

BOOK REVIEW

Ruth MOSTERN 2021. *The Yellow River: A Natural and Unnatural History*. New Haven: Yale University Press. 376 pp. ISBN: 9780300238334.

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‘China’s Sorrow’, the moniker of the Yellow River in China’s present is more an artefact of European imperialist observers in China than it is an accurate description of the flows of Chinese riparian history. Narratives of disaster, though, seem reconfirmed by the 2021 flooding in Henan. In a repudiation of this discourse, Ruth Mostern’s *The Yellow River* puts the river’s history into the metric of geomorphic time, emphasizing the relatively short history of human intervention. She argues that history can only be unpacked by following the journey of sediment and requires a holistic analysis of loess plateau and floodplain: increased erosion from settlement and resource extraction on the plateau caused the ejection of artery-choking silt on the floodplain that made the viability of agrarianism dependent on intensive hydro-engineering. However, this intrinsic link remained largely illegible to the hydrocrats of Chinese states, mudded by the demographic, political and military exigencies of the moment.

The book is divided into four chapters that seek to take the entire watercourse into account chronologically over three thousand years, in order to explain how and when floods occurred in a human-dominated riparian landscape (14–15). Chapter one goes long and deep, much like the river itself, introducing topographic, geographic and climatic characteristics of the three courses of the rivers. It sets up the necessary framework for how loess erosion on the plateau becomes alluvial silt on the floodplain. Last, it treats the advent of human geography in the riverscape and sets the book’s key interpretive lens: intensified sedentism, with its attendant deforestation and new agro-ecologies, in both plateau and floodplain catastrophically accelerated natural erosive processes. This leads to an upregulation of hydrological engineering that creates a positive feedback loop. Conversely, abatement from war or socio-political collapse yields a deceleration, leading to ecological recovery and the return of the river system to non-catastrophic parameters.

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Chapter two argues for the hydro-social river: river engineering was inseparable from Chinese statecraft and expansion, especially its confrontation with steppe polities. Han dynasty (202BCE–220CE) agrarian colonialism on the plateau and new irrigation agro-ecologies on the drained floodplain created the first period of floods, though forest cover and soil integrity remained in good condition. Chapter three treats the Tang to the Yuan period: geopolitics and intensified state management created path-dependent deforestation and siltation that set the conditions for the first large-scale floods and ecological collapses. Two massive course changes in 1048 and 1194 underscored a long-running hydrocratic debate over whether to use dikes to speed-up the river and thus propel sediment to sea, or facilitate drainage with canals and dredging. Chapter four is the culmination of these anthropogenic processes in the Ming-Qing period where a high-intervention approach of complex riverine engineering systems became the norm, but favored the Grand Canal system of transportation to sustain Beijing over the economic viability of the floodplain.

This deep history of the Loess Plateau and the Yellow River floodplain is an innovative approach to China's relationship with the Inner Asian steppe. Environmental history has brought what are often conceived of as liminal spaces along the Inner Asian frontier into the core history of the Chinese heartland. Jonathan Schlesinger and David Bello have pioneered an environmental history that brings environmental exploitation and degradation into dialogue with the conspicuous consumption of positional goods and the practice of power at the imperial center. This dynamic is inextricably linked to the Inner Asian and Manchurian origins of Manchu Qing rule (Bello 2016; Schlesinger 2017). Whereas these histories seek to center borderlands, Mostern's achievement is the elucidation of an intimate dyad of the steppe-sown frontier with the riparian agro-ecologies at the core of Chinese civilization. Instead of these realms being linked by merging political cultures, they are fused by the dictates of geomorphology: either militarized colonization or intense pastoral activity in the Ordos necessarily meant oscillations between hydrological action and socio-economic dislocation downstream. In a sense, this is the environmental manifestation of Victor Maier's assertion that the engine of Chinese history is really the explosive dynamic of Inner Asian and Central Plains' engagement (Maier 2004).

Another important innovation of Mostern's study is its emphasis on the localization of riparian management and hydrological engineering. Previous studies have largely taken a state-centered approach that assumed the court was responsible for all large hydrological engineering projects. This approach is appropriate for projects like the Grand Canal under the Sui, and improvement programs for dynasties that centered their capital in the North (Yuan, Ming and Qing). Over time, facilitation of commerce to supply the metropole, not increased agricultural productivity, informed hydro-engineering: a stark departure from earlier periods (Marks 2017: 269–274). However, centralized control was not the hallmark of most riparian environments. Rather, hydrocracy was regional, localized, and negotiated, just as forests and fisheries were (Miller 2020). Song hydrocrats, for instance, steeped in bureaucratic meritocracy, were measured by achievements in local riparian administration, not on how such efforts contributed to the stability of the whole. Thus, judicious repairs to one section of the levee system propelled sediment and floodwaters downriver, often facilitating the breach and flooding of another's jurisdiction (160–161). This held true in a larger sense in the policy disjoint between the Loess Plateau officials fixated on securing the border through erosive colonization and hydrocrats downstream preoccupied with solving salinization of fields and siltation of riverbeds (164–174, 202, 229–231). These approaches at both scales made long-term solutions insoluble.



A focus on localization, however, does not obscure macroscopic patterns. Weaving northwest and Central Plains into a coherent narrative provides a unified view of the relationship between sedentism and deforestation in the expanding Chinese polity. Research on premodern Chinese forestry has kept these two realms separate, or does not treat them at all. Mark Elvin (2004: 19–39) dealt specifically with agricultural and state building projects on the Loess Plateau as a systemic source of deforestation in the northwest, but did not link hydro-engineering significantly. More recently, one lonely paragraph on hydro-engineering's role in deforestation on the floodplain populates Ian Miller's (2020) early modern study of Chinese forestry, while Zhang Meng (2021), assessing the Qing, only treats the Yellow River as a logging transportation device. Mostern, rather, shows that logging happened simultaneously in the Ordos and the floodplain: the former to clear land, secure fuel and establish settlements, and the latter to build the dykes and canals necessary for agricultural irrigation and flood control (129–155). Importantly, the former deforestation process compelled the latter while the aggregate result remained erosion and flooding. Thus, there was a simultaneity to expansionism through both state and local actors that degraded forest ecologies and ultimately led to catastrophe, an approach applicable to other disparate environments governed by the same state. However, further attention to how commodification and commercialization of the lumber market acted as a positive feedback loop would provide additional insight into this ecological and geomorphic change (Miller 2020).

Yet, an overemphasis on anthropogenic change in riparian environments significantly, and somewhat unreasonably, downplays the role of endogenous climatic factors outside human control. Mostern is very comfortable parsing climate patterns and regional meteorological anomalies. She states the Loess Plateau is highly sensitive to climate variations, and does usefully lay out the climate system in which the plateau is embedded, linking the Asian monsoon to sudden summer downpours, and El Nino events to increased aridity (27–28, 43). For instance, a dry year followed by a wet would increase erosion. Yet, she discounts the explanatory power of climate vis-à-vis anthropogenic activities consistently throughout the book, claiming major increases in flooding do not correspond to climate change: the latter serving at most as a proximate cause due to climate migration (63, 73, 75, 192, 198). Climate, then, is relegated to a system humming in the background within reasonably reliable parameters. Mostern also seemingly assumes that increased temperature should translate into stronger monsoons and more floodwaters, if climate were a factor (70–74). Yet, this might be a false equivalence: the Medieval Climatic Optimum (c.1200–1350), known for its privileging of flora in China, does correspond to a period of recovery in the Ordos under the Mongols (186). Vegetation fixed moisture in the loess, and so an increase in vegetation cover would have counteracted erosion just as decreased human activity would (Pederson et al. 2014; Sun 2021). Furthermore, the transition from this warmer period to the Little Ice Age appears to correspond to the zenith of catastrophic flooding in the late imperial period. As Bruce Campbell (2016) points out, this transition inherently destabilized climate patterns globally. Timothy Brook (2017) has used documentary proxies, like Mostern, to show fluctuations in precipitation during the Yuan and Ming, a situation that would have exacerbated anthropogenic erosion. Climate change, though difficult to excavate, cannot be denied significant agency alongside humans.

Animals, plants and riverine life in general are similarly disenfranchised. Flora and fauna are intimately entwined in ecosystems. For instance, on the Canadian Pacific coast, salmon play a huge role in transporting nitrogen into riparian coastal environments sustaining both flora and fauna. Thus, fluctuations in salmon populations from overfishing have long-term consequences



for these environments and the people who depend on them (Hocking 2011). Animals, like humans, often serve as both victims and vulnerabilities in environmental or climate change (White 2014). Environmental changes along the Yellow River would have similar chain reactions. Yet, the reader is left with little idea of how varying levels of the engineered riverine ecosystem from the loess plateau to the floodplain looked or affected fauna. Tantalizing clues are offered in fleeting statements of flood refugees reverting to herb-gathering and fishing (168). In contrast, highly engineered riverscapes seemed to have experienced a transformation in domesticated crops: millet and sorghum stalks were used for levee repair, but these are in short supply in the later Qing, perhaps indicative of the transition to wheat and rice agriculture on the floodplain (231).

Thus, while enlivening the agency of water, the narrative regrettably renders most other non-human life inert. Ungulates used to populate the forest of the upper reaches, such as chiru, wild yak and musk deer have no meaningful presence. The floodplain on the other hand was a marshy swamp before draining and diking, a key habitat for migratory birds, such as mergansers and red-crowned cranes. Hydroengineering significantly altered their ecosystems, while breaches and flooding would have recreated marsh ecologies. Animal occlusions are symptomatic of current Chinese environmental history. But if understanding anthropogenic geomorphology is at the heart of the project, then mapping animal lives onto the slow violence of anthropogenic ecological change is crucial to achieving a wholistic assessment. As Felipe Fernandez-Armesto (2002: 153) reminds us: ‘We are enmeshed in ecosystems of which we are part, and nothing... in human history makes complete sense without reference to the rest of nature.’ Yellow River histories must also be crafted for the wider biosphere.

Mostern claims that the study ‘resists declensionism, the notion that human intervention has led inexorably to ecological degradation’ (17) in a departure from Mark Elvin’s work. Yet, this resistance appears flaccid, as the bulk of the narrative remains the desperate struggle of hydrocrats and peasants in a positive feedback loop. Desertification and deforestation upriver are paired with levee breaches and river course changes that inundate, salinize and ultimately extirpate arable lands and their human stewards. Yet, though both the plateau and floodplain intermittently supported huge populations, little is learned of what might have constituted sustainability over two millennia of intervention. Only the briefest of interludes where agricultural productivity and human flourishing are mentioned and provide some respite from the heavier course of self-inflicted human trauma (87). There is no triumphalism to be found in the observation that silt creation on the plateau creating flooding downstream remained illegible to the state because of political exigencies (230–231). This dilutes the concluding reflection on the hope riverine management offers human-altered environments today, especially since earlier efforts came at the price of millions of lives (174, 241).

The Yellow River is, despite these elisions, ground-breaking and breaches long-held divisions between the histories of the Loess Plateau and the Yellow River floodplain. Mostern couples science fluency with an aptitude for merging that data with historical texts in a dense, yet absorbable narrative that would make Neil deGrasse Tyson flush with pride. This deep history is not only a call for intensely multi-disciplinary approaches, but a demonstration that environmental histories must follow diachronic geomorphologies, rather than dynastic or nation-state periodization and geographical divisions. A new standard has been unquestionably set.



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