BOOK REVIEW
Rui Kunze and Marc Andre Matten, *Knowledge Production in Mao-Era China: Learning from the Masses* (Lanham, MD: Lexington Books, 2021)

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What did "science" mean during the Maoist era? And how did the Chinese Communist Party promote a particular conception of science to the Chinese people? *Knowledge Production in Mao-Era China* sets out to answer these questions, examining how official discourses of science in the early People's Republic of China took shape and were popularized. Using case studies that take us from the commune to the factory floor, the book traces how ideology, politics, and scientific practices were interactive and mutually constitutive: socialist science emerged in tandem with revolutionary shifts in populist governance. In the process, the book reminds us that knowledge production is never neutral, but rather a social process that is both "historicized and situated" (xvi).

Throughout the book, authors Rui Kunze and Mark Andre Matten build on the pioneering work of scholars like Sigrid Schmalzer, Fa-ti Fan, and Joshua Eisenman, who have argued persuasively for the need to take Mao-era science seriously on its own terms.[1] Yet, as Kunze and Matten point out, the scientific pursuits of the 1950s and 1960s have remained marginalized for two main reasons: first, because of the overt alliance between Chinese science and Maoist class struggle, which has run counter to persistent stereotypes about the universal, rational, and politically disengaged nature of science; and second, because of post-1978 discourses which have positioned Deng-era science as a total rupture from the preceding decades. *Knowledge Production in Mao-Era China* does a great deal to resuscitate both the significance of Maoist science and the continuities in Chinese science production across the Mao-Deng divide. Arguing that science popularization is itself a form of knowledge production, the authors show how Maoist scientific experimentation was not just a search for knowledge but more importantly a "social practice" that aimed to generate significant sociopolitical change (xxi).

Perhaps the key way that Maoist science stimulated political engagement, undermined entrenched hierarchies, and contributed to the technological breakthroughs of the later Reform period was through its emphasis on experience and practice. Throughout much of the early PRC, and particularly in periods of national mobilization like the Great Leap Forward (1958-1961), the Party leadership promoted a vision of science that privileged technology and applied knowledge over abstract theory. Following the Sino-Soviet split and the increasing geopolitical isolation of the PRC, this approach to science promotion more urgently stressed the need to rely on the local knowledge and hands-on experiences of ordinary Chinese people as a way of overcoming resource constraints.

Despite the devolution of scientific innovation to the masses, science popularization was not devoid of centralized state intervention. Much to the contrary, the Party leadership guided knowledge production at each step: from defining which pursuits were legitimate to propagandizing technological breakthroughs on a national level. The intended result of these undertakings was to incorporate the masses into a shared understanding of Maoist ideology, class consciousness, and nationalist sentiment. Of course, this outcome was not always met. Different people interpreted the messages of science dissemination in different ways, and many resisted state intervention into agricultural and medical practices when it conflicted with local knowledge or traditional conventions.

Knowledge Production in Mao-Era China adopts a wide temporal scope, cycling between Republican-era precedents, the Maoist period, and Reform and Opening to show how the discourse of science has remained authoritative in twentieth-century China despite shifts in what "science" has meant, how it should be pursued, and who has the power to pursue it. Chapter 1, "Defining Correct Science," shows how the Maoist state rhetorically distinguished between "science" and "superstition," but was far more flexible than its Republican predecessors as to what types of scientific knowledge were legitimate. Local knowledge based on direct experience, as opposed to strictly elite, technocratic knowledge, was embraced as useful and appropriate, even as it may have flouted conventional Western assumptions about what science entailed. Moving from defining science to promoting a particular view of science, Chapter 2, "Creating the People's Science," examines three forms of science popularization: exhibitions, films, and magazines. Building on Denise Ho's work,[2] Kunze and Matten show how each of these forms of knowledge dissemination advanced a socialist ideology that encouraged its viewers to pursue scientific experimentation on the basis of their own lived experience.

The following three chapters use case studies to illustrate how science was pursued for local and pragmatic purposes. Chapter 3, "Promising a Bright Future," looks at how the Maoist state attempted to mechanize agriculture while grappling with insufficient funds and limited technologies. Compounding these economic problems was an ideological conflict in the Party leadership: while Mao sought to achieve technological modernization through voluntarism and collective action, others like Liu Shaoqi preferred to rely on technocratic expertise. Throughout the first two decades of CCP rule, the pendulum alternated between these two extremes. Yet particularly as the PRC found itself increasingly isolated from the international community, mass science gained the upper hand. The Party leadership encouraged farmers to innovate by drawing on local needs and practices, an appeal that met some degree of success through the example of locally produced ball bearings, which facilitated the use of wagons and carts in the absence of more advanced modes of transport.

Chapter 4, "Producing Knowledge on the Shopfloor," moves from the countryside to the factory. As with agricultural modernization, industrial advancement was similarly shackled by resource constraints. The solution, likewise, was an appeal to self-sufficiency and on-the-ground innovation, which would serve both practical and ideological purposes: if laborers proved to be just as inventive as technocrats, then existing social hierarchies would naturally flatten. One way that local knowledge was marshaled toward rapid industrialization was by supplementing steel with indigenously produced materials like nodular cast iron. The last case study, "Creating a Bifurcated Knowledge System," examines the example of Chinese veterinary medicine to describe how this new approach to veterinary treatment – one that combined both Western and indigenous knowledge – was hailed as a successful example of privileging practice over abstract theory. By prioritizing a flexible approach to therapeutic knowledge that considered local needs and conditions, Chinese veterinary medicine was able to integrate "different knowledge traditions without seeing them as mutually exclusive" (117).

The final chapter, "Re-Shuffling Science in the Reform Era," serves as both a conclusion and an extension of the authors' observations into the post-Mao period. Joining authors like Joshua Eisenman and Sigrid Schmalzer, who have argued that the scientific contributions of the Mao era were less an aberration than a building block for the subsequent Deng administration, this chapter likewise posits that Maoist mass science continued to influence Chinese scientific pursuits well past the 1970s. Despite the return to professionalization and the vindication of technocratic expertise beginning in 1978, Maoist contributions to knowledge production were not completely overturned; as Kunze and Matten argue, one lasting legacy of the Maoist period was the emphasis on experience, applied practice, and the equation of science with technological innovation.

While the case studies examined in the book are not particularly robust, the major contributions of the monograph are more theoretical than empirical. At several points, Kunze and Matten encourage us to question entrenched binaries like science/ superstition, foreign/indigenous, traditional/modern,

and radical/technocratic to instead embrace a more capacious conception of scientific knowledge, one that is able to incorporate multiple epistemic viewpoints simultaneously. Their conclusion is particularly thought-provoking. Suggesting that we move to replace discourses of "science" with those of "knowledge" more broadly, the authors argue that a shift away from the limited rhetoric of "science" will enable us to pivot from Eurocentric conceptions of scientific practice in order to consider the contributions of different epistemological traditions equally.

I am grateful for the opportunity to extend the insights of this book through a conversation with the authors. There are three points that I've been ruminating on and would be curious to hear Kunze and Matten's thoughts. First, the authors' reminder of the need to challenge discursive binaries is certainly apt, but their solution to this intellectual problem often involves the replacement of one set of binaries with another. For example, in Chapter 3, they note that the main operational binary invoked in periods of mass science was not simply one that contrasted "radical" with "technocratic," but rather one that juxtaposed *tu* (native, local) with *yang* (foreign). Similarly, in Chapter 5, although veterinary medicine may have bypassed the typical binaries of "science/ superstition" and "foreign/indigenous," propaganda materials nevertheless foregrounded a dichotomy between "new veterinary medicine" and "folk veterinary medicine." Is it possible to conceive of an approach to Maoist science that circumvents binaries altogether? Is there another conceptual paradigm we can consider that would enable us to acknowledge the epistemic contributions of Chinese scientific production without juxtaposing them to a Western "other"?

I am particularly curious about this question in terms of how it relates to discourses of science and superstition. As Kunze and Matten rightly point out, definitions of what constituted science and superstition "were not consistent and stable" across the twentieth century (19). Instead, the authors argue that the fight against superstition "was not a fight trying to dispel wrong knowledge, but rather one to dispel the myth of the expert and his power – fundamentally it dealt with the issue of class struggle" (18). Yet, questions of expertise notwithstanding, superstition *did* involve wrong knowledge. Practices like divination and *feng shui* were consistently deemed feudal, backward, and unscientific throughout the entirety of the Maoist period (as well as earlier and later periods). To what extent, then, was there an authoritative and stable standard for judging what constituted correct and incorrect, right and wrong forms of knowledge-seeking? And what did this standard entail?

Finally, what resonated most with me about this book was the authors' appeal to taking seriously the epistemic and practical contributions of Chinese knowledge systems. In China studies, we have become very comfortable with examining how Western science traveled around the globe and was interpreted and deployed locally. But I am equally curious about the reverse process. In what ways can Maoist mass science challenge our understandings of "science" on a global scale, beyond the boundaries of the PRC? How might Chinese approaches to knowledge production reorient, challenge, and expand typical conceptions of scientific inquiry from non-Chinese perspectives? What happens if we stop considering Chinese science as "alternative knowledge" (132) and instead approach it as different but equal? And is it possible to trace the transnational influences of Maoist science, thereby shifting our impressions of knowledge flows as always moving from West to East?

These are difficult questions – and ones that I certainly don't have the answer to. But *Knowledge Production in Mao-Era China* has invited the possibility for thinking broadly and deeply about what we mean by "knowledge" in the first place, and how the Maoist experience provides an opportunity to challenge engrained ideologies about what science is and who has the ability to practice it.

[1] Sigrid Schmalzer, *The People's Peking Man: Popular Science and Human Identity in Twentieth-Century China* (Chicago: University of Chicago Press, 2008); Sigrid Schmalzer, *Red Revolution, Green Revolution: Scientific Farming in Socialist China* (Chicago: University of Chicago Press, 2016); Fa-ti Fan, "Science, State, and Citizens: Notes from Another Short," *Osiris* 27, no. 1 (2012): 227-249; Joshua Eisenman, *Red China's Green Revolution: Technological Innovation, Institutional Change, and Economic Development under the Commune* (New York: Columbia University Press, 2018).

[2] Denise Ho, *Curating Revolution: Politics on Display in Mao's China* (Cambridge: Cambridge University Press, 2017).

Response

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We are grateful to Emily Baum for her thoughtful review of our book and for her questions. Many thanks to Yidi Wu for arranging the review, which offers us the opportunity to share our findings and thoughts with the PRC History community.

Knowledge production, especially the production of scientific knowledge, in the Mao era is not only an integrated part of the PRC history and history of the Cold War, but also an excellent case that urges us to rethink the conception of "science 科學" in historicized and situated contexts. To do so, we bring to the fore issues such as legitimate producers and evaluative criteria, process and purposes of science dissemination, as well as how "science" manifested itself in economic sectors such as agriculture, industry, and veterinary medicine. Following pioneering works of colleagues,[1] we propose to understand the production of scientific knowledge in Mao-era China as a social process, which takes political and socio-economic factors seriously. Meanwhile we highlight its experimental nature by showing how the pragmatic knowledge pluralism adopted by the CCP (Chinese Communist Party) led to violent fluctuations and conflicts. In particular, the highly experimental Maoist mass science, with its visions of social equality and synergy of professional and experience-based knowledges, contradicts essentially the CCP's authoritarian use of "science" for its presumed universal truthfulness.

As the reviewer points out, one major question we explore is: to what extent can the long-standing paradigm, which is based on the epistemic binaries such as West vs. East/China, universal vs. local knowledge, still help us understand the Mao era, whose global entanglements of ideas, peoples, and technologies have come to be recognized by researchers?[2] With the intervention of postcolonial theory in the history of science, writing about knowledge cultures in the periphery, with its assumption of the West as the center, has come under growing scrutiny. Numerous studies on the self-assertion and dissemination of non-European local knowledges have further shown that the dichotomous categories of modern vs. traditional knowledge, scientific vs. antiscientific practices should not be taken for granted.[3] Replacing "science" with the more accommodating term "knowledge," we approach the production of scientific knowledge in the Mao era as social practice. This allows us to circumvent the problematic epistemological categories that imply civilizational hierarchy and presume a unified notion of science.

In our three case studies, we discuss the juxtaposition of *tu* 土 and *yang* 洋, which we frequently encounter in source materials, where the former was generally preferred over the latter (especially during the Great Leap Forward era). While this sounds binary and ideological, it should not be dismissed lightly. Exercising what Sigrid Schmalzer calls "layered reading" of these sources,[4] we deploy this dichotomy heuristically to reveal the drastically swaying state policies regarding knowledge producers and knowledge produced – between local non-experts (*tu*) and trained experts (*yang*); experience-based knowledge (*tu*) and professional knowledge (*yang*).

The reviewer raises the question whether there are forms of "wrong knowledge" that were deemed superstitious in twentieth-century China and to what extent there was "an authoritative and stable standard for judging what constituted correct and incorrect… forms of knowledge-seeking." We propose to understand "superstition" as a heuristic device, which leads us to ask questions, such as how to define "wrong knowledge" and/or wrong episteme, by whom and for what purposes. In other words, it should bring us to examine (the contention for) the authority of knowledge. The reviewer's quote from our book that superstition was rather a fight "to dispel the myth of the expert and his power" is one

example at the historical moment of the Great Leap Forward era, when the party-state put into question the legitimacy of professional knowledge and the authority of the expert in order to champion mass science. There were numerous contestations over what counted as legitimate knowledge in both the Mao-era and the post-Mao decades, including several anti-superstition campaigns led by the party-state. The topics ranged from divination and *fengshui* 風水 to extrasensory powers (endorsed by Qian Xuesen) and then *Falunggong* 法輪功 in the late 1990s, not to mention the perennial debates over Traditional Chinese Medicine (TCM) – including the ongoing debate over its use for preventing and curing Covid-19. The definition of correct vs. wrong knowledge, therefore, is not just based on the consensus of the scientific community, but can also be a political act entangled with contemporary social issues and religious traditions. The complexity of various forms of "superstition" may explain the different degrees of success of the state's interventions. In our study, we discuss unorthodox knowledge and practices in Maoist mass science, such as white steel and Chinese veterinary medicine. The purpose is not to juxtapose "correct" and "wrong" knowledge (traditions), but to point to various factors that the legitimacy of knowledge hinges on, including evaluative criteria, local power relations, and socio-economic conditions on the grassroots level (such as the availability of resources and expertise).

The negotiations of legitimate knowledge were not limited to China. Visiting China in the 1970s, American leftist scientists and members of the Black Panthers discovered a new understanding of science and technology that enabled them not only to debunk "the myth of an apolitical and benevolent science that prevails in America",[5] but also to rethink what "science" should be, including its meanings and image, producers, and applications, etc. In some cases, with acupuncture and TCM as the most prominent examples, these international interactions contributed to the transfer of technological innovations and scientific practices of China to the United States and Europe. The transfers themselves are not necessarily a reliable indicator for their success, but they certainly demonstrate how the discourse of science and technology changed and to what extent it was adapted and appropriated by various parties. In this sense, we feel the reviewer's third question about the need to understand knowledge transfers *from* China is relevant and timely. Sharing Fan Fa-ti's view, we believe that the history of science and technology can no longer be seen as monodirectional.[6] We should reevaluate the potential contributions and consequences of knowledges developed from different epistemologies, social and political agendas, and to take them seriously. Given the party-state's current ambitions and increasing investment in the science and technology sector, how are Chinese approaches to knowledge production going to transform established conceptions of scientific inquiry is one of the most fascinating questions, which will eventually become a global challenge – when we think of pandemics, artificial intelligence, and surveillance technologies.

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[1] For example, Sigrid Schmalzer, *Red Revolution, Green Revolution: Scientific Farming in Socialist China* (Chicago: University of Chicago Press, 2016); Joel Andreas, *Rise of the Red Engineer: The Cultural Revolution and the Origin of China's New Class* (Stanford: Stanford University Press, 2009); and Miriam Gross, *Farewell to the God of Plague: Chairman Mao's Campaign to Deworm China* (Berkely: University of California Press, 2016).

[2] Wang Zuoyue pioneers the research on the transnational movements of Chinese science and technology. See also the special issue of *Comparativ – Zeitschrift für Globalgeschichte und vergleichende Gesellschaftsforschung* vol. 29, no. 1 (2019): "Moving Knowledge—The Soviet Union and China in the Twentieth Century", edited by Marc A. Matten and Julia Obertreis; John Krige, ed. *How Knowledge Moves: Writing the Transnational History of Science and Technology* (Chicago: Chicago University Press, 2019).

[3] For example, Dipesh Chakrabarty, *Provincializing Europe* (Princeton: Princeton University Press, 2007); Lei Sean Hsiang-lin, *Neither Donkey nor Horse: Medicine in the Struggle over China's Modernity* (Chicago: University of Chicago Press, 2014); Burton-Rose,

Daniel, and Wu Yi-Li. "Acupuncture, the Black Panther Party, and People's Medicine." *Asian Medicine* 16, no. 2 (2021): 251–75.

[4] Sigrid Schmalzer, "Beyond Bias: Critical Analysis and Layered Reading of Mao-Era Sources," *positions* 29: 4 (November 2021): 759–782.

[5] Science for the People, *China: Science Walks on Two Legs. A Report from Science for the People* (New York: Avon Book, 1974), p. 4.

[6] Fa-ti Fan, "East Asian STS: Fox or Hedgehog?" *East Asian Science, Technology and Society: an International Journal* 1 (2007): 243–247.