Reply to a Recent Review

I am replying to Catherine Jami's recent review of my book "On Their Own Terms: Science in China, 1550-1900" (HUP, 2005), which appeared in the *Journal of Asian Studies*, in summer 2006.

In her review, Jami marshals two examples from pages 151-152 of my book, which she claims are typical of the failings she has found. The first "mistake" is that I did not realize that the Kangxi emperor began his science studies after the Yang Guangxian affair. Jami is correct that Kangxi began his early adult studies of European astronomy after the Yang Guangxian affair, but Ferdinand Verbiest, until his death in 1688, provided that learning for him. Verbiest's influence increased after 1665, although his scientific influence on the young emperor seems to have peaked after 1668. In Jami's review, and in her recent *Late Imperial China* article, she elides the role Verbiest played in the emperor's studies of Western learning, which included mathematics and astronomy as well as philosophy, ethics, and logic. These issues are discussed in pp. 133-149 of my book, which Jami does not mention. The Yang Guangxian affair led to Adam Schall's and Verbiest's imprisonment before their being amnestied in 1665. The grand empress dowager, who advised Kangxi while the Oboi regents ruled in his name, helped secure their release. Thus, the impact of Adam Schall and Verbiest on the Manchu court was interrupted when they were jailed because of Yang Guangxian's accusations. Jean-Claude Martzloff notes that "the Belgian Jesuit missionary F. Verbiest (1623-1688) came to teach the young Kangxi, who was Emperor of China from 1661 to 1722, the rudiments of European science." (*History of Chinese Mathematics*, p. 26) The French Jesuits, who arrived in China in 1689, represented the second period for such study. Recently, Han Qi from Academia Sinica, Beijing, has reconfirmed Verbiest's scientific influence on Kangxi, which Wang Ping from Academia Sinica, Taiwan, had stressed in her pioneering 1972 article. A moderate revision of my original text is all that is needed: "The Kangxi emperor began his youthful studies under Ferdinand Verbiest when the Yang Guangxian affair was over."

Secondly, Jami presents a "mistake," which includes a number of other alleged errors. She contends that my presentation of Minggatu's *Geyuan milu jiefa*, which relied on Peter Jartoux's (1668-1720) work on the power series, is mathematically uninformed. Moreover, she claims that Minggatu's formula for using the chord to know the arc was not an algebraic "method" but a "general method" that algebraicized the results. Then, she contends that Jartoux's "work" was not a uniquely authored book but a copy of earlier analysis. My word "work" was not intended to imply that Jartoux was the first focus on the power series. Nevertheless, we know that Louis Pfister in his 1934 bibliographical account noted that Jartoux was the author of two manuscripts and another work, which went beyond the ready-made formulas that Jami refers to. Those works have not survived, according to Martzloff.

I would have been clearer if I had described the *Geyuan milu jiefa* as a work on the geometric aspects of the power series expansions of trigonometric functions, rather than a "geometric power series expansion." Jean-Claude Martzloff, for instance, refers to the geometrical considerations that the Chinese used to explain an infinite series expansion (*History of Chinese Mathematics*, pp. 358-360). Martzloff adds: "For this they took a geometrical approach, generalizing the procedure for trisecting arcs given in the *Shuli jingyun* . . ."

On the **method** question, I have followed Li Yan and Du Shiran's pioneering *Chinese Mathematics: A Concise History*, ably translated by John N. Crossley and Anthony W.-C. Lun. There Li and Du describe how Minggatu (Ming Antu 明安圖 in Chinese) used the "method of finding the chord knowing the arc." The Chinese reads: 明安圖是由已知 "孤背" 求 "通弦" 的方法入手,逐步進行研究的 (Li Yan and Du Shiran, 中國古代數學簡史 [1963], pp, 304-305). Martzloff's meanwhile notes that Minggatu's best student, Chen Jixin, used "three **procedures"** to (1) find the length of the circumference as a function of the diameter, and for (2) and (3) to find the chord and the sagitta as a function of the arc (*History of Chinese Mathematics* page 358).

Regarding the lesser "mistakes," Jami claims **Minggatu** is an unconventional Romanization for his Mongolian name. Another Romanization is **Minggantu**, which other sources such as Hummel's *Eminent Chinese of the Ch'ing Period* indeed use. Both spellings are acceptable renderings in Old Mongolian, but I have found the former Romanization more common, as in Martzloff's *History of Chinese Mathematics*, than the latter. Finally, Jami notes that Jartoux was born in **1668** and not in **1669** and that his name was **Pierre** not **Peter**. For Jartoux's dates, I have followed a Taiwanese list of all Jesuits in China, although other sources I have used also give **1669** for Jartoux's birth. Meanwhile, many renditions of Jesuit names and surnames are often Latinized or Anglicized. For example, Pierre Jartoux is also known as **Father Petrus Jartoux** or **Father Joseph Petrus Jartoux.** He appears as Peter Jartoux in the Taiwanese list.

I would welcome the chance to evaluate any other mistakes in the book.

I had been asked by HUP to prepare "On Their Own Terms" for a more general reader, not just for the China specialist. The press was not "retrograde." Many reputable books on China recently published have no characters in them. Nor are the presses that produced them all retrograde.

According to Jami, my alleged mistakes in dates, names, and terms insinuate faulty interpretations. Students, she hopes, will thereby be saved from my mistakes, if they avoid the book altogether. They should wait for future "no-fault" accounts of the history of science in China produced by reputable scholars working together because the problem is too big for any one scholar in the history of Chinese science community.

Criticism is expected but not at the expense of presenting an author's specific arguments or concrete findings. The arguments that I have developed about the Gregorian calendar and its relation to Ming-Qing calendar reform, are not mentioned. Nor does Jami consider my argument that Chinese mathematicians and physicians increasingly defined their technically disparate interests in light of the literati focus on the "investigation of things" (*gewu* 格物) and the "extension of knowledge" (*zhizhi* 致知). Later simplified into "*gezhi*" 格致, this term was applied to Western learning (*scientia*) under the influence of the Jesuits (after 1600) and then to modern science by Chinese translators working with Protestants (after 1850).

Jami also claims that I don't articulate my views very clearly. Which of my arguments, for example, can't she follow? Which footnotes fail to match the text? My views are muddled, she claims, and poorly digested summaries of the existing secondary literature. Again, which views? Why no specific examples here? If my arguments are so muddled, why fear that anyone,

especially an undergraduate, will understand the claims better than she has? But what did I say? What are the specific arguments that cause so much concern, if the work is not worth reading?

Finally, recent calls for an end to competitive comparisons in the history of science, while well-intended, succumb prematurely to a “no-fault” historiography that unfortunately absolves earlier Euro-Americans for their longstanding claims of scientific, cultural, and religious superiority. Succumbing unwittingly to colonial disavowal, such “no-fault” views also seek to preempt recent positive narratives about the qualified successes in early modern Chinese, Islamic, and Sanskrit exact studies. The rehabilitation of the exact sciences in the premodern, non-Western world is a long-term precondition before such post-imperial perspectives are plausible.