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**Benjamin A. Elman, *On Their Own Terms: Science in China, 1550–1900* (Cambridge, Mass.: Harvard University Press, 2005). Pp. xxxviii + 567. \$55.00.**

Among the many emblems of the modern age, there are few that have been afforded as much attention as “modern science.” As a translator and a diplomat, it has bartered enduring peace agreements between concepts that once battled in our minds as irreconcilable opposites: the infinite and the infinitesimal, matter and energy, application and abstraction, the line and the curve, the square and the circle. In its less than benign manifestations, it has collaborated with the modern state to achieve a power at once devastating and clinical, where a simple “go code” can, through a cascade of transmissions and subdivisions of the horrific totality, project power transoceanically and turn whole cities and their inhabitants into dust. The modern age, it sometimes seems, was itself a by-product of the rise of modern science.

Among the many loose ends in this narrative, there is one in particular that deserves a nice, sharp tug: how do we reconcile modern science’s claims to universalism with its parallel claim to European origins? How can it be both universal and occidental at the same time? Is it not curious that, without exception, the sciences now deemed modern were coined, formalized, and professionalized by scholars hailing from a small handful of western European countries—many of which were emerging as global colonial powers at roughly the same time?

In his bold new work, *On Their Own Terms: Science in China, 1550–1900*, Benjamin Elman sets out to reposition the classically Eurocentric account of modern science. The author mounts a resplendently empirical argument, which commences with a brief but engrossing analysis of late Ming modes of knowledge formation. This is followed with a sustained exploration of a three-part process of transmission, mediation, and incorporation that shaped China’s encounter with European science. In each of these three stages, a complex interplay of historical and cultural factors resulted more often than not in a checkered and turbulent

transmission of scientific information from the West to China, a choppiness that, for Elman, partially explains the uneven development of modern science in China as compared to Europe.

Elman's study focuses on two groups, Jesuit advisors and Protestant missionaries, whom he identifies as the primary transmitters of modern scientific knowledge from Europe to China prior to 1900. Starting in the early 1600s, the Jesuits made inroads into the imperial court by drawing upon their astronomical and cartographic knowledge to answer the emperor's call for a more accurate calendrical system and more precise maps of the empire. Protestant missionaries arrived some two centuries later, responding to the growing demand among Chinese reformers for advanced industrial and military technologies—a demand that, as Elman notes, was itself prompted by China's defeat at the hands of the British in the Opium War.

These three hundred years of scientific transmission exposed Chinese intellectual circles to many of the key elements of Western science. Many of the most important theories and principles, however, did not make the journey. Channels of transmission were frequently filtered or obstructed by powerful mediating forces, particularly the religious commitments of the Jesuits and Protestants themselves. In deciding which scientific theories to convey and how to portray them, these Christian missionaries sometimes delayed or prevented many of the most critical components of the scientific revolution from ever reaching China. As committed Aristotelians, for example, the Jesuits were remiss when it came to introducing the principles of Newtonianism, a factor that delayed the full translation of the *Principia* by over a century. Similarly, Protestant missionaries were highly selective in their portrayal of Darwinism, shaping Chinese understanding of the theory so that it would correspond as much as possible with their own creationist orientation. In other cases, the Jesuits and Protestants themselves had simply lost touch with contemporaneous developments taking place back home, resulting in the not-infrequent transmission of obsolete or disproved theories, which the Chinese then mistook for cutting-edge Western science.

In addition to religious mediations such as these, the transmission of modern scientific knowledge from Europe to China was further filtered and obstructed by members of the imperial court. Because the Chinese court maintained a *de facto* monopoly on interactions with European visitors, any given theory or technology first had to appeal to the court's sense of utility before it could be incorporated into the larger infrastructure of sanctioned knowledge. Consequently, the influx of Western science was subject to a continual litmus test of applicability, a process favoring those imports that could expeditiously resolve pressing problems of the day. Areas of abstract research, such as Leibniz's mathematical notation, received comparatively scant attention, a factor that in this case delayed China's appreciation and incorporation of the calculus.

As a whole, Elman's study is a tremendous achievement in both its analytical insight and empirical depth. At the same time, however, it remains to be seen whether it will succeed in disrupting existing historiographic frameworks. Even when taking into account its rich and nuanced analysis of Chinese scholarship, for example, Elman's portrayal of China remains rather consistent with the classical account of modern science: save for the introductory chapters, China functions for the most part as the recipient of Western knowledge, the only questions being how speedily such knowledge was transmitted, how faithfully it was mediated, and how readily it was incorporated.

By outlining these issues here, the point is not to diminish Elman's work but simply to raise the question: is it even possible to write a non-Eurocentric history of modern science? To explore this question, let's consider some areas of potential intervention and see how they might succeed or fail. One beachhead that has been stormed repeatedly involves appeals to the past achievements of Chinese civilization. The inhabitants of what is now called China, this intervention reads, were among the first to undertake sustained and extensive forays into the realms of hydrology, navigation, medicine, astronomy, mechanics, and so forth. Thus, even though Newton, Copernicus, Leibniz and the rest were credited with the formation of what we now call modern science, the revolution they led would have been impossible had they not stood on the shoulders of Chinese giants.

As Elman demonstrates, Qing dynasty (1644-1911) officials and scholars attempted just such an intervention. Allergic to self-satisfied Western claims of scientific superiority and universality, Qing officials attempted to place a check on European arrogance by officially categorizing physics, chemistry, and other supposed universal sciences under the rubric of "Western Learning"—a method somewhat reminiscent of the way Westerners today use subtle taxonomic distinctions to circumscribe non-Euro-American intellectual and artistic output, donning it "Eastern Philosophy," "World Music," "Traditional Chinese Medicine," and so forth. In later years, the Qing court stepped up these efforts, commissioning Chinese elites to comb through the ancient classics in an attempt to prove that all the great theories of Western science were in fact merely derivative corroborations of prior Chinese discoveries.

Despite these efforts, however, this attempt to recenter the global history of science has failed. First of all, whereas European powers were able to broadcast their narratives into China, the Qing court had no ability to return fire, discursively speaking. Second, European historians and China observers were able to absorb the impact of such arguments and even use them to build an ever more totalizing account of the modern age. In this clever retelling, which Elman dubs the "failure narrative," historians in the West have killed Chinese science with kindness, heaping generous praise upon the ingenuity of the ancient Chinese while portraying their descendants as static and incapable of innovation. For a host of cultural and political reasons, this argument proceeds, China wrested defeat from the jaws of victory, squandering an immense lead in the great marathon of civilization and, in the last few miles, falling behind a group of feisty, late-blooming Western Wunderkinder. Suddenly, the very achievements cited proudly in the Qing narratives were transformed into embarrassments: after all, with everything China had accomplished in the past, how did it fail to take those last few steps—to open the door to the modern age?

In all, Elman's new study deserves to be read closely by anyone interested in history of science, transnational and comparative history, late imperial and modern Chinese history, and European colonialism. At the same time, readers should continue to question, both of themselves and of this wonderful text: is not our definition of modern science so firmly and uncritically tied to European intellectual output that it is perhaps impossible to write anything *but* a Eurocentric history thereof? The terms of the debate, however much Elman and others would like to reconceptualize them, seem to be set out for us in advance, for better or for worse.