
Jacob Eyferth

(Jacob Eyferth (Ph.D. 2000, Leiden University) teaches modern Chinese history at the University of Chicago. His research focuses on the social history of twentieth-century China, in particular the Chinese countryside, with special interest in the history of work, technology, gender, and everyday life. He is the author of Eating Rice from Bamboo Roots: The Social History of a Community of Handicraft Papermakers in Rural Sichuan, 1920-2000 (Cambridge, MA, 2009), and numerous articles dealing with the working lives of non-elite people. His current project traces changes in women’s work in rural China during the Maoist period. Contact: eyferth@uchicago.edu)

Karel Davids’ concise book (278 pages, with index and bibliography) is unlikely to end the debate on why and how Europe gained a technological edge over China, but it performs important work in evaluating earlier positions and pointing out new directions for research. Davids, professor of global history at the Vrije Universiteit Amsterdam, has published widely on the knowledge infrastructures—guilds, navigation schools, universities, etc.—of the Dutch Republic and on Jesuit scientific networks in the seventeenth and eighteenth century. His concern in this book is only partly with the “Great Divergence” between China and Europe; parts of the book are concerned with dating, locating, and explaining the “Little Divergence” between Protestant northwestern Europe and the Catholic South. In the following comments, I will focus on the parts of the argument that are most relevant to historians of East Asia.

This is a synthetic book: it contains little original research but deftly weaves together results from a large number of separate fields. Davids’ central argument, carefully stated and qualified in many ways, is that religious traditions mattered in both the Great and the Little Divergence. This is not a reformulation of Max Weber’s thesis that the inner-worldly asceticism of Calvinist Protestantism gave rise to a modern capitalist mentality, or of Lynn White’s argument that Christianity, by placing mankind above the rest of creation, opened a pathway for the exploitation of nature and for rapid technological advance. Davids rejects the assumption that religious beliefs determined technological behavior; as he rightly points out, the absence of man-nature dualism in East Asia did not prevent Chinese and Japanese from despoiling their environments, and the search for a link between cosmological beliefs and technological change has
yielded few convincing results (pp. 44, 55). To the extent that religion shaped the development of technology, it did so indirectly, through social practices and institutions. Davids looks at three institutional settings: the formation of human capital in apprenticeships, schools, and academies; the circulation of technical knowledge in the form of texts and objects or through the movement of skilled persons; and the role of religious and secular institutions in fostering technological change.

The first question to ask, of course, is when the divergences of Davids’ title first appeared. Davids’ time frame is 700 to 1800, but he does not make a strong case for divergent paths between China and Europe (or Southern and Northern Europe) in the centuries he covers. In the introduction, he states that “in terms of the sheer variety of machines used, China and Europe before 1800 looked remarkably similar” (p. 7), while “the general level and rate of technological change in China and Europe before the end of the eighteenth century did not vary largely” (p. 8). He does see “differences in the nature of technological change” (p. 8): a more widespread adoption and steady evolution of new technologies in Europe; a greater realization of the potential of technologies, especially in the adoption of mechanical devices; a broader scope of change, involving more sectors of the economy (p. 13). On the whole, his story is one of a greater build-up of potential in Europe than in China: a laying of different foundations rather than a dramatic divergence of paths. There is perhaps more than a hint of backward projection in this: because we know that “it was Europe, not China, where the transition to a modern industrial economy began and sustained economic growth took off” (p. 14), the two economies must have differed in important ways before that take-off happened, even if observed levels of technological competence are not dramatically different.

Most of the introduction and the first chapter set out the framework for Davids’ thesis that differences in technological performance are at least partly caused by religious factors. Technology is narrowly defined as “the abilities of people to control or transform nature for productive ends,” excluding, for example, domestic techniques such as cooking and home-making (p. 27). Theories that locate technological inventiveness in visions of nature and man’s place in creation are discussed at great length and found wanting: religious teachings at both ends of the Eurasian continent were too complex and internally contradictory to allow for generalizations, and there is little evidence that religious views in Europe or China translated into coherent sets of attitudes regarding technological change in any systematic way.

Chapter Two takes on one of the indirect ways in which religion may have shaped the path of technological development: through the formation of human capital, defined (following Fritz Machlup) as the investment in
individual persons in ways that enable them to produce more or better
goods or services, earn higher pecuniary incomes, spend their incomes
more intelligently, and develop an enhanced appreciation for the “finer
things” in life. It is not clear why Davids adopts a terminology that
presupposes a fully monetarized, capitalist economy in which people’s
actions are motivated by the desire to earn and spend higher cash
incomes—clearly an unwarranted assumption for much of the medieval
and early modern world. There is however little doubt that formal and
informal education is a crucial factor if one wants to understand the
trajectories of technological change. Davids first discusses formal learning,
in particular literacy and numeracy. Given the scarcity of data, he often has
to deal with proxies: the ability to sign one’s names and the quantity of
books in circulation stand in for literacy; the ability to accurately report
one’s age for numeracy; literacy and numeracy then stand in for
technological competence and human capital formation. These are
methodologically awkward operations, and Davids fully acknowledges the
resulting uncertainties. As in the earlier discussion of levels of technologi-
cal competence, the evidence on educational attainments is too limited to
make a hard case for a divergence between Europe and China before 1800.
Davids then moves on to a discus-
sion of schools, in particular the role of
European religious institutions in offering primary and secondary
education to ever larger numbers of students. His discussion of Chinese
schooling is short and based on a somewhat selective reading of the
secondary literature. He sees a decline of Buddhist education after the Tang
and a growing tendency from the Song “towards a system composed
of a multi-layered state school complex and a network of private schools” (p.
82). This reading allows him to contrast a diverse European landscape in
which monastic houses, mendicant orders, and territorial states vied to
provide education, with a Chinese case in which religious institutions were
pushed aside, leaving the educational field to the state. What is missing
here is an appreciation of the factors that really drove popular education in
Ming and Qing China: the supply of teachers from the ranks of
examination candidates and the desire of local communities (families,
lineages, and villages) to prepare their sons for careers in civil service or
business.

Davids is on firmer ground when he deals with vocational education.
China had few institutions comparable to the mining, navigation, and
fortification schools and professional academies that sprung up across
Europe since the Renaissance. Technical training in China “overwhelm-
ingly took place via informal learning in the framework of families.” This is
true as far as it goes, but to understand vocational training in premodern
China, we have to extend our notion of the family to include large
communities of agnatic relatives, linked by ties of co-residence, kinship,
and shared profession. The Caos 曹 of Jingxian County 涇縣, Anhui, who dominated the production of xuan paper 宣紙 from the thirteenth to the twentieth century, may have been a “family” and may have trained their sons informally, but they are perhaps best seen as a large, complex community with a set of formal and informal institutions that sustained product innovation for more than five hundred years. Specialized kinship groups and village communities of this type can be found in all parts of China; together with apprenticeships (only briefly discussed by Davids), they played a central role in the reproduction of technical knowledge.

Chapter Three looks at religion and the circulation of technical knowledge, examining in quick succession print industries, illustrations, models and templates, manuscripts, and collections (libraries, museums, botanical gardens, etc.). Here, Davids makes a clear and convincing case for a more efficient circulation of technical knowledge in printed, hand-written, and artifactual form in Europe. In particular, Europeans developed more effective forms of graphic representations and used them to “think on paper” (p. 142) in ways the Chinese did not. European encyclopedias of useful knowledge circulated more widely; libraries and artifact collections were more numerous and open to a wider public; religious and secular institutions were more active in collecting and reproducing useful knowledge. Differences between China and Europe are less clear-cut in the circulation of knowledge via the movement of people, which, as Davids rightly points out, must have accounted for most of the spread of technical information (p. 124). In both China and Europe, such movements were partly institutionalized: China saw periodic movement of examination candidates to provincial and national capitals and, before the mid-Ming, the circulation of artisans under the corvée system; Europe saw religious travelling in the form of pilgrimages and visitations within networks of affiliated monasteries, as well as the tramping of journeymen. China, Davids argues, did not see much religiously inspired movement of people and ideas, at least not after the Tang. From this he concludes that “in the Chinese empire, movements of people relevant to the circulation of technical knowledge were dependent on state regulation for a longer time and to a greater extent than in Europe” (p. 169). There is some truth to this as Chinese governments did actively encourage and manage population movements in ways European governments did not, but the notion of an interfering Chinese state that checked the movement of people across its territory is clearly wrong. In contrast to Europe, where every city state and principality regulated the immigration and emigration of skilled labor, and where rights to employment were often conditional on birth as a citizen and membership in the dominant local confession, all Chinese since the mid-Ming enjoyed freedom of movement across a continent-sized country—and widely availed themselves of that freedom, as the existen
of native-place associations all over China demonstrates. Here, Davids looks only for the presence or absence of European practices or institutions in China, and reads their absence as a lack: in Europe, religiously motivated migration wrought positive changes; China had little migration of that kind; therefore China falls short in that respect. In this light, even forced confessional migrations, such as the expulsion of the Huguenots from France, is seen in a positive light, as contributing to the dispersion of technical knowledge. What is missing here is a realization that political fragmentation and confessional divides were, first of all, obstacles to the movement of people and ideas across Europe, even if the same forces could sometimes set people and ideas in motion, and that a religiously less conflicted Chinese state may have provided a much more conducive environment for the circulation of people and ideas.

The fourth and final chapter deals with the mechanisms of technical innovation in Europe and China. Much of the chapter discusses river control in northern Italy, the Netherlands, and China, a topic on which Davids has published before. Davids shows (convincingly, in my non-expert view) that engineers in the Papal States managed to integrate the experiential knowledge of local experts with the new science of river hydraulics, in ways that the Chinese Yellow River bureaucracy did not. His argument for a role of religion in the creation of new knowledge here is somewhat tenuous, since his “religious” actor here is in essence a territorial state, albeit one headed by the pope. On pp. 188-193, he develops a more systematic comparison between the drivers of technological creativity in China and Europe: the greater ability in Europe to think pictorially through the use of accurate drawings and sketches; the existence of a variety of institutional support structures—states, religious institutions, markets—for technical innovation, the notion (absent or undeveloped in China) of laws pertaining to physical nature. Again, much of the argument centers on the central role of the Chinese state in fostering technological change and the absence of (secular or religious) alternatives to the state. Part of the problem here, it seems, is Davids’ conception of the Chinese state as a monolithic centralized bureaucracy. Throughout the text, Davids (like many other writers in the field) sees the European competition between state and church, state and state, and church and church as a driver of technological change; to the extent that such competition was absent in China, China falls short of an implied model. But the Chinese state was neither unified nor monolithic: local authorities, the central government, and the imperial household with its workshops in Beijing and in the provinces operated independently of each other and drove technological change in different ways. The Chinese state was monolithic only in the sense that it established relatively uniform conditions throughout the empire, making it possible for Hakka migrants from Guangdong and
Fujian to spread their mining, cash-cropping, and manufacturing skills throughout central and southern China, or for Huizhou and Shanxi merchants to develop financing and trading networks that stretched from Tianjin to Canton and from Beijing to Chengdu. The actors that need to be considered to understand technical change in China include merchant networks rooted in shared local origin, communities of ethnic migrants that roamed across the Chinese countryside, villages and kinship groups that funded schools and reproduced artisanal skills, imperially commissioned technocrats of unfree (eunuch or bondservant) status. These are unfamiliar groups from an Europeanist’s perspective, especially one used to the binary of state and church. The fault for this oversight does not lie with the author: with very few exceptions, Davids relies on the most recent China scholarship available. It is us China scholars who have failed to demonstrate convincingly that the mechanisms and institutions that drove technological change in China were different from those in Europe, and that these unfamiliar actors need to be studied in their own right.