

Agustín Udías, *A Jesuit Contribution to Science: A History*, Cham etc., Springer, 2015, xi+277 p., \$129.00 hardcover, \$99.00 e-book, ISBN 978-3-319-08364-3

Over the past twenty years, historians of science have focused increasingly on the Jesuit contribution to science, particularly in the sixteenth- and seventeenth centuries. Several monographs, journal publications, and collected essays – by Ugo Baldini, Joseph Needham, Mordechai Feingold, Marcus Hellyer, John Heilbron, John O'Malley, Ines G. Županov, Paula Findlen, Florence C. Hsia, Liam Brockey, Andrés I. Prieto, and Henrique Leitão, among many others – have been especially important in identifying the Jesuits as key contributors to early-modern science and to the circulation of knowledge between Europe, East Asia, and South America. Nowadays, the literature on Jesuit science is quite extensive but it is also rather uneven, since most historians still pay more attention to the early-modern period than to Jesuit scientific activities after the restoration of the Society of Jesus in 1814.

Some scholars nevertheless have turned their attention fruitfully to the scientific history of the Society as a whole, such as the study by Agustín Udías (*Searching the Heavens and the Earth: The History of Jesuit Observatories*, Dordrecht, Kluwer Academic, 2003), which provides an analysis and a complete list of observatories founded by the Jesuits since the sixteenth century. With this new study by Udías, the focus broadens out further, to provide the first genuine attempt at a global synthesis of the scientific history of the Society of Jesus from its foundation in 1540 to the twentieth century. With the aim of providing a unified history of both periods pre- and post-suppression, *A Jesuit Contribution to Science* sets out to address three main themes: the importance of mathematics and astronomy before the suppression in 1773; the emergence of an extensive network of seismological, astronomical and meteorological observatories after the restoration in 1814; and the decline of science in the Society from the 1970s.

After a brief and accurate description of the main characteristics that accounted for the success of the first Jesuit colleges, Udías discusses the life and work of some of the most prominent mathematicians, astronomers and physicists in the early-modern period, such as Christopher Clavius, Christoph Grienberger, Christoph Scheiner, Giovanni Battista Riccioli, Athanasius Kircher, Roger Boscovich, Matteo Ricci, Schall von Bell, and Ferdinand Verbiest. He also describes the foundation of astronomical observatories in Jesuit colleges (1540–1773); the importance given

to scientific training, especially for those sent to the overseas missions; and the work developed by important pedagogues, such as André Tacquet and Tomás Cerdá. One of the most interesting discussions in the first part of the study concerns relations between the Jesuits and Galileo, from the latter's triumphant reception at the Collegio Romano in 1611, to the emergence of the well-known controversies with Scheiner and Grassi. But, most importantly, it delivers a refreshingly even-handed account of the part played by the Jesuits in Galileo's trial. Another valuable theme in the early chapters deals with the official requirement to teach Aristotelian scholastic philosophy, which traditionally has been identified as one of the most relevant contributing factors in the portrayal of the Society of Jesus as a conservative and obscurantist institution.

Following this discussion of the well-known role played by the Jesuits in Europe, *A Jesuit Contribution to Science* devotes a chapter to astronomy in China and India, where Ricci, Schall von Bell, and Verbiest are the leading protagonists, while the Imperial Astronomical Observatory provides the main setting. Since the role played by the Jesuits in India is less known than in China, it is commendable that a section of this study is devoted to the topic, along with a valuable subsequent section dedicated to the circulation of knowledge between West and East. One of the most interesting features of the first part of this book is the exploration of Jesuit efforts to combine the practice and teaching of mathematics, astronomy and physics in Europe, East Asia and South America, and of Jesuit activities relating to cartography and natural history, pursued especially overseas. Regarding natural history, José de Acosta is one of the leading protagonists of this narrative, since, as the author observes, he was one of the «first Jesuits to describe the natural conditions in America» (p. 106). Many other naturalists, especially those who conducted their work in the New World and China, are mentioned throughout this chapter, such as Bernabé Cobo, Fernão Cardim, José Gumilla, Alonso de Ovalle, Thomas Falkner, and João de Loureiro. Apart from describing the most relevant cartographic work done by the Jesuits, Udías also provides an interesting account on the exploration of the new lands of America and Asia, and identifies some of the most renowned explorers.

While the first five chapters are dedicated to Jesuit science from 1540 to 1773, the following five chapters focus on Jesuit scientific activities after 1814. This second part of the book begins with a detailed chapter on the establishment of a worldwide network of observatories. Despite an excellent introduction on

the discontinuity between the old and the restored Society, this section perhaps would have benefited from a detailed analysis of the suppression and, in particular, some of the most important anti-Jesuit rhetorical works produced in this period, given their significance in portraying the Jesuits as backward clerics and a major obstacle to scientific progress. The longevity of these accusations, together with the «wish to resist the rationalist current» that «aggressively maintained an incompatibility between science and Christian faith», certainly were the most important factors that influenced the renewed «desire to continue the scientific tradition of the old Society» (p. 136). Important to note, furthermore, is the outstanding account of scientific education in the colleges of the restored Society, with an excellent description of the «radical change in education that would affect the new Jesuit schools» (p. 215), a detailed analysis of the adoption of neo-Thomism, and a clear explanation of the distinction between «scholastic cosmology» and the modern sciences.

As with his previous study of 2003, Udías analyses the foundation of an extensive network of meteorological and seismological stations, and he pays special attention to Jesuit work conducted on hurricanes, typhoons and cyclones in Cuba, the Philippines and China, and to research in the seismological stations established by Jesuits worldwide. For the restored Society, Udías selected four modern scientists as the most representative of the Jesuit cohort in the nineteenth- and twentieth century: an astrophysicist (Pietro Angelo Secchi), an astronomer and geophysicist (Stephen J. Perry), a seismologist (James B. Macelwane) and a geologist (Pierre Teilhard de Chardin). This choice appears to neglect the new naturalists and biologists of the restored Society. However, Udías retrieves them in the chapter, «The Sciences in Colleges and Universities», since the tradition of research in natural history continued «thanks to Jesuits teaching in universities and secondary schools» (p. 226). In this section, the author mentions important naturalists such as Pelegrín Franganillo, Longino Navás, Jaime Puliula, Joaquim da Silva Tavares, Cândido de Azevedo Mendes, Carlos Zimmermann, Ethelbert Blatter, and the renowned molecular biologist and bioethicist, Luís Archer, among many others.

A Jesuit Contribution to Science also accounts for the «downward trend in the number of Jesuits involved in scientific research» (p. 230) in the closing decades of the twentieth century. In explaining this development, Udías identifies the decline in religious vocations, combined with the priority outlined in the thirty-second General Congregation (1974–75) concerning the promotion of

faith and justice, which had «an unintended negative influence in the involvement of Jesuits with science» (p. 233). In the epilogue, Udías links the Jesuits' dedication to the teaching and practice of science with Ignatian spirituality, particularly with the pursuit of the greater glory of God, the desire of seeking God in all things, and the Society's predilection for working on the frontiers, including in the field of knowledge.

As the author points out, this study includes mention of a total of 363 Jesuit scientists from a variety of fields, especially mathematics, physics, astronomy, geophysics, geology and meteorology. Despite constituting «only a small sample of the large number of Jesuits dedicated to science» (p. vii), their inclusion in this book, as some of the most representative examples in the Society, helps to construct a useful continuous narrative from 1540 to modern times. As the first genuine broad history of the scientific activities carried out by Jesuits since their foundation, this book certainly offers a valuable work of reference for the next generation of scholars, providing an excellent starting point for those seeking to study any aspect of the Jesuit contribution to science.

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Micah TRUE, *Masters and Students: Jesuit Mission Ethnography in Seventeenth-Century New France*, Montreal, McGill-Queens's University Press, 2015, 242 p., \$32.95, ISBN 978-0-7735-4513-7

The mastery of a foreign language normally includes a deeper knowledge of the culture that is attached to the language being acquired. In seeking ways to express oneself in an acquired language, the student of a language must eventually conform to a certain degree with the way the culture thinks and speaks. However, to what extent can the student of a language also become a master of that culture and even inform it? The author posits such a unique reversal of roles, as may be gathered from a new reading of the accounts of Jesuit missionary activity in French Canada. The author, an assistant professor of Modern Languages and Cultural Studies at the University of Alberta, examines how the missionaries' acquisition and use of the languages of the First Nations in the seventeenth-century mission territories of New France served, not only as means to communicate with native peoples, but also as a way of eventually controlling the image of these nations across