

the importance of the 1769 transit to the American Philosophical Society, but these are minor points. The eighteenth-century transit stories are so fascinating that the transits of 1874 and 1882 have suffered by comparison in the historical and popular literature. Here is where Sheehan and Westfall excel, as they report in detail on the many expeditions and observations of this period and bring this great international enterprise into better focus.

The book concludes with excellent information about the 2004 and 2012 transits, with observing tips for the casual viewer and the amateur astronomer. A few appendices add the twenty-first century transits as well as a list of all transits of Venus from 2971 B.C. to A.D. 7464. I would have welcomed an appendix on how you would actually calculate the solar parallax from the timing difference of two separate observers rather than leaving the details as an exercise to the student, but that may be asking too much for a book meant for general audiences. This is an excellent work that in 2012 could introduce the transits to a new audience of astronomically-interested people who are better situated for seeing that event than they were in 2004.

Dibner Library, National Museum of American History

RONALD BRASHEAR

JESUIT ASTRONOMERS

Searching the Heavens and the History of Jesuit Observatories. Augustín Udías (Astrophysics and Space Science Library; Kluwer Academic Publishers, 2003). Pp. xiv + 369. €104. ISBN 1-4020-1189-X.

This book, written by a Jesuit professor of geophysics at the Universidad Complutense of Madrid, beyond being “aimed at all scientists and students who do not want to forget the Jesuit contribution to science”, is, in fact, a most useful tool for all those, including Jesuits, who are unaware of what a great contribution the Society of Jesus has made to science. I must confess that, although I am a Jesuit, I have discovered only now while reading this book how much the Jesuits have contributed to the advancement of science by the great number of observatories they founded in all parts of the world. Suffice it to say that in the eighteenth century the Jesuits had 30 observatories in Europe, almost a quarter of those in existence at that time.

The work is divided into three parts. In the first seven chapters the history of the various observatories is told. Here are presented the histories of the Jesuit observatories in Europe and in the Jesuit missions, especially those in China and India, in the seventeenth and eighteenth centuries, before the suppression of the Order. Chapters 4 to 7 are dedicated to the observatories founded as of 1814 when the Order was restored.

The second part presents a brief description of each of the 74 observatories of the modern Society of Jesus during the years 1814 to 2000. For each observatory there is listed the Jesuits who have worked there, the publications, the physical plant and

instruments, the fields of research (astronomy, meteorology, seismology, magnetism, geophysics, etc.), and a bibliography of works concerning each observatory. The third part assembles bibliographical notes on 58 Jesuit scientists who were directors or professional staff members of the observatories described in Part 2. This is followed by a selection of their principal publications.

In order to give a more concrete idea of the material in this book, let me point out why the Society of Jesus, in contrast to other religious orders, right from its founding attributed great importance to the teaching of the sciences and to the founding of these observatories. Udías notes the coincidence of the founding of the Society with the birth of modern science and the specifically Jesuit emphasis on education. “The Jesuit order, when it established the first colleges, was not hindered by a medieval tradition, present in the older orders, like the Dominicans and Franciscans, who were also active in universities. So Jesuits could more easily enter into the new fields of modern science.” He cites the historian Joseph Needham, who “states that in order to accomplish their religious mission, science was a means to an end for the Jesuits. Their aim was naturally to support and commend Western religion by the prestige of the science from the West which accompanied it”. Udías adds that this did not prevent Needham from concluding that “all in all, the contribution of the Jesuits, chequered though it was, had qualities of a noble adventure”.

Besides these historical facts, Udías points out some internal elements strictly connected with specific Jesuit spirituality according to which the Jesuit is a man who should strive to “find God in all things”, or, as others have put it, the Jesuit must be “contemplative in action”. This aspect of the Jesuit tradition is magnificently illustrated in the description of what Ricci, Shall, Verbiest and other Jesuits accomplished in China and other mission countries. It is enough to recall that they were responsible for the first map of China, as well as the first exact forecast of solar and lunar eclipses, leading to the reform of the Chinese calendar. Jesuit astronomers were appointed directors of the imperial observatory in the years 1644–64 and 1669–1805 and they introduced the Copernican system to Chinese astronomers in 1761.

Among the many surprises that this book unveils are: the first publication of *Ephemerides astronomicae* by Jesuit astronomers in Germany and elsewhere, the invitation to a Jesuit astronomer (Hell) to observe a transit of Venus in Norway from a Protestant king who did not otherwise allow Jesuits into his territory, the foundation of the Georgetown Observatory in spite of the contrary advice by the head of the Jesuits, the large number of Jesuits who were appointed members of prestigious academies such as the Académie des Sciences, the Royal Society and the Royal Astronomical Society, and the large number of scientific networks organized by Jesuits, as well as the many associations of Jesuit scientists.

In conclusion I must say that the author merits praise and thanks for having, with a passionate interest and high professional standards, brought out a work that fills an unjustifiable void in the history of science. He has thus responded to the wish of many “who do not want to forget the Jesuit contribution to science”.

Vatican Observatory, Castelgandolfo

SABINO MAFFEO, S.J.