Science and Technology in Modern China, 1880s-1940s

Edited by

Jing Tsu and Benjamin A. Elman

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Introduction

Jing Tsu and Benjamin A. Elman

In the past several years, China historians and literary scholars who study the culture and institutions of modern science have developed a strong interest in comparative methodology in intraregional and global histories. Critical interests are merging in new ways in an effort to rethink the impact of nationalism, the ways in which ideas and technology interact and circulate, and new intersections between local episteme and global knowledge. This is, in part, due to a felt need to move beyond the "belated" hypothesis of the development of science in China (the "Needham paradigm") based on the often-reified "Western" frame of comparison. How to go about this, however, has been a question of some debate and dissensus. This volume results from a two-day symposium that was convened in New Haven, Connecticut, in January 2010, to address these methodological crossroads and changing historical viewpoints.[1] The conference brought together junior and senior scholars of history, history of science, and literature in an attempt to reevaluate the meaning and practice of "scientism" in nineteenth- and twentieth-century China. Revisiting the foundations of modern intellectual history as well as charting new directions in the study of science and technology in relation to culture, we identified the following themes:

- Intellectual History and Humanism
- Language, Translation, and the Technology of Scripts
- Scientism and National Empires of Knowledge
- Lexical Changes and Epistemological Shifts
- Professionalizing Science
- Dissemination, Circulation, and Competing Networks
- Popular Science and Empirical Practice in Everyday Life

1 We thank the Council on East Asian Studies and the Department of East Asian Languages and Literatures at Yale University for sponsoring this project, which was also supported by the East Asian Studies Program at Princeton University. The Andrew W. Mellon Foundation has provided a timely publication subvention for the conference volume.

It became clear to the editors that one of the major lacunae in the study of "modern science" in China was the late Qing and Republican era, from the 1890s to 1949. Wedged between a period of prolific missionary translation activities accompanied by domestic technological buildup in the nineteenth century, on the one hand, and the state-driven agenda of the Communist period starting in the mid-twentieth century, on the other, the setting for science during this transitional period comprised new ideas, failed attempts, and renewed efforts. The experimental nature of these adjustments in part led to a flatly interpreted narrative concerning the alleged lack of adequate growth in science and technology in modern China.[2] This assumed story line was generally taken at face value. In recent years, however, this view has become particularly suspicious, especially in light of the crumbling of the overall premise of deficiency that is associated with the Needham paradigm. For more than three-quarters of a century, Joseph Needham and *Science and Civilisation in China* have supplied the dominant framework for interpreting the limitations of science, medicine, and technology in premodern, "imperial China."

At the same time, above and beyond reversing long-standing presuppositions, our collective examination makes new inroads into a much more varied topography, primarily during the Republican era. In each case under examination, the adapted uses of scientific knowledge range from creative appropriation to disarticulated, small-scale efforts. The result does not always follow planned institutional goals. Nor do these incremental acts necessarily respond, in a unified way, to overarching local, national, or global exigencies of scientific modernity. Together, these different threads weave distinct webs of established, as well as informal, networks. Each locus of activities extended beyond the local frontier while shaping international and global scales of contestation. An analysis of their dynamics disputes a narrative of deficiency and the failure to modernize drawn from the interpretation of late imperial developments. More pertinent to the modern period, an examination of their highly differentiated circumstances forestalls the a priori dominance of any generalizing framework in favor of new conceptual and empirical syntheses.

Beginning during the discussions at the conference and continuing afterward, the editors and participants decided that the papers presented at Yale, and the additional contributions solicited later, could serve as an important first step in readdressing the place of the Republic of China in the history of modern science, medicine, and technology before 1949. Accordingly, at the

2 While the failure narrative was literally deployed in this way, it paradoxically also acquired an expansive, rhetorical utility in projecting the prospect of national, racial, and cultural rejuvenation in the late Qing and Republican periods. See Tsu 2005.

March 2010 Association for Asian Studies Annual Meeting in Chicago, the editors consulted with Albert Hoffstädt from E. J. Brill in Leiden. A blueprint for the present volume was in the making. We agreed that the Yale conference papers would move beyond our earlier fixations on the failures of "imperial China" (see further below) and its impact on understanding modern science in China. We wanted to readdress the unbalanced historiography of the late Qing and Republican periods by finally acknowledging the limitations of uncritically applying premodern labels (disguised as "debates") to the remarkable growth of science and technology, now called "technoscience" (*keji* 科技) in China, during the twentieth and twenty-first centuries.[3] In this light, habitually invoked concepts and categories for comparison such as "logic," "freedom," "natural law," "despotism," "classical Greece," "ideograph," "linear perspective," "capitalism," "Westernization," and so on would require a new set of historical sensibilities as well.

Our discussions also helped us realize how murky our understanding of the history of science, medicine, and technology in Republican China had become when viewed through the refracted shadows of the premodern historiography on science in imperial China before 1850. The Yale conference brought together the leading lights in the modern field, whose new and ongoing work make this new turn in understanding "science in Republican China 1911–1949," possible. This volume is thus not only one of the first to move beyond past historiography about late imperial China, but also one of the first interdisciplinary efforts to explore the contemporary implications of science during the two "republics": the ROC since 1912 and the PRC since 1949.

Just as past limitations are taken into account in these pages, the desired new perspective also brings its own challenges. To be sure, a paradigm shift will not be accomplished within the confines of a single volume. At the same time, our attempt resonates with similar stirrings in other corners of China studies. We join the recent chorus of scholars who are engaged in rethinking the customary methods used in comparing China and the West, which have generally downplayed the primacy of intraregional influences and other local-global circuits of transmission. The focus, instead, on large differences between grand civilizations has traditionally set the terms of comparison from the time of Needham to even more recent works on empires that seek to rebrand the "Asian Age."[4] Lately, everywhere a "China theory," or something with a Chinese

3 Kurtz 2011 provides an example of how the new literature approaches topics such as "logic" as a factor in the history of science in China.

4 Frank 1998.

twist or characteristics, is propagated to stand as an alternative developmental and historical model to Euro-American versions of capitalism and modernity.

While it has been instructive to reverse the terms of asymmetry for heuristic purposes in this way, the editors also hope to encourage further steps by suggesting a global context for reevaluating China's scientific modernity. Among other things, the paths that were not taken in the history of the West are no longer recapitulated as examples of belatedness or lack of development, confined to non-Western contexts. Instead, we consider these other historical scenarios as active shifts in the standards of comparison, thereby highlighting the multiple possibilities of divergence in materializing the various shapes and scales of modernization. This includes, rather than defines itself against, that which has been traditionally referred to as "Western." While the past is prelude to the present and future, our currently changing "present" standpoint on the "past" may not have much of a "future" in a reassessment of the global history of modern science.[5]

Part of the methodological challenge stems from the evolution of the field of China studies itself. Premodern historians, for instance, have tended to reify the perennial fields of "Chinese Science" (CS) and "Traditional Chinese Medicine" (TCM). Looking back from the present in reverse teleology, they opt to essentialize in order to explain the recurrent natural philosophies that informed premodern intellectual life in imperial China.[6] Working in fields that existed before the rise of modern science even occurred in either Europe or China, such studies have anachronistically stressed the "failure" of these fields (CS and TCM) to become modern in imperial China on their own.[7] There have been notable exceptions. Premodernists like Nathan Sivin, for instance, have artfully exposed Needham's ideological blind spots in relation to Daoism (misreading who ancient Chinese scientists were), Marxism (overdetermining Chinese despotism), and capitalism (inflating the limits of Chinese commerce). Needham's assumptions, Sivin shows, were so far off the mark that they compromised Needham's "grand titration" of East and West.[8]

Despite such suggestive advances beyond Needham, premodernists have also spent much of their time researching issues in earlier natural studies while continuing to explain why modern science, technology, and medicine arrived so late in China. Recent efforts by Geoffrey Lloyd and Nathan Sivin in their

5 Sivin 1978, for example, provides an incisive review of Elvin 1973 by attending to the book's use of evidence pertaining to science and technology.

6 Sivin 1995a.

7 Elman 2006.

8 Sivin 1995b; see also Sivin 2005. Compare the more radical critique of Needham in Hart 1999.

book *The Way and the Word: Science and Medicine in Early China and Greece* (2002) are a case in point. They reaffirm the millennial differences in mentality between the ancient Chinese (as monolithic and uniform in their imperial worlds of public discourse) and the decentralized city-state Greeks (as inherently disputatious). Earlier, Frederick Mote had contended in his *Intellectual Foundations of China* that there existed a deeply metaphysical "cosmological gulf" between ancient China and the West that had continued into modern times.[9] Like Mote's book, Lloyd and Sivin's *The Way and the Word* reestablished incommensurability between the "ancient" Chinese and Greeks as a background gloss to explain why modern science and medicine appeared first among modern Europeans in the classical-Greek-oriented West.[10] Such asymmetrical grounds of comparison have been uncritically applied to the evaluation of other cultural and linguistic forms. On the level of language, for example, the perceived differences between "alphabetic" and "ideographic" writing systems, representing Greek and Chinese civilizations, respectively, have for centuries been made to support the claims about the West's unique capacity for abstract thinking.[11]

The "Needham Question"—Why did a divided Europe, and not imperial China, develop modern science first?—until recently remained preeminent. This question was paralleled by continuing scholarly efforts in other fields to explain why China did not develop capitalism or democracy before Europe.[12] We are, however, now entering a new era that explores modern science in Republican China in more active, rather than simply receptive, terms. What was once vaguely described as appropriation can be seen in stronger relief by examining the specific contexts of agency and mobilization. Increasingly, we are able to address modern science in Republican China from a comparative point of view and include it in the story of global science, instead of excluding it on the view that its predecessors in China had failed to materialize it in a particular way. Our volume thus recasts the roots of modern science in the late Qing and its continued development in early Republican China, rather than building a house of cards on the abstractions that are associated with the Olympian vision of the premodernists and that start with ancient Greece and China.

9 Mote 1989, 12–25, 95–96.

10 Needham 1969, 150–168; and Lloyd and Sivin 2002, passim. Lloyd 1990 has usefully recognized the danger of anachronistically positing perennial "mentalities" to explain long-term historical developments in mind-sets. Cf. Kuhn 2000.

11 Tsu 2010.

12 See Pomeranz 2000; Jones 1987; and Needham 1959, 150–168.

As part of the broad history of China's modern transformation, it will continue to be useful to make references to the advent of Western science. One sees great promise of further, innovative interpretations when one moves beyond identifying similarities and differences, impact and response. Rather than unfairly homogenizing both Chinese and Western contexts in the process by naming what one has in terms of what the other does not, the possibility of their comparison is considered anew in the following pages. Westernization has been a historically necessary, but in itself insufficient, explanation for how science developed in modern China. In a similar way, we no longer can afford to deflate the place of science, or the platform it provides, in China's increasing participation and growing stakes in the contemporary world. China's plans to send expeditions to the moon and Mars in the twenty-first century are partly a response to the shock of heavy-handed Western and Japanese imperialism since 1850. It is therefore important that the role of modern science, technology, and medicine in contemporary China is properly considered in its varied social, political, and cultural dimensions—and not only by historians of science.

While China's quest for modernization has often been described in terms of progress and developmental models, it is better analyzed as a complex process through which China sought to reboot itself in an unfamiliar global order. In this regard, the demonstrability and reproducibility of knowledge across contexts were of exceptional importance. It is impossible to appreciate the significance of science in modern China without taking into account how well it can be communicated to, and grafted onto, existing knowledge structures and infrastructures. China's experience of modernity has also been marked by a general distrust of knowledge, both local and foreign. Though empiricism, experience, and experiment are more commonly associated with questions of truth value, they were just as often implicated in debates about believability and utility. Could science, then, be relied upon to cross boundaries? Or would it work only where complicated systems were in place to support it? How could the Chinese be confident about their new understandings when appearances and well-established systems had failed before?

The role of the Chinese state in modern science continues to be decisive. But a state-centered approach to modern science, however useful, would be incomplete without an equal emphasis on the global and comparative issues involved in the mastery of modern science in different social and cultural strata. We have also overlooked the advent of early Chinese practitioners and intellectuals who acted as spokespersons for modern science, before the "scientist" became an accredited informant. At the same time, we need to rethink our reliance on the early, at times crude, political rhetoric and philosophical

theory enunciated by Chinese publicists of science since the 1919 May Fourth Movement. While they championed the cause of a "Mr. Science" made in Japan that was called *kexue* 科學, they left few directives and theoretical foundations on which further pillars could be built. The problem is how best to incorporate these different emphases into a more conceptually coherent, while empirically differentiated, picture.

Similarly, we must problematize post-Mao efforts to distinguish Chinese socialism from scientific progress. Most Euro-American and Chinese accounts have indicted Maoist mass science and its rhetoric of science's role in class struggle as a smokescreen for power politics. We have elided what socialist ideals were about during the Great Proletarian Cultural Revolution from 1966 to 1976. Although the victimization of many scientists during this period and the role of Maoist ideology in leading some Chinese scientists to oppose relativity in the name of dialectical materialism, for example,[13] are important issues in the unmasking of Maoism after 1976, the broader aspects of understanding why mass science appealed to many Chinese and some Euro-Americans in the 1960s force us to question the easy separation of scientific practice from social and political agendas.[14] More researchers in socialist laboratories will reveal the peculiar nature of socialist rhetoric and communist institutions in forging myths about science that enhance its revolutionary status in China and elsewhere in the increasingly postsocialist world. After all, liberal capitalist ideals have informed our own Euro-American notions of modern science as the sine qua non for the rise of the middle classes via science and engineering since the industrial revolution.

In sum, the account above, taken as a whole, suggests a number of ways that a comparative history of science can lead us in new directions. First and foremost, historicizing the Western scientific revolution in a global context makes it possible to compare other, non-Western approaches to modern science without reducing such efforts to simple reception history.[15] Second, differential studies that wield appropriate concepts and categories for comparing precise historical situations are mandatory. In particular, case studies can successfully integrate scientific contents and the historically dynamic contexts as the key to moving from the local to the global and back again. We should explore Chinese interests in modern science as scientists there articulated and practiced them, rather than speculate about why they did not act the way Americans and Europeans expected them to act. Future research on the active careers of mod-

13 Wang Zuoyue 2007.

14 Schmalzer 2007.

15 Shen 2007.

ern Chinese scientists, both individually and as a group, will allow us to supersede past accounts of the passive reception history of modern science in China by publicists such as Liang Qichao.

To this end, each of the essays in this volume opens up a potential venue that invites further study and debate. They are organized into two groups: (1) critical historical frameworks and (2) new research directions. As part of the first group, Benjamin Elman's opening essay introduces the terminological changes in the concept of science from the late Qing to the early Republican period. The essay rethinks the historiography of modern science in China in light of the influence of Meiji Japan on the development of modern science there after the 1894–1895 "First" Sino-Japanese War. Meiji-style science, Elman argues, trumped the Western sciences that Christian missionaries and Chinese reformers had enunciated during the "Self-Strengthening Movement" after 1865. In order to move toward a clearer understanding of the place of science in modern China, Elman contends, we need more case studies that successfully integrate the technical contents of scientific assimilation with the historically dynamic contexts in which those contents were deployed. This may require us to move from the local to the global and back again.

At the Yale conference, Wang Hui presented an essay on Yan Fu's translation of Thomas Henry Huxley's (1825–1895) *Evolution and Ethics* (*Tianyan lun* 天演論). Although we could not include it in this volume, we should mention here that Wang noted in his essay that, early on, some readers considered Yan Fu a follower of the metaphysics and epistemology of the *Changes Classic* (*Yijing* 易經). They associated John Maynard Smith's *On Evolution* with nativist discourse, not Darwinian inspired theories. Wang Hui contended that Yan Fu, read in this light, can be understood as a Westernizing scholar who tried to create a universal naming system (*mingxue* 名學) to rationalize the conflicting ideas of evolution, induction, individualism, collectivism, and so forth into an ordered structure. The world of the *Changes* that Yan Fu read into Spencer and Huxley was not a Social Darwinist world of the "survival of the fittest" and "natural selection." What Yan was using Spencer and Huxley for was elaboration of a cosmic principle that was compatible with Chinese discourses of change based on the investigation of things (*gewu* 格物) and Western notions of induction. For our conference, what was important was the fact that Yan Fu's notion of evolution was more than just a reflection of Spencer and Huxley. He used the logic of the *Changes* to articulate a universal human order that would explain human society (*qun* 群), ethics, and politics and that would escape the "competition for survival" that was the source of political chaos.

Focusing on the historiography of science and technology of the modern period, Iwo Amelung provides a panoramic view of the cultural and intellec-

tual context in which science acquired its intellectual and disciplinary significance. Emphasizing the driving force of national consciousness against the larger background of modernization, Amelung examines how science and technology were discussed and interpreted through the lens of national salvation. A key point is Chinese intellectuals' and educators' reclassification of traditional texts in order to reposition scientific knowledge within a worldview that was more familiar to them. Subsequently institutionalized as part of "National Studies," the integration also entailed curricular changes in academic institutions, further reinforcing its legitimacy.

While new classifications made it easier to reproduce scientific knowledge, their artifice is far from neutral. Taking up the issue of how taxonomies themselves constituted the very battleground on which traditional and new systems of thought were amalgamated, Joachim Kurtz analyzes the issue in the intellectual context of an important, if eclectic, National Essence proponent, Liu Shipei. Focusing on this single figure to cross different intellectual terrains, Kurtz demonstrates how Liu used the core disciplines of modern Western humanities—psychology, ethics, and sociology—to reinvent the relevance of ancient Chinese learning.

Together, these four essays (three included in this volume) place science in its broader institutional, intellectual, and epistemological context. Reorienting the basic issues at stake, they pave the way for the next set of essays, which take off in new directions, thereby building different contexts for new research questions. If science in modern China was heatedly debated among leading figures and institution builders, it was often the lesser-known inventors, educators, amateurs, and other unofficial practitioners who helped to bring it to life in the popular consciousness. Turning to the middle strata of knowledge dissemination through its commercial, industrial, educational, media, and regional players, the next set of essays shifts our focus from core intellectual circles to scientism at large. They provide different reference points for the issues outlined in the first set of essays and raise new questions in little-known areas of research.

While knowledge dissemination through translation and popular culture has been widely studied, one hitherto neglected issue is how the general communication between high and popular culture, involving foreign and indigenous words as well as concepts, was also intimately tied to the changing materiality of language. Shen Guowei's, Jing Tsu's, and Thomas Mullaney's essays address the role of language in translation, typewriting technology, and telegraphy, respectively. Departing from the general reliance on translation as a blanket term for a space of autonomy and creative appropriation, Shen explains the semantic nuts and bolts of the notoriously difficult translations of

the late Qing intellectual and reformer Yan Fu. Shen focuses on Yan's complex negotiation with Chinese and Western philological and philosophical traditions, with Japanese as a crucial intermediary. He provides a detailed study of how commensurate meanings are made and unmade in the hands of this pivotal figure during this epistemic transition.

While the contestation between languages in contact is most visible on the level of translated meanings, Jing Tsu argues that the material transformation of the Chinese language in the late nineteenth through mid-twentieth centuries opened up a new, unprecedented playing field. The very physical medium of the Chinese script had to negotiate its own terms of scientific modernity. Turning our gaze toward a hitherto little-studied history of the materiality of the Chinese script, Tsu examines the technological crossing of alphabetic and "ideographic" writing systems since the late nineteenth century that culminated in the invention of a pathbreaking Chinese-language typewriter in the 1940s. This particular invention intersected with several international and linguistic battles that were being waged between civilizational writing systems, global language wars, typewriting technology, late Qing language reform, and the Cold War. It responded in ways that fundamentally changed the linguistic conditions of civilizational strife from the inside out.

Looking at China's entrance into the family of nations, Thomas Mullaney's piece shows how attempts were made to put the Chinese language on equal footing with Western languages through the international codification of telegraphy in the nineteenth century. The favoritism toward the English language shown by the institutionalization of the Morse code, and Chinese telegraphers' strategic maneuvers in response, shed light on the disparate, but no less historically significant, efforts to combat China's disadvantaged entry into global communication. Mullaney explains how these incremental if underestimated technological innovations unfolded and later even became an object of jokes and derision. The study shows that China was already enmeshed in a new global order in the nineteenth century, which required the Chinese to adopt a set of linguistic technologies and symbolic systems structured around alphabets rather than the Chinese script.

If science and technology in China were often enmeshed in questions of sovereignty, their commercial and educational aspects involved a different set of problems. From brand names to academic rivalry, the spread of authoritative knowledge relied on middlemen, entrepreneurs, and professors, as well as scientists, to bring about a widely shared sense of scientific modernity and materialism. Eugenia Lean discusses how science manuals intersected practices of editorship and entrepreneurship as novel knowledge and commerce created the need for authentication. She focuses on the maverick cultural

figure of Chen Diexian, who, among other things, was also a fiction writer. Industrial knowledge, as Lean shows, facilitated the transfer between specialist knowledge and popular consumption. Taking a different angle, Fa-ti Fan analyzes how the cultural authority of science was established in a debate about spontaneous generation in the 1930s. Its level of controversy drew in specialists and spectators alike, making the bounds of experimental science itself an institutionally and epistemologically contested affair. Both essays are concerned with how the authority of science was established in cultural and public discourse.

While debates about the public digestibility of science raged on, Danian Hu takes us back to the familiar intersection between Western propagators and the Chinese audience. Instead of missionaries, however, Hu looks at the collaborative efforts between Western and Chinese academic institutions through the career of the British physicist William Band at Yenching (present-day Beijing) University. Band was interested in making physics available for solving China's social problems, such as the services it could offer to the Rural Reconstruction Movement in the 1930s. His case exemplifies how science was positioned to make tangible social and political contributions that were specific to China's needs.

Harking back to the issue of language, but in the specific context of the geological sciences, Grace Shen looks at how the circulation of scientific authority depended on the access to print sponsorship. Such sponsorship provides a concrete barometer for understanding the degree of interaction, collaboration, and competition between Chinese geological societies and the international scientific community. Maintaining Chinese authority over the development of the discipline in China's hinterland as well as urban areas, on the one hand, and sustaining a friendly line of exchange with foreign channels, on the other, mapped out a distinct local-global nexus for science building.

Finally, Hugh Shapiro's essay turns the rationality of science back on itself by probing the limits of neurosis, insanity, state power, possession, self-mutilation, and cultural taboos against mental illnesses in 1930s Beijing. Using the case of a thirty-year-old woman who communicated her symptoms almost exclusively in the performative style of traditional Chinese opera, Shapiro provides a rare glimpse into the explicit and implicit social and cultural contexts in which mental illness was evaluated, authenticated, and co-opted by perceived norms as well as by the voices of modern medical science. By demonstrating the extent to which mental illness pushed the bounds of both traditional and biomedical prescriptions of psychic expression, Shapiro blurs the distinction between rational science and accepted cultural norms for rationality.

In terms of overall findings, the essays in this volume break much new ground, going well beyond the earlier Needham-inspired limits on the history of modern science in China that Elman's paper describes. Iwo Amelung, for example, contends that the emergence of the historiography of Chinese science and technology needs to be understood as part of a number of larger developments, namely the reception and appropriation of Western knowledge since the late imperial era. Similarly, Joachim Kurtz reconstructs the key elements of Liu Shipei's reinvention of ancient China's intellectual history in Euro-American terms and analyzes the violent conceptual transformations that foreshadowed the many reformulations of the histories of Chinese science and thought published throughout the Republican period. Shen Guowei suggests that Yan Fu made only a cursory effort to use the Japanese concept of "science" (*kexue*) as a core concept of the modern age. Yan himself thought deeply about the full meaning of science, the necessity of adhering to the scientific method, and the nature of scientific terminology. For Yan, however, the fundamental chasm between Chinese and Western scholarship, and the attitudes of traditional society toward "science" and "art," remained in place.

In light of the revolution in communications at the turn of the twentieth century, Jing Tsu shows how machine translation eliminated the possible distortions caused by multiple approximate and overlapping semantic meanings between languages. It also created a different translation, in which language itself was submitted to another level of permeability. The ideograph/word was divided into smaller units of denomination, thereby revamping the basic assumption of scale in a word-to-word translation. For Thomas Mullaney the Morse code connected the Qing Empire to the rapidly expanding international telegraphic network. The product of this convergence was the Chinese telegraph code of 1871, in which approximately seven thousand common-usage Chinese characters were assigned a series of nonrepeating, four-digit numerical codes.

Eugenia Lean addresses the commercializing forces inherent during the early Republic whereby long-standing practices of collecting and compiling knowledge were combined with new forms of industrial and commercial pursuits to popularize and legitimate the incorporation of modern science into daily life and industrial endeavors. Fa-ti Fan shows how science, especially the scientific experiment, gained and maintained its epistemological and cultural authority in Republican China. Scientists formed a group identity and guarded their institutional and intellectual status whereby science became part of a public discourse. Likewise, Danian Hu shows how William Band's mentoring of a large group of top native physicists (including several distinguished women) fostered the study of theoretical physics while making contributions

to the indigenous Rural Reconstruction Movement. The transnational contributions made by individual Western scientists grew out of the special role played by mission colleges.

Grace Shen traces how local scientists deployed language, sociability, and publications first to enroll outsiders in their cosmopolitan vision of Chinese geology and then to carve out a "private" sphere for domestic debate. Both aspects reflected the Chinese understandings of the international scientific economy and their shifting place within it. Hugh Shapiro points to the ambiguous interplay between healing, theater, possession, gods, actors, and patients in the formation of a nascent neuropsychiatry in urban China. The hybridity of competing vocabularies for understanding individual experiences and for analyzing a person's interiority using the clinical terms of psychiatry empowered a sacrosanct-curative-theatrical zone where performance, religious practice, healing, escape, and anxieties about madness comingled.

Offering new frameworks, orientations, issues, and research proposals, these eleven essays draw from the history of science in China, as it has been known and not known, in order to launch the particular intersection between early twentieth-century science and the history of Chinese science as a new starting point. The fate of science in modern China is, after all, far from a uniform or conclusive tale. How it will intersect with and challenge scholarship on modern China is a question we leave open for others to explore.

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