

Introduction to Special Issue “Approaches to Science, Technology, and Environment in Chinese History”

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How should we assess China’s understanding of nature before the country’s contact with Euro-American science? Does this earlier Chinese production of knowledge constitute “science” itself, comparable to that of “the West”? Was the Chinese effort to transform the natural environment a success, or does the question present an interpretive trap? How did the Chinese experience, adapt, and adopt the forms of Western science and technology imported during the early twentieth century? Should we even use the terms “science,” “technology,” and “nature” to describe China’s historical experience, or do they suffer from an inherent Eurocentric bias? If we reject them as loaded with too much normative baggage, then what framework might replace them? How do we fashion analytical categories that both relate China to a broader global story and capture what is unique about it? Since Chinese studies emerged in the United States after World War II, efforts to answer these questions have led to a broad range of historical inquiries and investigations. Nevertheless, these attempts have so far yielded only partial answers.

We have created this special issue to take the scholarly debate over these questions to the next stage. Science produces a particular form of knowledge about the world, while technology aims at putting that knowledge to practical use. Together they shape our historical experiences as human beings and the worlds we inhabit—both the abstract-thought world that exists in our mind and the material environment in which our lives are embedded. These claims apply to China as well as the United States, Great Britain, Germany, or Japan. Indeed, China has its own story to tell, but the country’s distinctive experiences also reveal part of a larger global narrative of historical change.

The special issue title reflects the important connections between each of these themes: Approaches to Science, Technology, and Environment in Chinese History. Our goal is not simply to describe the current state of the field (though some of us do) but also to discover how American scholarship has evolved over time, understand what makes it tick at an epistemological level, and consider the directions that future research might take. Each of us either has finished or is about

This is the author's manuscript of the article published in final edited form as:

Zhang, X. (2023). Introduction to the Special Forum, “Approaches to Science, Technology, and Environment in Chinese History.” *Asian Review of World Histories*, 11(1), 3–7. <https://doi.org/10.1163/22879811-bja10009>

to complete a longer book manuscript on science, technology, or the environment in China, and this special issue allows us to present our views on these subjects.

This set of articles consists of three pieces that adopt a broader conceptual approach and two empirical case studies that demonstrate “how to” implement these new interpretive approaches. In the first study, Stephen Halsey proposes environmental history not so much as a sub-field of Chinese history but as a new way of approaching history itself. In other words, Chinese history is environmental history and vice-versa. His article identifies the pitfalls of the teleological narratives focused on ideas such as declines and crises and instead calls for attention to historical processes as well as outcomes. By changing our anthropocentric point of view, Halsey demonstrates that *Homo sapiens* need to share the stage with non-human Others in the stories we tell about the past, even if they are not always comparable. If we decenter ourselves, we can gain a much better understanding of time, space, and historical agency in Chinese history, an important part of the global Anthropocene era.

With a similar endeavor, Xin Zhang examines how, for many decades before historians began to discover China’s identity, the approach to the history of science and technology had been dominated by the notion that considers these subjects as products of the West—of exclusive ownership of the early industrialized countries in the North Atlantic and later Japan. By tracing the continuing effort of historians to explore the reasons behind Chinese failure in producing science equal to that of the West, Zhang indicates that there existed not only an assumption that the Chinese civilization was sub-par compared to the West but also a correlation between the “failure” narrative and the “rise of the West” meta-narrative in the study of world history. Only after the field experienced a paradigmatic change at the turn of the 21st century, did historians begin to move away from the Western-centered biases that affected previous studies. Based on his survey, Zhang sees the field as very promising for reevaluating the Chinese contribution to the world and urges historians to continue their efforts in moving the field in the same direction.

In our third article, Megan Greene departs from the previous approach to the study of Chinese efforts to operationalize Western science and technology. Instead of focusing on the period when China met the Euro-American science, as most previous studies have done, Greene centers on the time when China was at war with Japan, a time when the country needed every bit of help to strengthen its capability of fighting the intruder and building its productive capacity. Through the Nationalist government’s wartime efforts to promote applied sciences in juxtaposition with the

varied experiences and motivations of scientists, technicians, and social scientists during the war, Greene shows that the Chinese road to the development of science and technology was full of twists and turns and that Chinese scientists and technicians were not necessarily responding to government rhetoric and policies in pursuing research during the war. Despite these challenges and the difficult wartime circumstances, however, the Nationalist government, along with individual scientists and technicians, succeeded, at least to a certain degree, to develop science and technology in China during the war.

The forum concludes with two empirical case studies that illustrate how these new interpretive ideas work in action. In our fourth piece, Qiong Zhang goes back to the early modern period of the Ming dynasty when China saw a surge of curiosity towards nature among intellectuals, many of whom were scholar-officials, a phenomenon that overlapped with the rise of interest in natural history in Europe. Unlike those in Europe, however, Chinese intellectuals were particularly drawn to exotic things. As they investigated those "material objects," they were able to gain knowledge about nature. Zhang focuses her research on Xie Zhaozhe, an atypical Chinese intellectual well versed in Confucian Classics, and closely examines his participation in what is known as the bowu (discourse of things) activities in China. Zhang's research reveals how Chinese intellectuals like Xie created a model of science-making infrastructure, fundamentally different from the previous one which emphasized the moralistic approach to natural studies (*gewu zhizhi* **wuzhizhi* - the study of things to attain moral knowledge), as formulated by Neo-Confucian philosophers of the Song dynasty (960-1279). This phenomenon reveals the rise of an empiricist attitude towards science in pre-modern China, which paralleled a similar development in Europe in the same period.

Xin Zhang completes the forum with an empirical study of shipbuilding before the modern era to complement his earlier methodological and historiographic study. With an overview of the evolution of technology in shipbuilding throughout Chinese history before the nineteenth century, Zhang attempts to answer the question of what characterizes China's own history of technology. Through the research, he demonstrated how the development of shipbuilding technology in China between the early civilization and the late imperial period intertwined with various historical changes as it struggled to meet the needs of the country's economic development while weathering disparate adverse circumstances. Zhang believes that what distinguishes the Chinese experience isn't just the technological achievements that have contributed to the country's prosperity for centuries, but also the ability of its shipbuilders to seize the opportunities and navigate the

difficulties with a high level of adaptability, both of which helped the technology to persist and develop over time. It is this combination of achievements, ability, and adaptability that afforded Chinese technology its own character and identity.

Why is this special issue important, and how should readers use this set of articles? We would like to emphasize several interpretive contributions that break with past practices or seek to build an emerging consensus. In conducting new studies, historians should consider evaluating “Chinese” science and technology in both the pre-modern and modern periods on their own terms rather than using “the West” as a comparative benchmark. Otherwise, we risk falling back on the ideas of modernization theory forty years after first criticizing it. On the other hand, if we abandon terms such as science and technology altogether on the grounds of inherent Eurocentric bias, we risk exoticizing China’s past. The country’s experience is distinctive and important but not unique. In fact, we would like to emphasize that our historical categories must *both* capture that distinctiveness *and* relate China to a broader global story. Here language such as resonances, parallels, divergences, adaptations, exchanges, encounters, and entanglements helps to transcend simple “East-West” binaries as well as claims of exceptionalism either on the part of Europe or China. In its most abstract form, this idea translates into a “both/and” rather than an “either/or” framework of analysis when examining interpretive problems.

In addition, we would like to emphasize two additional interpretive claims. First, future work should approach the relationship between human activity and the natural environment in a new way, recognizing the active role played by non-human Others in shaping our shared past. All human behaviors are inextricably entangled with those of the plants, animals, fungi, microbiota, soils, water, air, minerals, and physical terrain that surround and, ultimately, define us. Second, future research must set aside the “failure” narrative that has clouded our judgment about Chinese history throughout the late imperial and Republican periods, including in the realm of science and technology. Even in the realm of the environment, simplistic stories of decline have led us into a teleological cul-de-sac. Here again, we find it more useful to think in terms of exchanges, encounters, and entanglements rather than the dialectics of East-West, tradition-modernity, and success-failure.

We believe that readers can use our articles in several ways. First, our articles introduce new students to the relevant historiography, without adopting a reductive “state of the field” approach. They could appear in comprehensive exam lists and the syllabi for methods courses and field

seminars on the history of Chinese science, technology, and environment. Second, our articles chart a potential course for future research and can help shape new projects with more experienced researchers in these specialized areas. Finally, they raise broader questions about how to “do” Chinese history, particularly by addressing the nature of historical agency, the legitimacy of different forms of knowledge production, the ways scholars periodize China’s past, and the tensions between cultural particularity and global connections. We hope to provoke a broader discussion about these seminal issues that engages our field as a whole. It’s time to get back to basics.