between Bertin and various Jesuit missionaries in China currently held at the Bibliothèque de l'Institut de France in Paris that is well worth further study. Where his explanatory chapters might have done more is in drawing out the depth of the Military Enlightenment and its significance for Amiot's work. Parr relies on a three-part definition of the Military Enlightenment advanced by Armstrong Starkey that, while clarifying, is somewhat limiting (5–6, 165). It focuses on the writings of military theorists, but the Military Enlightenment in France included many more. Christy Pichichero's *The Military Enlightenment: War and Culture in the French Empire from Louis XIV to Napoleon* (Ithaca, NY: Cornell University Press, 2017), a book that Parr unfortunately overlooks, notes that the Military Enlightenment included many non-military writers from artists and royal bureaucrats to members of the broader public. Indeed, this broader definition of the Military Enlightenment might have worked to Parr's favor because his promotion of Amiot as a participant in the Military Enlightenment suggests that even missionaries contributed substantially to the larger goals of this intellectual movement. Pichichero's focus on the importance of "sentiment" and *sensibilité* in the writings of the Military Enlightenment also tracks well with Amiot and the ways that he framed Chinese military culture. A broader vision of the Military Enlightenment would have added further support to Parr's already convincing argument about the place and importance of Amiot's *Art militaire*.

The Mandate of Heaven is a welcome addition to studies on French Jesuits and their impact on the Enlightenment. Parr and the other contributors to the volume are to be applauded for their contributions to understanding eighteenth-century Jesuit missionary culture and the global connections that facilitated and inspired the Enlightenment.

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Paula Findlen, ed.

Empires of Knowledge: Scientific Networks in the Early Modern World. New York: Routledge, 2019. Pp. xvii + 394. Hb, \$175.00; Pb, \$42.95.

As historians of early modern Europe began to focus more on the global effects that resulted from exploration and empire, intellectual and cultural historians have followed suit. To what extent did knowledge and culture travel along

those routes? Was there a mutual exchange of knowledge and culture? The current volume, which grew out of a workshop at Stanford University, looks at these issues as they relate to early modern scientific knowledge, and in this the Society of Jesus was particularly important.

Two essays deal exclusively with the Jesuits. Paula Findlen's substantial essay provides an overview of how global knowledge developed within the Society of Jesus and how it became a model for all Europe. Jesuit missionaries from the beginning understood that their understanding of natural philosophy facilitated their work, and their superior understanding of natural philosophy came from the efforts of Christopher Clavius, who taught mathematics at the Collegio Romano from 1563 to 1612 where missionaries learned the qualitative and quantitative skills necessary to advance scientific study. Clavius's teachings enabled José Acosta to describe natural phenomena of Peru in the late sixteenth century, and his books, most notably the *Natural and Moral History of the Indies*, became major sources for the study of the natural world of South America. Moreover, as observers, the Jesuits were aware of the importance of instruments and of having the best data, even if the source came from the "wrong side" of the religious divide. Giovanni Antonio Rubino preferred Protestant tables over the defective ones of his coreligionists.

Clavius's successor at the Collegio Romano, Christoph Grienberger, importantly promoted networks of correspondence among the missionaries, especially in Asia, and after that the Jesuits shone in scientific correspondence. Paolo Sagredo, a friend of Galileo's, found invaluable information in his correspondence with Jesuits. As Findlen informs us, in the seventeenth century "a culture of long-distance scientific communication was emerging – not only among Jesuits following a relatively fixed itinerary between Europe and Asia, but also involving lay correspondents in other locations. Their shared interest in observing the natural world with the best skills and tools available, rather than the 'union of hearts' which bound all Jesuits together, united them" (67). Johann Schreck left the secular world, where he was a member of the Accademia dei Lincei, to become a Jesuit, and he brought the two worlds together, though he could not get Galileo to share his data or observations despite their previously working together. The Lutheran Johannes Kepler, on the other, was graciously forthcoming.

Findlen, whose previous work on Athanasius Kircher, the great polymath and successor to Clavius's chair, has been instrumental in establishing his importance to the scientific world of the seventeenth century, once again demonstrates the central role of Kircher, this time as the center of the widest network of scientific correspondence, not only for the Jesuits but also for such scientific luminaries as Nicolas-Claude Fabri de Peiresc, Pierre Gassendi, and Marin

Mersenne. This aspect of Kircher's contribution is further elaborated in the essay by Marcelo Aranda on the Ignatian Tree, but Aranda also uncovers other meanings in this idea. The Ignatian Tree was an illustration in the chapter from his book *Ars magna lucis et umbrae* (Rome, 1646) on the suggested use of light and shadow in sundials in helping to determine longitude. Kircher hoped that accumulating data on lunar eclipses would solve that crucial navigational problem, which Aranda maintains the Ignatian Tree was supposed to represent. Aranda further sees in the Ignatian Tree a map expressing on the one hand the expansion of the Jesuits from the seed planted by St. Ignatius in Rome and on the other it shows the Jesuits as a world-wide religious order. This fits in with the Jesuit success in accumulating, analyzing, and disseminating information, as described by Findlen. But Aranda interestingly finds in it a mathematical instrument for determining the time of day in the order's various locations around the world, an early example of the construction of time zones.

Other essays may not focus on the Jesuits, but the reader often finds them lurking in the shadows. Carol Pal writes about Samuel Hartlib and his group of correspondents. One of them, John Drury, lamented that they did not have the intellectual and fiscal resources of the Jesuits. When Jordan Avramov mentions the difficulties Henry Oldenburg encountered in getting responses to his questionnaires for the Royal Society, this reader thought about the advantages of a disciplined religious order. For the Protestant International, a trans-Atlantic league described by Lydia Barnett, which, in the early eighteenth century tried to propagate Protestantism in opposition to Catholicism and was engaged to trying to fit giant fossil bones and the Taunton Stone described by the American minister Cotton Mather into their biblical worldview, the Jesuit order was a model, but once again, as Barnett notes, they lacked the strong central organization that made the Jesuits so much more successful. Alexander Statman writes about French Enlightenment Sinophile scholars who turned to ex-Jesuit missionaries in China following the suppression of the order as their main source of information about ancient Chinese civilization.

While this volume is not specifically devoted to the scientific contributions of the Jesuits in the early modern period, it demonstrates once again that we cannot fully understand the development of early modern science without understanding the role of the Society of Jesus in that story.

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