The Ecological Uncanny: Thinking with a Mobile Region

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A decade and half ago, while perusing the eighteenth- and early nineteenth-century maps of the Gangetic plains executed by British surveyors, I was struck by the cartographic approach to the hydro-geographical particularities of the region. Foremost among these British-made maps were those of the Ganges and Brahmaputra Rivers produced by James Rennell between 1764 and 1771. Primarily used in military reconnaissance, and secondarily for gauging revenue potential, the maps in essence were tools for consolidating territory. With the declining power of the Mughal empire, the political boundaries in eastern and northern India had become unsettled. The English East India Company, under whose aegis the map-making was undertaken had asserted territorial supremacy over the Mughal province of Bengal in 1757. The northern and western frontiers of the vast province remained unconsolidated from a military point of view. The map makers were thus instructed to record navigable routes, sites of shelter, water sources, the produce of the country, and the general lay of the land. Much more than empire was unsettled, however.

The geomorphology of these rivers was different from their European counterparts. Here waterways changed course so frequently that the land itself appeared mobile. In this context, survey maps were not stable guides, and cartographic techniques needed improvisation for delineating the restlessness of the rivers and waterbodies. The European surveyors' lack of familiarity with the land and its rivers created a need to learn new terminologies and devise new methods of representation to describe the

The rivers in the Lower Gangetic Plains of India changed their course so frequently that the land itself appeared mobile. Their eighteenth- and nineteenth-century cartographic representations pose the question: What becomes a region when it eludes representation? The maps of the plains were haunted by the ecological uncanny, offering opportunities to query the imagination of a still, stable land as the basis of architectural practice, history, and theory.

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temporal changes in the land. Knowledge of deltaic formations in Germany, Italy, and England, which would have been the bases of these surveyors' training, did not suffice. The durational flux of land and rivers in this region eluded modes of graphic representation that attempted to still riverine phenomena in space and time. What becomes a "region" when it eludes representation?

Rennell and his eighteenth-century successors such as Thomas Hyde Colebrooke, in their effort to document navigable routes, became fascinated with the topographic transformations brought about by the rapid changes in the course of rivers. Their field notes and survey memoirs register their awareness of the limits of cartographic accuracy. Their maps remained experimental in their empirical fervor and stopped short of delivering a regional coherence. Indeed, they did not use the term "region" to describe the riverine tracts they surveyed. Instead, the term "country" was consistently used to refer to the surveyed tracts. Rennell once used the phrase "tropical regions" as a typological reference in a lecture on the Ganges and Brahmaputra Rivers delivered in 1781.[1] This was before the dynamics of "natural regions," as evidenced in flora, fauna, climate, and topography and popularized by the work of Alexander von Humboldt in Mexico, caught the imagination of European geographers and naturalists. From the idea of a "natural region," the concept of the "physical region" would be developed in the 1820s.[2]

The appearance of the term "region" in nineteenth-century geographic discourse on the Gangetic plains perhaps shared in this transcontinental discursive shift.[3] The goal here was not so much to explain the distinct ecological attributes of the land. Rather, it was meant to enable comparison across geographical time and space and to facilitate infrastructural intervention. Transfer of technical knowledge and skills across the world demanded deciphering general principles or "laws" that guided natural phenomena. With the East India Company's increasing territorial control in the subcontinent in the nineteenth century, maps of the Gangetic plains sought to move beyond military reconnaissance and aimed to expand the colonial state's extractive reach in the form of agricultural revenue, mineral and botanical prospecting, forestry and hydroengineering. The ecological limits of cartography that haunted this process might help us understand the instability of the "region" as a construct.

The eighteenth- and nineteenth-century maps of the Gangetic plains, as I have discussed elsewhere, were haunted by the *ecological uncanny*.[4] The sense of the uncanny

emerges as a spatio-temporal disjunction, when the past appears unexpectedly, and involuntarily, in the present, producing an estrangement.[5] Occurring in the process of territorial occupation, the ecological uncanny manifests as a form of cartographic anxiety that accompanies colonial map-making and the use of maps. The ecological uncanny is insinuated by the slippage between spatial scales—of the desire to visually capture the whole "region" as a spatial construct and the proliferating details within the immediate field of vision—and between the notion of time as linear and time as recurrent, made prominent by the ecologics of a mobile land. The land, by refusing its presumed stability, being prone to subsidence, submergence, accretion, diminution, unpredictable returns, and sudden upheavals, unsettles the very grounds of representational authority.

The ecological uncanny need not be debilitating, however. It may well provide an opening to rethink many of our assumptions about region and architecture, particularly the assumption of land as fixed matter—the implicit or explicit assumption of all regional discourse.

James Rennell's maps were at best tentative, affected by the on-site difficulties of observing the territory as well as the perpetually changing character of the rivers and adjoining land and bodies of water. Rennell felt the need to write down the seasonal particularities of the streams and the banks, as well as ephemeral marks such as tiger tracks on the riverbank's soft soil. It apparently did not trouble him that those marks would be washed away in a few hours. Indeed, his maps displayed the impossibility of capturing the land as stable information. The accuracy of the maps was delimited by time: they bore the marks of an effort to be truthful to the very moment—that specific time and place when he was there. Rennell's maps were therefore autographical and thus not amenable to generalization.[6]

If Rennell was concerned about the ephemeral topography, in 1795 Colebrooke noted that not only the "topography" but the "geography," was "liable to perpetual fluctuation … as the face of the country is not only altered by the rivers, but the villages are removed from one side to the other; some are completely destroyed, and new villages are continually rising up in other spots."[7] Not surprisingly, by the turn of the nineteenth century Rennell's maps were no longer useful for navigation, and in 1807 Colebrooke could no longer relate what he saw in the field with the maps he had completed ten years prior: "I was astonished to observe the alterations in

the formation of the sand which had taken place… . Several islands raised considerably above the surface of the water, upon which cattle graze and corn is sown, now occupy the space of the river … which earlier was at least 30 feet deep" (**fig. 1**).[8]

Fig. 1. Map of the branches of the Ganges River showing meanders.
Major Robert Hyde Colebrooke, "On the Course of the Ganges through Bengal," *Asiatic Researches* VII (1805).

Colebrooke did not fail to mention that among the "natives" of these provinces, "who have long witnessed such changes, the most remarkable encroachments of the rivers and deviations of their streams" (that is, the change in the relationship of land and water) produced "little surprise."[9] They were used to moving their houses and possessions to safer spots when they discerned the water encroaching on the riverbanks where they lived. Their houses were built of mud or such light materials that the residents could expediently dismantle and carry them off. Their sense of property and ownership was attuned to the temporal rhythms of the riverine region.

The sand islands thrown up by the turbulent river, locally known as *char*, Colebrooke noted, were "immediately

cultivated" even when they appeared to have little soil on them: "Water melons, cucumbers, and *sursoo*, or mustard, become the produce the first year. It is not uncommon even to see rice growing in those parts where a quantity of mud has been deposited near the water's edge."[10] The new lands were often used for pasturage. In those parts that were uninhabited by people, a variety of birds and animals found refuge among the reeds and low "impenetrable thickets": tigers, wild buffalo, deer, hogs.[11] Where the watercourses wound in an intricate manner, the riverbanks "overrun with tall grass" provided shelter for "hares, partridges and other game."[12] He tried to explain the difference between freshly formed sand banks and islands, the former being more mature land that had grown in area due to continual alluvial deposits and the latter being more permanent lands formed decades prior. Local inhabitants knew how to best utilize these various landforms created by the movement of the water. Indeed, when the new lands were sufficiently firm, "the natives then no longer hesitate to take possession of them, and the new lands become an immediate subject of altercation and dispute."[13] Colebrooke went on to summarize how the people went on to "settle more permanently" on the islands.[14] Denoting these durational variations in maps was challenging, however.

Rennell and Colebrooke cobbled together ways of riverine mapping, attempting to keep the maps and sketches open to change and interpretation. They recognized that whatever empirical validity these maps could claim resided in keeping the lines on the map tenuous. Tidy map-making and clear cartographic conclusions were inimical to these riverine tracts. Although, initially at least, he had hoped to make reasonable conjectures about future changes by observing the state of the riverbanks and the pattern of currents, Colebrooke was aware that his inability to locate stable features of the land was shadowed by a much longer history of geographical and geological change that he could not fully grasp. Like Rennell, he turned to an autographical mode of map-making.

Reconnaissance surveys are characteristically linear, and reconnaissance narratives are structured in a manner that recounts the surveyor's path of movement.[15] In contradistinction, by repeatedly retracing his steps over survey routes taken earlier and narrating his experience of the unfamiliarity of the previously familiar, Colebrooke allowed his maps to be contaminated by a nonlinear temporality. As in Rennell's maps, idiosyncratic marks incommensurable with modern cartographic techniques and frequent recourse to written notations and pictorial sketches

introduced an open-endedness to the maps. Such maps could not support the visual authority that came from distancing—the distancing of the surveyor from the land, the kind afforded by the Trigonometrical Survey that by the 1830s would become the ideal mode of geographical imaging. It is useful to note that the provisional marks and annotations in Rennell's and Colebrooke's survey maps and accompanying field journals were left out of finished maps in favor of scalar and representation clarity, and in so doing they rendered the land comprehensible through fixity.

While both Rennell and Colebrooke maintained an interest in the *longue durée* of history, they came to terms with the multiple temporalities that linked their surveys with their maps. They saw the landscape as a cumulative work of geo-history and were at home with accumulating details; they engaged with precarity even when not quite comfortable with its implications.[16] They had learned to make new connections between space and time, becoming comfortable seeing in multiple temporal registers at once. They had, one could argue, heeded the ecological uncanny. Rennell explicitly cautioned against digging canals and trying to shape the course of rivers in this region, and Colebrooke recommended working with the rivers and not against them, even if that meant foreclosing efforts to increase the navigability of the rivers.

In contrast, James Fergusson, confronted with the vagaries of these rivers, opted for a very different mode of conceptualizing rivers. In an 1863 article, he began with a striking description of the mobile land:

> The river is *nearly* where it is shown on the map, but as it was there in 1850–53, it certainly is not there now… . The city of Serajgunge—the largest and most important mart in that part of the country—is somewhere in the neighbourhood now, but not where marked on the map, of course, and it is annually obliged to accommodate itself of the vagaries of the stream, and change its locality. It may be ten miles up the stream, or ten miles further down, or five miles further east and west, but is somewhere thereabout; and that is all the information that geographers can hope for in a country where land can only be classed with floating capital.[17]

Fergusson's understanding of land as floating capital was Smithian in conception. It assumed "fixed and circulating capital as characteristics attributable to things," rather than in terms of the roles that commodities play in the process of capital accumulation.[18] Capital circulation necessitates fixity in land—and therein lies capital's contradiction. That land can be conceptualized as both fixed and floating was beyond Fergusson's comprehension. To confront that seeming contradiction would be to consider capital's spectrality, its uncanny ability to morph and disassemble "all that is solid."[19] The aqueous metaphor in Fergusson's description of land as liquid capital is nevertheless useful for us in our attempt to recognize the pressure placed on geographic discourse with the introduction of capitalist notions of property in land. Modern geographic discourse shaped in the crucible of colonialism/capitalism attempted to conform to emergent views of land/water as capital.

The global circulation of capital enabled by colonialism necessitated the determination of permanency in land tenures. In Bengal this was epitomized in the Permanent Settlement of 1793, which sought to fix revenue demands in perpetuity by conferring the rights of private property on a new class of landowners. Private property was a tool to extract revenue from the peasantry via native landowners.[20] The paradigm of movable towns and mobile land did not fit this determination and indeed confounded British colonial authorities' efforts to ascertain the criteria for land revenue assessment, as the land/water failed to acquiesce to modern notions of property. That is to say, the fluidity of land/water disobeyed the logic of circulation, or there was a misalignment between the fluidity of riverine geography and the conception of fluidity that capital demanded. Fergusson's career as an indigo planter in Jessore, Bengal, had made him familiar with the riverine phenomena of the region in relation to property relations, and he sought a theory that would explain and thereby circumvent, if not fix, the misalignment. His goal was to figure out how to act on these rivers. Accordingly, his thinking with maps fundamentally differed from Rennell's and Colebrooke's approaches.

Better known for his work on architectural history, Fergusson began his paper on the deltaic Ganges by noting that although he was not a geologist, his claims were founded on his own experience of living "on the banks of one of the most active of the Bengal rivers" and participating in a riverine mapping expedition with Jean-Baptiste Tassin.[21] His interest was in the historical period, and firsthand experience had given him both a sense of the rapidity of changes as well as the manner in which the movement of

rivers dishevels any neat understanding of sedimentary strata:

> I myself have seen the bricks which formed the foundation of a house I had built carried away, and strewed along the bottom of a river at a depth of 30 or 40 feet below the level of the country. Since then the river has passed on, and a new village now stands on the spot where my bungalow stood, but 40 feet above its ruins; and any one who chooses to dig on the spot may find my "reliquiae" there, and form what theory he likes as to their antiquity or my age.[22]

To avoid such fallacies—to circumvent the open-ended spatio-temporality of such riverine geography—one needed to decipher general principles. He opted for a theoretical model of the courses of rivers (**fig. 2**). Introducing the river as a body of water in "unstable equilibrium" in a manner exactly the opposite of a pendulum, which would oscillate "for ever if we could abstract all the natural conditions of friction, resistance of the atmosphere. &c," he wrote,

> if we could likely abstract all the natural conditions of inequality of surface or of soil, it would flow continuously in a straight line; but any obstruction or inequality whatever necessarily induces an oscillation, and, the action being continuous, the effects are cumulative, as those in the pendulum are discumulative; and the oscillation goes on increasing till it reaches the mean between the force of gravity tending to draw it in a straight line, and the force due to the obstruction tending to give it a direction at right angles to the former.[23]

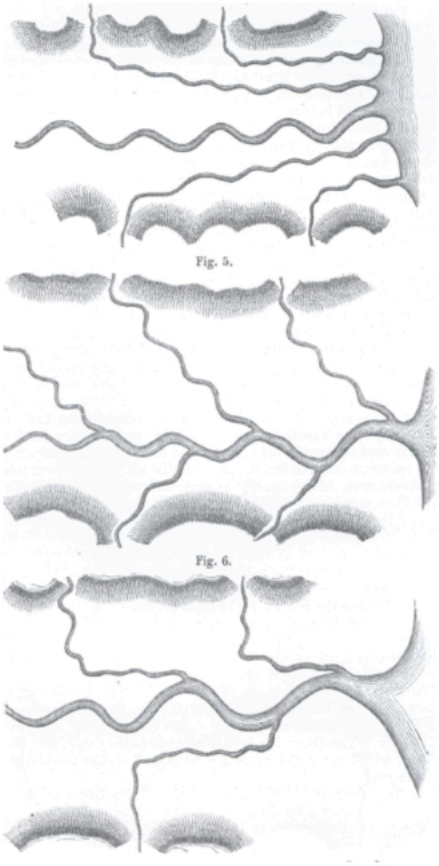

Fig. 2. "Diagrams illustrating the junctions of tributary streams with main rivers."
James Fergusson, "On Recent Changes in the Delta of the Ganges," *Proceedings of the Geological Society*, April 1, 1863.

A mathematical model of this oscillation would enable "any one on inspecting a map to calculate approximately the slope of a country, and to estimate the relative importance of every river there delineated, but they would enable the engineer to regulate their courses, and the statistician to predict the result of the changes he sees taking place."[24] Fergusson's explanation restated Rennell's 1781 analysis of Ganges hydrology, this time using the pendulum as an analogy, but it led to a very different interpretive outcome.[25] Such a model would explain fluvial patterns, even if it could not quite still the river channels and stabilize maps. More importantly, for Fergusson it would be a useful model for predicting change. Presumably such a model would replace or improve upon the predictive habit of the natives, who had learned through experience how to live with riverine fluctuation. In so doing, Fergusson also inserted this particular deltaic geography into a universal language of the riverine, leaning upon a larger theoretical armature to make sense of—to stabilize—this body of knowledge.

Fergusson's explanation garnered warm approval in later nineteenth- and early twentieth-century discussions of colonial geography. Geographer Clements R. Markham, for example, writing in 1871, credited Fergusson for deciphering the "laws" that governed not just the Ganges and Brahmaputra but, by extrapolation, "all rivers."[26] Included in a chapter on the physical geography of India, Markham's discussion of the work of surveyors (in which he included topographic and revenue surveyors, geodesists, geologists, antiquaries, and meteorologists) was meant to facilitate "Indian comparative geography" devoted to assessing change across time and space. The goal was for the geographer to form generalizations based on ever-increasing stores of new data on "climate, superficial configuration, forests, rivers, soils and productions."[27]

The Gangetic plains as a "region" was thus a construct of the colonial state and followed the geographic tradition of Humboldt: it enabled comparison and helped anchor generalizations, even though the restless water/land continued to elude geographical and historical bounds by expanding, shrinking, and leaking as it morphed.[28]

While Fergusson's solution to the mobile landscape was shaped by the particularities of the riverine system he was addressing, the problem is not peculiar to British surveyors or to the colonial project of creating a riverine infrastructure. Despite repeated failures with flood control, the same techniques used in building embankments, canals, bridges, railway lines, and dams were not only continued but asserted with greater confidence. The problem is characteristic of modern modes of visualizing the land and rivers and the modern state's belief in its capacity to control wayward rivers and stabilize mobile lands. Representational authority promises regional coherence and stability, even when it does not deliver.

The imagining of a still, stable land as the only valid basis of practice and theory has left a deep impression on the spatial disciplines: architecture, archaeology and geography.[29] It is, for example, the basis of architectural visualization. Asserted by the surety of the ground plane, the line that separates the soil, water, creatures, and minerals belowground from the built enclosure of the human habitation aboveground is so naturalized that we hardly ever question the projections that flow from this simple conceit in illustrating the physical environment. Perhaps by embracing the ecological uncanny, we can let go of how we think about not only the dividing line

between water and land, between human and nonhuman, between below- and aboveground but also the play between the ephemeral and perennial, the permanent and impermanent. The spatio-temporal unhinging of the ecological uncanny may be productive of a conversation about how we might acclimatize ourselves and our architectural imagination to the ecological changes brought about by global warming and how we might rethink the sureties of the construct of the region as an analytic.

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1 James Rennell, "An Account of the Ganges and Burrampooter Rivers," 25 January 1781, in *A Bengal Atlas*, vol. 11, ed. Kalyan Rudra (Kolkata: Sahitya Samsad, 2016), 239. ↑

2 Anne Marie Claire Godlewska, "From Enlightenment Vision to Modern Science? Humboldt's Visual Thinking," in *Geography and Enlightenment*, ed. David N. Livingstone and Charles W. J. Withers (Chicago: University of Chicago Press, 1999), 247–48. ↑

3 The term "region" is used by James Fergusson in his essay "On Recent Changes in the Delta of the Ganges," *Quarterly Journal of the Geological Society* 19, no. 1–2 (February 1863): 321–54. ↑

4 Swati Chattopadhyay, "Cities and Peripheries," *Historical Research* 83, no. 222 (November 2010): 1–23; Swati Chattopadhyay, "Traverse, Territory and the Ecological Uncanny: James Rennell and the Mapping of the Gangetic Plains," in *The Cartographic Necessity of Exile*, ed. Karen Bishop (London: Routledge, 2016), 89–109. I draw upon the evidence and argument of these two previously published works. ↑

5 The unheimlich or uncanny in Sigmund Freud's work is frightening, not simply because it is not known, the "opposite of heimlich, heimisch, meaning 'familia,' 'native,' 'belonging to the home,'" but rather because the unfamiliar is made strangely familiar, or the familiar is made strangely unfamiliar. Heimlich "develops towards an ambivalence, until it coincides with its opposite unheimlich." Sigmund Freud, *On Creativity and the Unconscious* (New York: Harper & Row, 1958), 124. ↑

6 Chattopadhyay, "Traverse, Territory and the Ecological Uncanny." ↑

7 Robert Hyde Colebrooke, "On the Course of the Ganges through Bengal," *Asiatick Researches; or, Transactions of the Society Instituted in Bengal* 7 (1803): 2. Also see Chattopadhyay, "Cities and Peripheries." ↑

8 R. H. Phillimore, *Historical Records of the Survey of India*, vol. 1 (Dehradun, 1959), 64. ↑

9 Colebrooke, "On the Course of the Ganges," 1. ↑

10 Colebrooke, "On the Course of the Ganges," 4. ↑

11 Colebrooke, "On the Course of the Ganges," 5. ↑

12 Colebrooke, "On the Course of the Ganges," 29. ↑

13 Colebrooke, "On the Course of the Ganges," 4. The practices of local inhabitants adapting to the "fluidity" of the land varied across Bengal and were inflected by the fluvial particularities of a river and adjacent bodies of water. Precolonial regimes understood the vagaries of the land and river and adjusted revenue claims accordingly. Such practices came up against the doctrine of land and revenue fixity promulgated by the British colonial state in the form of

the Permanent Settlement of Bengal (1793), with devastating consequences for the peasantry. Colonial revenue records are rife with cases of dispute over both land and water rights. The Bengal Alluvion and Diluvion Regulation (1825) intended to address land claims and disputes in riparian lands, and the revised legislation of 1847 failed to address the problem, as its legal framework was based on an inadequate understanding of such riparian environments—that it was "impossible to lay down any fixed laws for shifting sand." See Christopher V. Hill, "Water and Power: Riparian Legislation and Agrarian Control in Colonial Bengal," *Environmental History Review* 14, no. 4 (1990): 1–20 (quote, 11). Discussing *diara* or *char* lands in Monghyr, Nitin Sinha has argued that the 1825 regulation indeed made these newly formed lands "sources of speculative capital." See Nitin Sinha, "Fluvial Landscape and the State: Property and the Gangetic Diaras in Colonial India, 1790s–1890s," *Environment and History* 20, no. 2 (May 2014): 209–37 (quote, 223). ↑

14 Colebrooke, "On the Course of the Ganges," 5. ↑

15 Matthew H. Edney, "Reconsidering Enlightenment Geography and Map Making: Reconnaissance, Mapping, Archive," in *Geography and Enlightenment*, ed. David N. Livingstone and Charles W. J. Withers (Chicago: University of Chicago Press, 1999), 176. ↑

16 For a more elaborate explanation, see Chattopadhyay, "Traverse, Territory and the Ecological Uncanny." ↑

17 Fergusson, "On Recent Changes," 334. ↑

18 Karl Marx, *Capital: A Critique of Political Economy*, vol. 2 (London: Penguin, 1978), 282. ↑

19 Karl Marx and Friedrich Engels, *The Communist Manifesto*, ed. Samuel H. Beer (Arlington Heights, IL: AHM, 1955), 13. ↑

20 For a classic account of the Permanent Settlement, see Ranajit Guha, *A Rule of Property for Bengal: An Essay on the Idea of Permanent Settlement* (Durham, NC: Duke University Press, 1996). ↑

21 Fergusson, "On Recent Changes," 332. ↑

22 Fergusson, "On Recent Changes," 327–28. ↑

23 Fergusson, "On Recent Changes," 322–23. ↑

24 Fergusson, "On Recent Changes," 323. ↑

25 Rennell, "Account of the Ganges." ↑

26 Clements R. Markham, *A Memoir on the Indian Surveys*, 2nd ed. (London: W. H. Allen, 1878), 358. ↑

27 Markham, *Memoir on the Indian Surveys*, 874. ↑

28 Markham uses the term "region" in a discussion of the distribution of plants in their relation to climate in the Humboldtian tradition. Markham, *Memoir on the Indian Surveys*, 364, 370. Also see Godlewska, "From Enlightenment Vision to Modern Science?" ↑

29 Gray Brechin and Stephen Graham have nicely explicated the problem in their discussion of the "minescape"; see Gray Brechin, "The Pyramid of Mining," *Imperial San Francisco: Urban Power, Earthly Ruin* (Berkeley: University of California Press, 1999), 66–67; and Stephen Graham, *Vertical: The City from Satellites to Bunkers* (New York: Verso, 2016). For a recent work questioning this paradigm in archaeology, see Sheena Panja, Arun K. Nag, and Sunando Bandopadhyay, *Living with Floods: Archeology of a Settlement in the Lower Ganga Plains, c 600–1800 CE* (Delhi: Primus Books, 2015). ↑