

IN CONVERSATION: RUTH MOSTERN ON *THE YELLOW RIVER: A NATURAL AND UNNATURAL HISTORY*¹

Ruth Mostern

University of Pittsburgh

ABSTRACT

In this interview, Ruth Mostern discusses her book *The Yellow River: A Natural and Unnatural History* which was published by Yale University Press in 2021 and was the winner of the 2023 Joseph Levenson Prize from the Association of Asian Studies.²

Philip Gooding (PG): *The Yellow River* is an incredibly ambitious book, especially for its temporal depth, and for its interdisciplinary nature. It covers the entire Holocene and incorporates sources from across the natural sciences and humanities. How did you approach this long-term history of the Yellow River? What did you aim to achieve when you first undertook it, and what are the book's key contributions?

Ruth Mostern (RM): This book came out of two converging threads in my research interests. Firstly, I wanted to extend some of the same methodology that I used in my first book, *Dividing the Realm*.³ I wanted to write another spatial history, meaning a history of how people and territory, people and geography, people and landscapes, and place and space have mutually constructed one another. I wanted to continue developing and analyzing spatial datasets and making maps, but to do so in the context of a tangible, physically existing landscape. *Dividing The Realm* was about the evolution of political

¹ This conversation was first recorded on the *Indian Ocean World Podcast*. To listen to the whole conversation, see: Sam Gleave Riemann, "Ruth Mostern, 'The Yellow River: A Natural and Unnatural History,'" *The Indian Ocean World Podcast on Appraising Risk*, (1 Feb 2023): < <https://www.appraisingrisk.com/2023/02/01/ruth-mostern-the-yellow-river-a-natural-and-unnatural-history/>>.

² To read the book, see: Ruth Mostern, *The Yellow River: A Natural and Unnatural History* (New Haven: Yale University Press, 2021).

³ Ruth Mostern, *'Dividing the Realm in Order to Govern': The Spatial Organization of the Song State (960–1276 CE)*, (Cambridge, MA: Harvard University Press, 2011).

geography during the three hundred years of the Song regime. I wanted to do something about geographies, landscapes, and human changes that were physically visible to people. That took me in the direction of environmental history, and I came to realize that some of the changes to the landscape of political geography were ones that occurred because of floods and changes in course on the Yellow River.

From a very different direction, I was also quite influenced by the fact that, at that time, I was living in semi-arid, seasonally flooding Central California. I came to realize how intensively managed a landscape needs to be in a complex landscape of water politics, agriculture, and the relationship between seasonal wetlands, mountains, snow melt, an alluvial plain, a delta, and an ocean. In contemporary California, this involves technologies such as sensors that keep track of water levels in canals and reservoirs; but I was starting to realize how much the landscape of medieval and early modern China had been influenced by water politics even though the available tools were different.

Those were the two big influences that came together to produce my book. *The Yellow River* shows how humans have intensive relationships to complex water landscapes, and how human society is profoundly influenced by those watery and riparian landscapes. In turn, humans also quite dramatically change the riparian landscapes with which they interact.

PG: In your book, you define your perspective as a sediment centered approach that accounts for the whole of the Yellow River Basin. Could you explain the meaning and methods of this approach and discuss how it is useful for environmental history, especially for the environmental history of the Yellow River?

RM: Almost all books on river history primarily focus on the alluvial plain of rivers. This is understandable, because the alluvial plains are the places that are flat, that are well watered, that are amenable to agriculture, and that are amenable to transportation. They are also the places along which large populations of people live and build cities, move around, and have high density forms of social organization. However, rivers are not just their alluvial plains. From the point of view of environmental history, rivers are the entirety of their watersheds. Rivers are basins and they are the topographical features within which any drop of water flows to a common place in an outlet in an ocean. As the landscape architect, Anthony Acciaviati, says: rivers are like “sediment sorting machines.” Likewise, Dilip da Cunha points out that rivers are not simple lines: rivers are zones of activity that are dynamic forces within the entirety of their watersheds. One of the kinds

of ideological work, as well as engineering work, that people do is to construct rivers as lines, when they are not. What that means on the alluvial plain is that rivers are always prone to flooding and to changing course. They are very active landscape features, and they are fundamentally acts of gravity, landscape features that draw moisture and any kind of entrained organic or mineral material from higher elevation to lower elevation—water runs downhill, and that's what a river is. A sediment centered approach leans into those insights and says that instead of just looking at what a river is doing on its alluvial plain, we need to look at that whole universe of what gravity is drawing downhill from higher elevation to lower elevation within an entire river basin.

What that means specifically for the Yellow River, which is the world's most sediment-laden river today and has been for at least a few centuries, is that the Yellow River has a distinctive course that passes through a region called the Loess Plateau. It originates on the northern part of the Tibetan Plateau and flows from there to the Loess plateau, which is centered on the modern Chinese province of Shaanxi. The loess soil is very thick—thirty metres or more in most places—and when it is covered by ground cover, it is relatively impervious to erosion. However, when the ground cover is removed, the particles of loess soil are very small and have a variety of shapes. It has a lot of interstitial gaps between these tiny particles, which is why it is so good for drainage when it is covered with ground cover. It is great for agriculture for that reason, especially the Neolithic, Bronze Age, Iron Age types of agriculture, because it is easy to work with. But for those same reasons, when it's dry, and when it's not covered, it just turns to clouds of dust. Then, when water comes along with that process of rivers acting as sediment sorting machines, water washes through gullies, and huge amounts of sediment are entrained into the river. And so, the history of the flooding of the Yellow River on its floodplain becomes a story of rising amounts of sediment of more and more of these particles of loess soil, traveling from the Loess plateau to the alluvial plain with consequences that are periodically cataclysmic for the people living on the plain.

PG: You highlight a number of cataclysmic turning points, such as major changes in the river's course in the eleventh and nineteenth centuries. How did these cataclysms play into the narrative of the Yellow River and Chinese history, especially when you think about the scale of thousands of years?

RM: Focusing on turning points in river history allows me to rethink what multi-century dividing points might be useful in Chinese history. Histories of China often pivot on the

rise and fall of particular regimes and dynasties that come and go. While many historians of China critique this approach, there are not always good alternatives that make better narrative sense. Environmental history offers significant ways of periodizing histories that don't have anything to do with political history, such as the medieval climate anomaly and the Little Ice Age. We know how consequential those kinds of turning points can be for more environmentally centered kinds of explanation in human history, and that's why I point out these turning points in Yellow River history, which don't always align well with political history.

The biggest turning point in Yellow River history was from an era of low flooding and low erosion to an era of high flooding and high erosion. I wrote this book using data analysis, so I can pinpoint that practically to the decade, and almost to the year. In the late 800s and early 900s, there was a sudden change in the number of floods and course changes that were recorded in historical sources. This also maps onto analysis by environmental scientists of soil cores, which show rising rates of sedimentation, as well as archaeological evidence. Different forms of interdisciplinary evidence converge on the idea that in the 800s, there was a sudden change from a low sediment and low flood era to a high sediment and high flood era. That was a really dramatic turning point, and it more or less coincides with the transition from the Tang Dynasty to the Song Dynasty, but not exactly. It actually comes a few decades earlier, which complicates a simple political, economic, or military narrative of causality. It's intriguing because it *sort of* maps on to changes in regimes and rulership, but not perfectly at all.

PG: In your book you make arguments for periods that are typically much earlier than that which are usually accepted as the start date of the Anthropocene and its derivatives, such as the Capitalocene or the Plantationocene. How does your work challenge the temporality or framing of the Anthropocene? Conversely, how does a long-term perspective that thinks about the whole Holocene help us to understand more or even challenge the concept of the Anthropocene as a whole?

RM: Sometimes I think that the Anthropocene is a terrific, fruitful, and generative framing. Other times, I think that it is obfuscating and doesn't engage effectively with social power relations. I have wrestled a lot with the concept of the Anthropocene and different possible start dates for it, as well as different terminologies. Are there better terms we can use for talking about the planetary scale of human impacts on the environment, rather than the term Anthropocene? These are all open questions. Certainly, after 1950, the rate of change

in human impacts on the nonhuman world became quantitatively and qualitatively different than they ever had been before, so the idea that something really significant happened quite recently in human history is important. However, at the same time, there were human impacts on the environment which began very early. In Arlene Rosen's work on Neolithic agriculture in the Luo River Valley, which is a major tributary of the Yellow River, she discovered that even Neolithic kinds of agriculture were sufficient to change the shape of the river valley from having been a 'U' shaped glacial valley into a 'V' shaped valley. This is what happens when human activity causes erosion and the soil settles on the valley bottom. Humans have always impacted the environment: however, so have beavers, ants, and termites. In that way though, humans have been landscape agents for tens of thousands of years. Rather than saying there's a period before human impact on the environment, and then there's the Anthropocene, instead, we should ask questions that arise more from a subtle and long-term political economy approach: in any era from deep in the Paleolithic until the present, what has been the scale and the impact of humans on the nonhuman world? I hope by taking a long-term approach in my book I do that, by tracking through what the intensity of human impact is on this river basin over the centuries.

PG: You make a convincing case that the eighth and ninth centuries were particularly important turning points. However, one of the striking things about your chronology is that there were significantly fewer disasters recorded during the era of division between the Eastern Han and the Sui Dynasty in the middle of the first millennium, and also following the fall of the Northern Song in the twelfth century. Does the fact that fewer numbers of disasters were being recorded reflect that perhaps there are just fewer documents? Could you comment on the changing number and quality of documentary sources from different time periods, and how you navigated these changes in making your time series of Disaster Management Events?

RM: As historians, we're always simultaneously operating at two registers. One is what happened in the past—to the extent we think we can say that with some degree of confidence—and another is, what are our sources doing? How well have they been preserved? What is the discursive world within which they were produced? What do they represent and so on. All works of history are trying to operate at both of those registers at once, including mine. Methodologically, one of the core pieces of this book is a dataset that I established consisting of several thousand attestations of acts of river management,

such as building or repairing levees and building or repairing drainage canals, as well as instances of river disasters, such as floods, course changes, and levee breaches. My dataset is only as good as my confidence that those attestations reflect what was happening on the river. Therefore, I also bolstered it with closer readings of specific documents by observers at various time-periods who explained what they saw happening on the river and what kinds of policy interventions they thought were appropriate. Additionally, I integrated information from soil cores and other environmental science information, which I wouldn't find in the historical record.

The fact that the turning points in the river do not align exactly with regime changes is actually very helpful to me in this case. The documentary record suddenly starts attesting that a lot more flooding occurs towards the end of the Tang regime, when things were in chaotic shape politically. It is during that period that the attestation of flooding increases, which you would not expect if this was simply an artifact of more ambitious regimes starting to report things more. The Northern Song, which takes power in 960, is known as an obsessively record keeping regime. Yet it was some decades prior to that, that the reports of floods increased, so that gives me a lot of confidence that I'm on the right track. Additionally, there is a very clear and vivid gap in the record of attestations of flooding, beginning with the division between North and South China after the fall of the Northern Song in 1127, and ending immediately with the reunification of North and South China in 1276. This is interesting because the Yuan Mongol regime took power in North China in 1234 but they did not pick up record keeping of floods on the floodplain. Instead, they only picked up the practice during the year that they unified north and south China. Any regime that controlled the entirety of the floodplain wanted to keep careful records about the capacity of transportation from north to south using the Grand Canal, about the capacity for maintaining agriculture, and about the likelihood that bands of desperate environmental refugees would be roaming around the countryside. Every regime cared about those things. When it was not possible for any regime to address those kinds of challenges, which is when North and South China were divided from one another politically, they stopped keeping those records. Conversely, that makes me confident that the records are quite good when they do exist. So absolutely, any of us with any historical project can only go as far as we can with our records. I read the historical sources against one another and read different types of sources together, so that I could draw conclusions with as much confidence as possible.

PG: In your answers, you've referred to the database that underpins your book. You describe this in much more detail in the book's appendix. In that section, you note that it was co-created with Ryan M. Horne and that it is called "The Tracks of Yu Digital Atlas." Could you describe the database and how it was created?

RM: In the database, there are essentially two key data sources with some ancillary material organized around them. One of them is the collection of attestations about droughts and floods and levee building and levee repairs, which come from primary sources with known dates, provenance, and authorship. They are basic bureaucratic documents that are part of the reporting structure of what it meant to run local government. There are about 3,000 of those kinds of attestations. Some of them are fairly trivial, while some of them are about events that are really complex, and which there are a lot of sources for. The other sources comprise a dataset about the locations and dates of the founding of settlements on the Loess Plateau, including large cities. It also includes the seats of prefectures and counties, as well as small settlements, such as forts, garrisons, coastal changes, horse ranches, and all of the things that had to happen locally to maintain the landscape, which for many centuries was highly militarized. By pinpointing the locations and dates of founding of those settlements on the Loess Plateau, I can make a strong correlation between the intensification of human activity on the Loess Plateau and the rate of flooding on the floodplain. Along with those two main sources, it contains some ancillary materials, such as moisture information from the Monsoon Asia Drought Atlas. We are doing a final round of cleaning, and once we are done, the dataset will be available publicly.

Transcribed by Wukai Jiang (IOWC, McGill University)