of the Tsangpo tended to believe that true discovery of the falls required in-situ visual verification by a European. They perceived that seeking this

¹²⁵ L. A. Waddell, ‘The Falls of the Tsang-po (San-Pu), and Identity of that River with the Brahmaputra’, *The Geographical Journal*, vol. 5, no. 3, 1895, pp. 258-260. The sketch was reprinted in Waddell, *Lhasa*, pp. 437-8.

¹²⁶ On Waddell’s criticism of Tibetan Buddhism see Donald S. Lopez Jr., “‘Lamaism’ and the Disappearance of Tibet”, *Comparative Studies in Society and History*, vol. 38, no. 1, 1996, pp. 3-25, here pp. 13-22.

¹²⁷ Waddell, ‘Falls’, p. 258.

single sublime view had the advantage of extending ‘heroic’ geography into the twentieth century. In this vein, the retired British Indian frontier surveyor and later President of the RGS Thomas Holdich proclaimed in 1913 that ‘we may congratulate ourselves that there is at least one little corner in this far-off north-east frontier of ours about which a little mystery still hangs, for surely the unexplored portions of the globe now are getting all too narrow for our practical explorers’.¹²⁸

While geographical discovery was strictly defined along racial lines in London lecture theatres, practices in Asian borderlands were more complex. Tibetan modes of spatial configuration and discovery provided a crucial basis for British exploration in the eastern Himalaya during the 1910s and 1920s. In 1913 two officers in the Indian Army, Frederick Bailey and Henry Morshead, split off from a military party surveying the Dibang tributary of the Brahmaputra. They headed for Mipi, a village on the Dibang’s upper reaches inhabited by Tibetan and Bhutanese communities.¹²⁹ These migrants had established themselves in Mipi as it lay in the region of Pemakö, a beyul (hidden land) ordained as a place of refuge by Guru Rinpoche, the originator of Tibetan Buddhism in the eighth century CE.¹³⁰ The spatial logic of the beyul configured

¹²⁸ Holdich, quoted in Bentinck, ‘Abor Expedition’, p. 113.

¹²⁹ G. A. Nevill, *Report on the Dibong Survey and Exploration Expedition* (Shillong: Assam Secretariat, 1913), p.7.

¹³⁰ Kerstin Grothmann, ‘Population History and Identity in the Hidden Land of Pemakö’, *Journal of Bhutan Studies*, vol. 26, 2012 pp. 21-52; Hamid Sardar-Afkhami, ‘An account of Padma-bkod: A hidden land in southeastern Tibet’, *Kailash*, vol. 18, no. 3, 1996, pp. 1-21; Elizabeth McDougal, ‘The Shapeshifting Goddess: The Consecration of Padma bkod’s Yang Sang Chu Region by the 20th-Century *gter ston*, Bdud ‘joms drag sngags gling pa’, in Frances Garrett, Elizabeth McDougal, and Geoffrey Samuel (eds.), *Hidden Lands in Himalayan Myth and History: Transformations of sbas yul through time* (Leiden: Brill, 2020), pp. 207-26.

Pemakö as the terrestrial body of the goddess Vajravārāhī. Topographical features corresponded to the deity's bodily features or cakras: the Tsangpo was her spine, while her womb—Pemakö's inner, most secret sanctuary—lay in forest-clad mountains south of the Tsangpo gorge.¹³¹ As well as fleeing Qing imperial expansion into eastern Tibet during the preceding decades, some residents of Mipi were also actively engaged in 'opening' Vajravārāhī's cakras.¹³² Their tantric Buddhist version of spatial discovery became a vital element in colonial attempts to know the Tsangpo-Brahmaputra.

Having resided in Tibet as a trade agent following the 1903 British invasion, Bailey took a considerably more sympathetic approach to Tibetan Buddhism than Waddell. Before venturing into Pemakö, he read the first European book on the region (published only a year before),¹³³ so already understood it as 'a sort of "Promised Land"'.¹³⁴ Buddhists in Mipi were critical to Bailey's exploration, constituting, he later recalled, 'my chance of getting through to Tibet from the Assamese side'.¹³⁵ Bailey's month-long stay in the village fulfilled his expectations. He relied on the village's Tibetan headman Gyamtso (figure 17) for information, letters of recommendation to local potentates, and the recruitment of three guides, including a hunter and a monk, and ten porters for the journey northwards to the area of the falls.¹³⁶ The monks of Mipi monastery, established as part of the 'opening' of the beyul of Pemakö, performed what

¹³¹ Sardar-Afkhami, 'Padma-bkod', pp.2-5; McDougal, 'Shapeshifting', pp. 208-9.

¹³² Geoffrey Samuel, 'Hidden Lands of Tibet in Myth and History', in Garrett, McDougal, and Samuel (eds.), *Hidden Lands*, pp. 51-91, here pp. 70-74.

¹³³ Jacques Bacot, *Le Tibet Révolté: Vers Nepemakö, La Terre Promise des Tibétains* (Paris: Hachette, 1912).

¹³⁴ F. M. Bailey, *No Passport to Tibet* (London: Rupert Hart Davis, 1957), p. 35.

¹³⁵ Bailey, *No Passport*, p. 38.

¹³⁶ Bailey, *No Passport*, pp. 45-6; Bailey Collection, British Library, MSS Eur F157/208, f. 9.

Bailey termed a ‘special service’ to ensure the party’s safe passage as it started along a route previously used by Tibetan migrants.¹³⁷ Gyamtso’s knowledge of the region, Bailey recounted, ‘provided an excellent justification for the exploration ... [because] I was not going to launch into the blue, but merely to follow certain routes which I had already outlined’.¹³⁸ Far from suggesting that he was venturing into *terra incognita*, then, Bailey actively acknowledged that he followed established paths through the beyul. Gyamtso also provided Bailey with the first indication that the Tsangpo’s turn southwards in the region of the falls was not an abrupt right angle as the Survey of India’s rendering of Kinthup’s information had it, but an extended, looping bend during which the river cut a deep gorge between high mountains.¹³⁹ Bailey hastily rendered a sketch map based on this information before leaving Mipi (figure 18), rightly considering it an improvement on the Survey’s depiction of the area.¹⁴⁰

[INSERT FIGURE 17 NEAR HERE. LEGEND: Figure 17. Frederick Bailey, ‘Gyamtso—Headman of Tibetans at Mipi’ (1913). Source: British Library, Photo 1083/36(45). © British Library Board.]

[INSERT FIGURE 18 NEAR HERE. LEGEND: Figure 18. Frederick Bailey, ‘Sketch map [illegible] routes in the lower Tsangpo valley’ (1913). Source: British Library, MSS Eur F157/443. © British Library Board.]

¹³⁷ MSS Eur F157/208, ff. 9-10.

¹³⁸ Bailey, *No Passport*, pp. 38-9.

¹³⁹ Nevill, *Report*, appendix B, p. 23.

¹⁴⁰ The map places Gyala Peri south of the Tsangpo’s bend, an error Bailey corrected later in the trip, suggesting that he rendered it in Mipi.

Tibetan Buddhist geography structured Bailey and Morshead's entire itinerary, linking villages and monasteries constructed by émigrés engaged in opening the beyul.¹⁴¹ Bailey was both aware and content that this was the case. 'The idea never occurred to us,' he later wrote, 'that any expedition should be routed and highly organized. There was so much to discover that once we left Mipi wherever we went and whatever we saw was important'.¹⁴² He and Morshead relied on cross-referencing the numerical survey data they generated with Pemakö's narrative and orally recounted topography. Their ability to navigate and map the region rested on sightings of Gyala Peri and Namcha Barwa, the enormous mountains flanking the Tsangpo gorge, by their Tibetan collaborators, who, Bailey noted, 'supposed them to be the breasts of [Vajravārāhī]'.¹⁴³

Tibetan and British knowledge became further entangled as the party approached the Tsangpo gorge. Bailey had already heard hints that the falls were not the 150-foot marvels reported in Kinthup's Survey of India narrative: 'an old man who knew something of the Falls' claimed 'the river fell about 30 feet (he said twice the height of a walnut tree which was near the house)'.¹⁴⁴ Upon reaching the gorge, Bailey and Morshead confirmed that the falls were in a small tributary rather than the main stream of the Tsangpo. Contrary to Waddell's pejorative description, the carving behind the torrent was of Shinje Chogyal, the lord of the Underworld, marking a gateway for

¹⁴¹ Bailey, *No Passport*, pp. 73-5.

¹⁴² *Ibid.*, p. 103.

¹⁴³ MSS Eur F157/208, p. 27. On the development of this notion among Tibetan Buddhists, see McDougal, 'Shapeshifting', p. 208.

¹⁴⁴ Nevill, *Report*, appendix B, p. 23; MSS Eur F157/208, f. 25.

travellers into Pemakö.¹⁴⁵ The gigantic falls fantasized in RGS lecture theatres were, then, an excessively literal translation of the feature's significance within the beyul into the aesthetics of exploration-based geography. Bailey and Morshead's subsequent journey into the inner sanctum of the gorge, which, Bailey thought, 'might perhaps conceal a fall rivalling the Niagara or Victoria Falls in grandeur',¹⁴⁶ relied wholly on devotional infrastructure. They used the pilgrim path along the river's right bank skirting Namcha Barwa, obtaining guides and porters by threatening violent punishments in order to tap into 'ula', a form of labour demand developed to aid Buddhist travellers.¹⁴⁷ Bailey also benefitted from a chance encounter with a monk on pilgrimage from Pemakö to Lhasa proceeding in the opposite direction, using the path the monk's retinue had cut through thick foliage on steep slopes to progress eastward deeper into the gorge.¹⁴⁸

Although they left approximately 45 miles of the Tsangpo unexplored, Bailey and Morshead photographed falls 30 feet high in the main stream of the river and reported the vast scale of the gorge. These 'discoveries' were premised not on the region's pristine isolation, but its deep incorporation into Buddhist cosmology. British knowledge of the gorge ran along channels carved by Tibetan conceptions of beyul space. In addition, the material and human infrastructures of pilgrimage provided the

¹⁴⁵ Ian Baker, *The Heart of the World: A Journey to Tibet's Lost Paradise* (New York: Penguin, 2004), pp. 108-9; F. M. Bailey, *Report on an Exploration on the North-East Frontier 1913* (Simla: Government Monotype Press, 1914), p. 7.

¹⁴⁶ Bailey, *No Passport*, p. 131.

¹⁴⁷ *Ibid.*, p. 149; MSS Eur F157/208, f. 105.

¹⁴⁸ Bailey, *No Passport*, pp. 123-49; H. T. Morshead, *Reports on an Exploration on the North-East Frontier 1913* (Dehra Dun: Trigonometrical Survey, 1914), p. 4.

crucial first stage in the winding and laborious passage of information into representations—maps (figure 19), photographic prints, numerical data, and texts—that the surveying establishment in India and major scientific societies of Europe and North America considered sufficiently authoritative to declare that the river had been found. Bailey’s receipt of the RGS’s Gold Medal in 1916 provided official closure to the discovery of the Tsangpo.

[INSERT FIGURE 19 NEAR HERE. LEGEND: Figure 19. Portion of Survey of India, ‘Part of North-Eastern Frontier and Tibet’ including ‘Pomokochung Falls’ (1914). Source: *The Geographical Journal*, vol. 44, no. 4, 1914, facing p. 360. Reproduced by kind permission of the Syndics of Cambridge University Library.]

What did discovery mean to the main players in this episode of British imperial geography? Bailey was insistent that he had merely verified Kinthup’s work.¹⁴⁹ Moving through Pemakö, he meticulously calibrated his own observations and Tibetan oral testimony with Kinthup’s information.¹⁵⁰ After returning to British India and seeking out Kinthup in Sikkim, Bailey was satisfied that the notion of a large waterfall in the course of the Tsangpo was a translation error rather than Kinthup’s fabrication.¹⁵¹ Responses to Bailey’s paper to the RGS in June 1914 detailing his survey were in keeping with the broader ambivalence of ‘geography triumphant’. Discovery was an anticlimax. The President of the Society glumly opined that ‘travel tends to dispel romance’, in this case by disproving in narrative and photographic forms ‘the legend of

¹⁴⁹ Ibid., p. 342; Bailey, *China*, p. 14.

¹⁵⁰ Bailey, *Report*, pp. 40-42; MSS Eur F157/208, ff. 42, 105; Nevill, *Report*, appendix B, p. 25.

¹⁵¹ Bailey, *No Passport*, pp. 279-80.

an enormous waterfall clouded in rainbow haze'.¹⁵² An attempt to reinstate an element of this sublime fiction can be discerned in a dispute between Bailey and the editors of the Society's *Journal* over a photograph in the published version of his paper (figure 20). After seeing the draft version of the article, Bailey complained about the excision of the bottom portion of this image showing 'the part of the river clean of spray [i.e., below the falls, which] gives a much better idea of it'. The editors seemingly ignored Bailey's request to reinstate the complete photograph—a particular instance, perhaps, of the desire to hint at a grander vista and thereby leave discovery incomplete.¹⁵³

[INSERT FIGURE 20 NEAR HERE. LEGEND: Figure 20. Frederick Bailey, 'Kinthup's falls from 100 feet above' (1913). Source: *The Geographical Journal*, vol. 44, no. 4, 1914, facing p. 357. Reproduced by kind permission of the Syndics of Cambridge University Library.]

Conclusion: the river mutable

Although most imperial surveyors and geographers understood Bailey and Morshead's journey to have answered the Tsangpo questions for good, alternative renderings of discovery persisted. In 1924, the theosophist Talbot Mundy set the denouement of a serialized novel in the improbably well-appointed residence of an enigmatic 'Lama'. In a bastardized version of the beyul's assimilation of the topographic and anatomical, the building overlooks the Tsangpo as it 'tumbled down a precipice between two outflung

¹⁵² Douglas Freshfield, quoted in Bailey, 'Exploration', p. 360

¹⁵³ Royal Geographical Society archive, London, CB8/8, Bailey letters 1911-1914: Bailey to Keltie, 11 August 1914.

spurs that looked like the legs of a seated giant ... the rising spray form[ing] a dazzling rainbow, and where, below the falls, the Tsang-po became the Brahmaputra'.¹⁵⁴

Mundy's idiosyncratic contribution may not have registered with institutions of imperial geography, but a journey undertaken to Pemakö by botanical collector Francis Kingdon Ward the same year did. Venturing into the portion of the gorge unexplored by Bailey and Morshead, Kingdon Ward also relied on the paths, way stations, and knowledge structures of Buddhist pilgrimage. Guided by a monk who had previously been on a journeyed through the gorge into Pemakö, he encountered a 40-foot cascade further downriver than Bailey had been able to reach; but this, he admitted, 'wasn't ... *the* falls, meaning the falls of romance, those "Falls of the Brahmaputra" which have been the goal of so many explorers'.¹⁵⁵ Kingdon Ward and his guide were unable to follow the Tsangpo through the entire length of the gorge. He instead drew on oral testimony from hunters along with information he was told existed in 'certain sacred books kept in the monastery' to assert that there were no large falls on the river's main channel.¹⁵⁶ Key figures at the RGS were convinced that, in Francis Younghusband's words, 'we now have in detail, from one end to the other, the whole history of the Tsangpo'.¹⁵⁷ Once again, European geographical discovery crucially relied on Tibetan infrastructure and information.

¹⁵⁴ Talbot Mundy, *OM*, 2nd ed. (London: Hutchinson, n.d. [1924]), p. 305.

¹⁵⁵ F. Kingdon Ward, *The Riddle of the Tsangpo Gorges* (London: Edward Arnold, 1926), pp. 197, 219-20.

¹⁵⁶ Kingdon Ward, *Riddle*, pp. 244-5; F. Kingdon Ward, 'Explorations in South-Eastern Tibet', *The Geographical Journal*, vol. 67, no. 2, 1926, pp. 97-123, here pp. 116-17

¹⁵⁷ Younghusband, quoted in Kingdon Ward, 'Explorations', p. 121.

The restless earth and ever-changing flows of water from monsoon skies and along fluvial channels ensures that discovery in terraqueous southern Asia remained and remains ongoing. Narrating his journey to Pemakö, Kingdon Ward floated the notion that geological and riverine agency undermined the idea of fixed geographical discovery. He recounted a local prophecy that ‘Namcha Barwa will one day fall into the Tsangpo gorge and block the river’ and aligned it with insights from geology and hydrology to conclude that topographic ‘features are always changing, they are never stationary ... there is no stability, no finality’.¹⁵⁸ A quarter of a century later, Kingdon-Ward (having hyphenated his surnames in the meantime) came to experience at close quarters what he had predicted through this amalgam of Buddhist and Western scientific logics. He was in the borderlands between Tibet and newly independent India in 1950 when a huge earthquake shook the Brahmakund into a new form, shifted river channels, and prompted fears that Upper Assam might, in his words, ‘be converted into a vast swamp, or even a lake’¹⁵⁹—resembling the fantastical Lake Chemay of eighteenth-century European maps.

Anthropogenic forces now disrupt the terraqueous environs of the region more forcefully than ever before. Militarized conflict, climate change, and dam-building projects are reshaping physical and human geographies of water in Himalayan Asia and its lowland shadow.¹⁶⁰ As new pressures change the Tsangpo-Brahmaputra, new

¹⁵⁸ Kingdon Ward, *Riddle*, pp. 126-7, 148-9.

¹⁵⁹ F. Kingdon-Ward, ‘Aftermath of the Great Assam Earthquake of 1950’, *The Geographical Journal*, vol. 121, no. 3, 1955, pp. 290-303, here p. 301.

¹⁶⁰ Ruth Gamble, ‘How dams climb mountains: China and India’s state-making hydropower contest in the Eastern-Himalaya watershed’, *Thesis Eleven*, vol. 150, no. 1, 2019, pp. 42-67; Maharaj K. Pandit, *Life in the Himalaya: An Ecosystem at Risk* (Cambridge, MA: Harvard University Press, 2017), pp. 9-

versions of discovery will doubtless emerge, just as they did during the age of empire. The tumultuous efforts to find the river during the colonial era also demonstrate that changing scientific methods and political imperatives generate different objects to discover. Many Tsangpo questions emerged and subsided at the unsettled confluence of imperial warfare and commercial expansion, contested meanings and methods of European science, partial but vital engagements with Asian cosmologies, and blockages and floods of data and water. In this high imperial borderland, discovery was not a unified and consistent flow towards a fixed embouchure, but multiple shifting channels that variously deluged and ran dry.

Competing interests: the author declares none.

10; Kenneth Pomeranz, 'The Great Himalayan Watershed: Water Shortages, Mega-Projects and Environmental Politics in China, India, and Southeast Asia', *The Asia-Pacific Journal*, vol. 7, no. 30, 2009, n.p.