

us against taking a teleological view of the accumulation of useful knowledge leading to the later creation of a powerful colonial state. As she puts it ‘The circulation of knowledge alone does not lead to power’ (p. 203). Nonetheless, the reader is constant struck by a corporate thirst for knowledge and information that enabled the Company to make well-informed decisions about political and commercial policy.

One wonders whether the Dutch, Portuguese, French, and other Europeans were as assiduous in their gathering of hybrid knowledge as the British (one suspects they were), so we are left to consider just how good the East India Company servants were at it. Winterbottom believes that they were very good, and she concludes that they were very effective in their production of ‘useful’ or ‘natural’ knowledge in the early East India Company settlements (p. 207).

Consideration of other Europeans is a task for another book on another day. For now, Anna Winterbottom has produced a beautifully written, richly detailed, and well-structured monograph that is required reading for all those with an interest in the East India Company, as well as all students of global history in the early modern period.

### **The gunpowder age: China, military innovation, and the rise of the West in world history**

*By Tonio Andrade. Princeton, NJ: Princeton University Press, 2016. Pp. x + 432. 25 b/w illustrations, 10 maps. Hardback £32.95, ISBN: 978-0-691-13597-7; paperback £19.95, ISBN: 978-0-691-17814-1.*

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In this book, the Sinologist Tonio Andrade has two goals. One is to rewrite the history of

gunpowder in China and the West. The other is to dispel some tenacious old myths about China and military technology, namely that the Chinese, having invented gunpowder, then neglected to make good (namely, military) use of it in guns and cannons because of their Confucian philosophy and their mandarins’ contempt for technology and for military matters. In fact, Andrade argues that China held its own in comparison to Europe, except for the period 1839–1945, during which it truly did fall behind.

This book therefore has two parts. In the first fifteen chapters, Andrade describes Chinese military technologies from the Song Dynasty (960–1279) to the mid eighteenth century. During this period, China was frequently at war with its nomadic neighbours to the north, with Europeans to the north and south, or with rebels within its territory. Several times the Han Chinese were defeated and much or all of their land was conquered by their northern neighbours, the Xi Xia, the Jin, the Mongols, and the Manchus. However, in three wars with Europeans – the Portuguese in 1521–22, the Dutch in 1661–62, and the Russians in 1685–89 – it was the Chinese who prevailed. Though their ocean-going ships were no match for those of the Europeans, on land their firearms and tactics were every bit as effective. In the fourteenth century, amid the constant wars between the Ming and the Manchus, China possessed the largest and most advanced arms industry in the world, one that supplied weapons to armies that would have dwarfed any European army. The fortresses with thick earth-filled walls that Europeans built during the military revolution of the seventeenth century were very similar to those that Chinese cities had possessed for centuries. Likewise, the drill, introduced to Europe by the Dutch in the seventeenth century, had long been practised in China and Korea.

What Andrade calls the Great Military Divergence – to distinguish it from the Great

(economic) Divergence described by Kenneth Pomeranz and other authors – began in the mid eighteenth century. It had two simultaneous causes. Europeans, so frequently at war, refined their knowledge of military affairs through the application of experimental sciences such as ballistics and chemistry. At the same time, they entered the Industrial Revolution, which included the development of technical drawing and machine tools, and which produced the steam-powered, iron-hulled boats and the Congreve rockets, howitzers, and explosive shells that proved so decisive in the Opium War of 1839–42.

The other cause of the divergence was the stagnation of Chinese military technology. By the mid eighteenth century, the Qing had finally defeated the Mongols and other Central Asian nomadic warrior peoples and had established ‘the largest, most powerful country in the world, by far’ (p. 234). After that, the Chinese government, deprived of the stimulus of war, lost interest in military modernization and technological innovation. When the British attacked in 1839, the Chinese weapons and tactics were a century behind. Chinese attempts to modernize were clumsy and ineffective; for example, they did not understand how a steam engine worked, nor did they have the machine tools and technical drawing skills needed to produce one. Though humiliating, the Opium War ‘was not in itself significant enough to shock the Qing into the deep-seated reform it needed’ (p. 271).

Later in the nineteenth century, the Self-Strengthening Movement, undertaken by provincial governors, produced better results: modern shipyards, schools for mathematics, engineering, and technical drawing, and modern rifles, artillery, and warships. The central government, however, felt the need to maintain a huge old-fashioned army that it could not afford to modernize. Reforms by provincial officials were undercut by conservative courtiers

and by the ineptitude of the Tongzhi emperor and his successor, the Empress Dowager Cixi. The result was the defeat of China at the hands of its much smaller neighbour in the Sino-Japanese War of 1894–95. Andrade’s book ends there, somewhat artificially, when gunpowder was replaced by smokeless powder.

Andrade’s explanation for the failure of China to modernize its military from 1839 to 1895 is essentially political, stressing the ‘increasing dysfunction of the Qing state’ (p. 294), rather than the Confucianism and other cultural explanations that Western historians have presented in the past. In his stress on politics, however, he downplays the impact of the disasters that befell China during this period. Internal rebellions, especially the Taiping Rebellion of 1850–64, killed tens of millions of people and ravaged China’s most prosperous provinces. The Yellow River flooded repeatedly during the first half of the nineteenth century. Between 1851 and 1855, it shifted its course from the south to the north of the Shandong Peninsula, devastating the North China Plain and forcing the state to abandon the Grand Canal, China’s main artery of transportation. Finally, the flood of 1887 was one of the worst natural disasters in history. Such calamities left much of the population homeless and impoverished, and the state without the means to compete militarily with Japan and the Europeans.

Andrade’s argument is based on extraordinarily thorough research in thousands of Chinese and European-language sources. Unquestionably, his book will be recognized as a fundamental contribution to the literature on both Chinese and European military history. In particular, it will transform the history of gunpowder. His analysis and research are of such high quality that one looks forward to a sequel, taking the story of China’s response to the changes in military technology up to the present.