
China and Western Technology in the Late Eighteenth Century

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We have never valued ingenious articles, nor do we have the slightest need of your country's manufactures.¹

BY THE LATE EIGHTEENTH CENTURY, THE BALANCE OF EUROPEAN OPINION had tilted against China. Westerners, earlier in the century almost uncritical in their admiration, came to the conclusion that the Chinese seemed unwilling, or unable, to improve on their earlier inventions, such as gunpowder and the compass, which formed part of the foundation for Western development. The famous assertion of Chinese self-sufficiency quoted above, made in 1793 by the Qianlong emperor (r. 1736–1795) in response to Lord Macartney's embassy from King George III, seemed to epitomize Chinese aloofness to the potential offered by Western knowledge.²

Europeans specifically equated this apparent lack of interest in what the West

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¹ "Yingshi Maga'erni Laipin An" [The Case of the English Macartney Embassy and Their Gifts], *Chang Gu Cong Bian* [Collected Historical Records] (Beiping, 1930–43), 3: 16–24, at 19b.

² There is an immense primary and secondary literature on this topic. Among the most influential early firsthand accounts were Jean-Baptiste Du Halde's *Description géographique, historique, chronologique, politique et physique de l'empire de la Chine et de la Tartarie chinoise*, 4 vols. (Paris, 1735–39; The Hague, 1736; English trans., London, 1738, 1741; German trans., 1748), based on missionary descriptions; George Anson, *A Voyage round the World in the Years MDCCXL, I, II, III, IV* (London, 1748; Paris, 1749), based on personal experience on the South China coast; and John Barrow, *Travels in China, containing Descriptions, Observations and Comparisons Made and Collected in the Course of a Short Residence at the Imperial Palace of Yuen-min-Yuen, and on a Subsequent Journey through the Country from Peking to Canton*, 2 vols. (London, 1804), based on the author's observations while in China with Macartney's embassy in 1792–93. On the changing Western views of China during the eighteenth century, see, for example, Basil Guy, *The French Image of China before and after Voltaire* (Geneva, 1963); Louis Dermigny, *La Chine et L'Occident: Le commerce à Canton au XVIII^e siècle, 1719–1833*, 4 vols. (Paris, 1964), esp. "Mythe et réalité de la Chine," 1: 11–80.

had to offer with a lack of interest in science and practical technology, because at that time the West had come to define itself in terms of, and derive a strong sense of superiority from, its undoubted technological power. From such a perspective, it was an easy step to regarding the Chinese as inferior in an overall sense. These views took firm hold as the nineteenth century unfolded and have remained tenacious to this day. Although scholars have recently exploded the myth of China's "opposition" to Western science, it remains widely believed, and, in the case of technology, neither the conviction of the Chinese lack of interest nor the assumptions on which it rested have been subjected to serious inquiry.³

Yet the situation in the eighteenth century was far more complex than Qianlong's public declaration suggests. In the preceding decades, he and a number of others in China had displayed considerable interest in all manner of things Western, particularly science and technology. Although this interest was duly recorded by a range of Western observers and made widely available to their European readers, the overwhelming body of opinion disregarded that evidence in favor of the attitudes outlined above.

This essay draws on both Chinese and Western archival and published sources to argue that, for different reasons, the imperial expression of disdain and Western readiness to accept it were primarily prompted by internal political agendas rather than by actual circumstances and that, as a result, the whole tenor of early Sino-Western relations was based on false premises. More accurate evaluation of the genesis and development of Sino-Western mutual perceptions will help correct a misapprehension whose effects are still evident two centuries after the Macartney mission.⁴ The essay analyzes Chinese use of Western knowledge and technical skill in the late eighteenth century, focusing principally on the sequence of events in China in the military sphere. This context was central to Western assumptions of superiority because military culture, including the civil-military relationship, has been and continues to be of signal importance to a proper understanding of China. Yet the extraordinary influence of Chinese civilian culture has led to an unfortunate neglect of these issues.

The circumstances that gave rise to the misunderstanding, the background to

³ For Western views, see Michael Adas, *Machines as the Measure of Men: Science, Technology, and Ideologies of Western Dominance* (Ithaca, N.Y., 1989); Carlo M. Cipolla, *European Culture and Overseas Expansion* (London, 1970); William H. McNeill, *The Pursuit of Power: Technology, Armed Force, and Society since A.D. 1000* (Chicago, 1982); Joel Mokyr, *The Lever of Riches: Technological Creativity and Economic Progress* (New York, 1990); Theodore von Laue, *The World Revolution of Westernization: The Twentieth Century in Global Perspective* (New York, 1987). On Chinese attitudes, see Pasquale M. d'Elia, *Galileo in China: Relations through the Roman College between Galileo and the Jesuit Scientist-Missionaries (1610-1640)*, Rufus Suter and Matthew Sciascia, trans. (Cambridge, Mass., 1960); Huang Yilong, "Tang Ruowang yu Qingchu Xili zhi Zhengtonghua" [Tang Ruowang (Adam Schall) and the Regularization of Western Astronomy in the Early Qing], *Xinbian Zhongguo Kezhi Shi* [Newly Edited History of Chinese Technology], vol. 2 (Taipei, 1990); Nathan Sivin, "Copernicus in China," in *Colloquia Copernicana II: Etudes sur l'audience de la Théorie Héliocentrique* (Warsaw, 1973); Sivin, "On 'China's Opposition to Western Science during Late Ming and Early Ch'ing,'" *Isis*, 56 (1965): 201-05; Wang Ping, *Xifang Lisuanxue zhi Shuru* [The Importation of Western Astronomical Knowledge] (Nangang, Taiwan, 1966); Harriet Zurndorfer, "Comment la science et la technologie se vendaient à la Chine au XVIII^e siècle," *Etudes chinoises*, 7 (Autumn 1988): 59-90. See also Nathan Sivin, "Science and Medicine in Imperial China: The State of the Field," *Journal of Asian Studies*, 47 (February 1988): 41-90.

⁴ See, for example, Alain Peyrefitte, *L'empire immobile, ou, Le choc des mondes: Récit historique* (Paris, 1989; English trans., New York, 1992).

which is described in detail below, were essentially as follows. In a manner familiar to those who deal today with Chinese foreign relations, Qianlong's public declaration had a double edge and was intended for a multiple audience. For a variety of reasons, he preferred not to admit publicly his interest in and awareness of the potential of foreign technology. His motivation becomes clearer when the episode is placed within the context of late eighteenth-century Chinese politics. The Manchu Qing dynasty (1644–1911) imposed and ultimately maintained its rule over China by military means while at the same time seeking to present to its Chinese subjects and the world at large an image that was both thoroughly Confucian and ethnically even-handed. For the Qianlong emperor, these somewhat contradictory goals meant, among other things, that he made a virtue of his own civilian accomplishments yet simultaneously leaned toward military culture by, for example, promoting the martial traditions of the Manchus; by awarding high civil office (usually the prize of scholars successful in a series of competitive examinations based on classical Chinese texts) to successful generals, almost all of whom were Manchus; by prohibiting the private possession of any weapon; and by jealously guarding access to all information, especially any that smacked of technology, conceivably of use to would-be rebels. No less important, the emperor's aspirations to universal authority combined with acute political factionalism and the gradual onset of a crisis of dynastic self-confidence to render any suggestion of a lack of imperial autonomy wholly out of the question.⁵ Thus the famous statement can be understood, on the one hand, as a piece of propaganda directed at a domestic audience with the dual objectives of morale boosting and intimidation.

On the other hand, the statement was, of course, directed at the king of England through his envoy Macartney and, by extension, at any other foreigners who might individually or collectively seek to alter the structure of China's foreign relations to the disadvantage of ultimate Chinese control. In this context, the emperor's disingenuousness conformed to a pattern dating back at least to the early seventeenth century and still discernible today. According to this pattern, the Chinese have consistently sought to absorb Western practical technical skills while remaining inimical to Western ideologies. This dichotomy originated with the attempted use by Christian missionaries of Western scientific and technical expertise as a means of arousing Chinese interest in the Christian religion. Many Chinese, although they fully grasped the utility of the practical knowledge, were hesitant to adopt it because it seemed inseparable from Christianity; accustomed to a political system in which ideology specifically either served orthodox authority or constituted rank heresy, they sensed the subversive potential of the foreign religion.⁶ Thus, as we shall see, when rebels threatened the Qing dynasty in the late seventeenth century, the Kangxi emperor (r. 1661–1722) was happy to

⁵ On Qianlong's view of his own monarchy, see Pamela Kyle Crossley, "The Rulerships of China," *AHR*, 97 (December 1992): 1468–83; Crossley, "Manzhou Yuanliu Kao and the Formalization of the Manchu Heritage," *Journal of Asian Studies*, 46 (November 1987): 761–90; Harold L. Kahn, *Monarchy in the Emperor's Eyes: Image and Reality in the Ch'ien-lung Reign* (Cambridge, Mass., 1971); Beatrice S. Bartlett, *Monarchs and Ministers: The Grand Council in Mid-Ch'ing China, 1723–1820* (Berkeley, Calif., 1991); Philip A. Kuhn, *Soulstealers: The Chinese Sorcery Scare of 1768* (Cambridge, Mass., 1990).

⁶ Jacques Gernet, *China and the Christian Impact: A Conflict of Cultures* (Cambridge, 1985).

improve his arsenal under Jesuit direction, yet he clearly recognized the actual and symbolic threat that papal authority over Chinese Christians would pose and rejected it absolutely. In the eighteenth century, even as Western missionaries' technical advice helped save Qing armies, Christian efforts to proselytize in the provinces were met with persecution. Subsequently, in the late nineteenth century, certain Chinese reformers sought to acquire the Western technology that would bring their nation wealth and power without abandoning the indigenous intellectual tradition. In a twentieth-century variation on this theme, Chinese leaders of the early People's Republic resisted subservience to Soviet control even at the cost of substantial setbacks in technical programs, such as building the atomic bomb, that were intended to bring China into a position of equality with its principal ideological foe, the United States. Most recently, Chinese rulers have continued to be wary of Western ideas, initiating campaigns against "spiritual pollution," "bourgeois liberalization," and "peaceful evolution" (to capitalism), and have endeavored to introduce economic reform in isolation from political reform.

In other words, the Chinese, and their rulers, have uniformly displayed a powerful reluctance to surrender authority or autonomy to any outsider or even to take a chance of doing so. This attitude must be distinguished from the isolationism, the hostility to innovation, especially when of foreign origin, and the immutable sense of superiority for which it has often been mistaken.

Responsibility for the late eighteenth-century miscommunication cannot, however, be laid entirely on the Chinese, for the shift in European views of China, like the Chinese denial of interest in the West, tended to reflect internal, subjective conditions rather than a change in China itself. The eyewitnesses who made note of Chinese interest in the West and what it had to offer included Jesuit missionaries, whose correspondence was published and widely read in Europe at the time, and members of Macartney's mission, who recorded it in their memoirs of the embassy. Unfortunately, these observations came to be superseded in Western minds by the impression, recorded in other such accounts, of the Chinese as sorely deficient in the inquiring and progressive spirit that Europeans considered one of their own culture's most enviable characteristics. There were a number of reasons for this. One was the steady decline of the Society of Jesus, whose members had once held a virtual monopoly on the interpretation of China to Europe. The triumph of those who opposed the Jesuits (the Society was abolished in 1773) seemed to confirm the unreliability of Jesuit accounts. At least as important an influence on changing European views of China was a series of momentous developments in Europe, in particular industrialization and the new focus on political liberty, with all the profound intellectual shifts that accompanied these metamorphoses.

The period of Sino-Western interaction that concerns us began with the arrival in China of Catholic missionaries in the late sixteenth century. Among these, Jesuits were the most conspicuously successful, in part because of their "top down" strategy, which brought them access to the country's elite and to the imperial court. The cartography and more direct military involvement of some of the early luminaries of the Jesuit mission are well known; these are briefly

recapitulated, however, since they created for both the missionaries and their Chinese hosts significant precedents for the events in the eighteenth century on which the main body of this essay turns.

JESUIT MISSION STRATEGY IN CHINA was controversial for its accommodative approach and for its attempts to arouse the interest of Chinese literati in Western scientific and technical knowledge.⁷ Among the most impressive achievements made in the course of these endeavors were those in the realms of cartography and geography, then advancing by major strides in Europe. Thus Matteo Ricci (1552–1610) produced in 1602 a world map that intrigued his Chinese contacts, even attracting the attention of at least one of the late-Ming emperors; in 1674, Ferdinand Verbiest (1623–1688), who built many of the instruments that can still be seen today at the Jesuit Observatory in Beijing, brought out an updated version of the world map that synthesized the knowledge acquired in the intervening decades. Other important early work in this area included the *Novus atlas sinensis* of Martinus Martini (1631–1661), published in 1655.⁸

Some Jesuit missionaries who displayed exceptional talent in these realms sowed the seeds of military assistance to the Chinese. Since classical antiquity, the Chinese had been well aware of the military significance of cartography, for the classic *Art of War* by the great strategist Sun Zi (Sun Tzu) had stressed the importance of “knowing one’s terrain.”⁹ That lesson was not lost on successive rulers of the seventeenth century, the first half of which saw almost continuous warfare as the result of the dynastic transition. The seeds began to bear fruit during the period of dynastic consolidation under the Kangxi emperor.

His reign coincided with the high tide of Jesuit influence in China. Kangxi himself greatly valued Jesuit cartography; under his auspices, missionaries undertook a ten-year survey of the entire empire that formed the foundation for all subsequent geographic study of China—incidentally offering the missionaries

⁷ The literature on the Jesuit mission to China is huge. For bibliographic references, see Carlos Sommervogel, *Bibliothèque de la Compagnie de Jésus*, 12 vols. (Brussels and Paris, 1890–1932); Erik Zürcher, Nicolas Standaert, and Adrianus Dudink, *Bibliography of the Jesuit Mission in China: Ca. 1580–ca. 1680* (Leiden, 1991); Robert Streit and Johannes Dindinger, *Bibliotheca missionum* (Rome, 1951–73), vol. 7: *Chinesische Missionsliteratur, 1700–1799*. See also Joseph Dehergne, “Les Archives des Jésuites de Paris et l’histoire des missions aux XVII^e et XVIII^e siècles,” *Euntes docete*, 21 (1968): 191–213; Dehergne, *Répertoire des Jésuites de Chine de 1552 à 1800* (Rome, 1973); Antoine Gaubil, *Correspondance de Pékin, 1722–1759*, Renée Simon, ed. (Geneva, 1970); Louis Pfister, *Notices biographiques et bibliographiques sur les Jésuites de l’ancienne mission de Chine, 1552–1773* (Shanghai, 1932). On Jesuit accommodation, see David E. Mungello, *Curious Land: Jesuit Accommodation and the Origins of Sinology* (1985; rpt. edn., Honolulu, 1989).

⁸ Jonathan D. Spence, *The Memory Palace of Matteo Ricci* (New York, 1984), 64–65, 149. The 1602 map was a revised version of one Ricci had made in 1584. On Verbiest, see Minako Debergh, “Une carte oubliée du P. Ferdinand Verbiest,” *Journal asiatique*, 277 (1989): 159–219; I am indebted to Franciscus Verellen for drawing my attention to this article. On Martini, see Mungello, *Curious Land*, 116–24.

⁹ Sun Zi’s dates are uncertain; he probably lived sometime between the fifth and first centuries B.C. In 221 B.C., the conquering first emperor had assembled all available maps, presumably with a view to keeping the information to himself. A chapter of the ancient text *Guanzi* concerns military maps; it is unclear whether this in fact predates the Han dynasty (206 B.C.–220 A.D.). Joseph Needham, *Science and Civilization*, Vol. 3, *Mathematics and the Sciences of the Heavens and the Earth* (Cambridge, 1959), 535–36.

