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Review of: June 8, 2004: Venus in Transit by Eli Maor

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ten to the power seventeen”) and ending, predictably, with “Zero,” whose various philosophical definitions continue for three pages. But by the time I, as a reader, reached this point in the book, on page 444, I was actually sympathetic to the inclusion of such material and was particularly fascinated by the fact that the Indian culture developed so many names for incredibly large numbers (e.g., Kathana: ten to the power 119).

Except for a few clumsy sentences in the introduction, the quality of the translation from the original French is remarkably smooth. Illustrations are plentiful and skillfully rendered. The index is comprehensive, with about 2,300 entries.

My only quibble is with the misleading title, which I suspect is the brainchild of the publisher rather than the author. This book is far from a “universal history of numbers,” which would necessarily run on for many volumes; meanwhile, the word “computer” in the subtitle has no relationship to anything between the book’s covers. In fact, the index does even not include “computer,” “complex number,” “algebra,” or many other topics that the title would seem to imply. The book is actually a cross-cultural history of natural numbers and their arithmetic, and on that basis it succeeds very well. It should have been titled accordingly.

As a reference work, this book belongs in every college library and on the shelf of every scholar of the history of mathematics. It should be recommended reading for every undergraduate mathematics major and required reading for every graduate student in mathematics.

ERNEST ZEBROWSKI, JR.

Bruce Stephenson; Marvin Bolt; Anna Felicity Friedman. *The Universe Unveiled: Instruments and Images through History*. 152 pp., illus., app., bibl., index. Chicago: Adler Planetarium and Astronomy Museum; Cambridge: Cambridge University Press, 2000. \$29.95.

The Universe Unveiled is based on the fabulous collection of historic astronomical and related scientific manuscripts, books, and instruments in Chicago’s Adler Planetarium and Astronomy Museum. Its many illustrations, many of them in full color, allow readers to examine and appreciate an array of wonderful instruments and images—including armillary spheres, astrolabes, clocks, drawing instruments, globes, navigational instruments, nocturnals, orreries, sundials, and early telescopes, as well as various

celestial charts and diagrams—most of which were made in Europe during the period 1450–1900. Each object and image is identified, with some information about its maker, country of origin, and date of manufacture. The accompanying text has four parts: “Discovering Space,” “Discovering Time,” “Understanding the Earth,” and “Understanding the Heavens.”

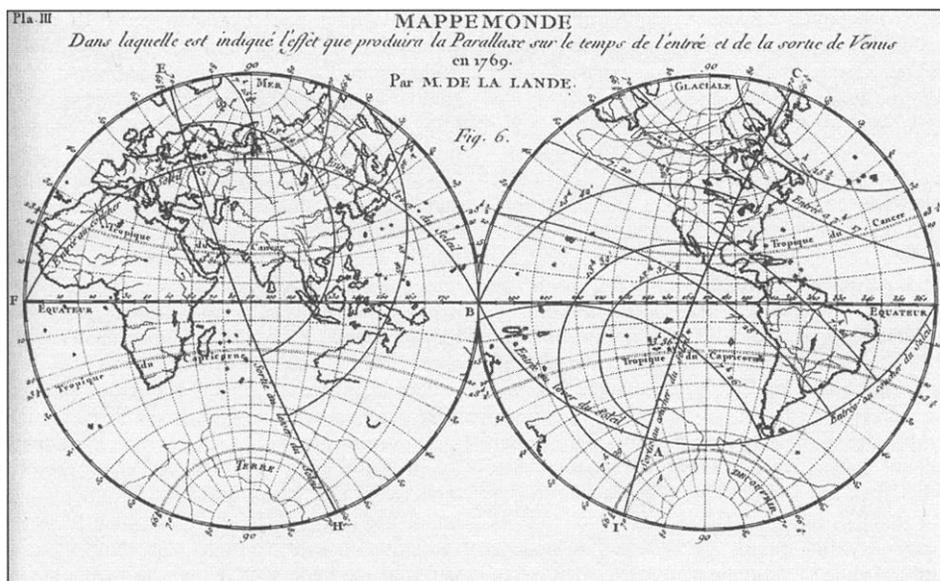
The authors, all members of the Adler’s curatorial staff, state that *The Universe Unveiled* is intended for “readers of all backgrounds.” Those readers with little or no background in the history of science or of scientific instruments might appreciate the beauty and intricacy of many so-called scientific instruments and images and realize that they were designed to serve broad cultural purposes as well as narrow scientific ones. Readers of this journal, however, and especially those particularly interested in instruments and images of this sort, might want much more information about these things and about their relation to the history of science and technology, both narrowly and broadly construed.

DEBORAH JEAN WARNER

Eli Maor. *June 8, 2004: Venus in Transit*. xiv + 186 pp., illus., figs., tables, apps., bibl., index. Princeton, N.J.: Princeton University Press, 2000. \$22.95.

Every so often, the planet Venus crosses the disk of the Sun, as viewed from the Earth. Because of a resonance between the orbital periods of Venus and the Earth (5 synodic cycles of Venus = 8 Earth years), a transit seen at one node of Venus’s orbit tends to be followed by another 8 years later. But then there is a wait of about 243 years for another event at the same node. In between, however, there will be a pair of transits at the other node of the orbit. Thus the sequence of the most recent transits of Venus: 1631, 1639, 1761, 1769, 1874, 1882. The next rendezvous is for 8 June 2004, which gives this book its title.

Johannes Kepler predicted transits of both Mercury and Venus for 1631. The Venus transit occurred during the night for Europeans and no one there saw it. However, the Mercury transit was observed by several people, including Pierre Gassendi. Because of small errors in his tables, Kepler missed predicting the Venus transit of 1639. But it was predicted and successfully observed by Jeremiah Horrocks and also seen by his friend, William Crabtree, in Manchester. Crabtree’s observation of the transit of 1639 was commemorated in a mural for the Manchester city hall by the Pre-Raphaelite painter Ford Ma-



Map showing the transit of Venus in 1769 (from Maor, June 8, 2004: *Venus in Transit*, plate 6).

dox Brown. So the romanticizing of the transits of Venus began with the Victorians.

Observation of these rare events could also serve a scientific purpose. Edmond Halley proposed using the Venus transit of 1761 to establish the solar parallax and thus the scale of the solar system. Observers at widely spaced locations could time the moment of ingress of Venus onto the Sun's disk, as well as the moment of egress. From comparison of the observations, the astronomers might work out an excellent value for the Sun's parallax. Halley died in 1742, but his plan was put into action for the transits of 1761 and 1769. The results were disappointing. Optical effects due to the physiology of the eye, as well as turbulence in the Earth's atmosphere and even refraction by the atmosphere of Venus, made it impossible to time the moments of ingress and egress as precisely as had been hoped.

This book is an engaging retelling of the story for a popular audience. It is heavily dependent on Harry Woolf's *The Transits of Venus* (Princeton, 1959) and even more so on Richard Proctor's *Transits of Venus: A Popular Account of Past and Coming Transits from the First Observed by Horrocks A.D. 1639 to the Transit of A.D. 2012* (1874). Indeed, Maor's book has been timed, as was Proctor's, to take advantage of an impending transit.

For some reason, the author chose to begin his

story with the dismantling of the ancient system of the world by Copernicus and Kepler. The opening chapters, which tell this story in a jumpy and discontinuous fashion, contain many hoary errors of fact. (The Ptolemaic system became cumbersome and useless by the successive addition of epicycles; Copernicus said that he had never seen Mercury; and so on.) However, once the main story begins, the book becomes more reliable.

The eighteenth-century transits involved plenty of drama and heartbreak. Le Gentil was sent by the Paris Academy of Sciences to observe the transit of 1761 at Pondicherry, India. Because of the French and English war he was unable to reach his station and was forced to observe the transit from his ship in the middle of the Indian Ocean. Rather than returning home in failure, he resolved to wait eight years for the transit of 1769. He hoped to observe that transit from Manila but was ordered by the academy to Pondicherry instead. He did as ordered, only to be clouded out on the day of the transit.

June 8, 2004: Venus in Transit is short and entertaining, in the genre of Dava Sobel's *Longitude* (Walker, 1998). The book ends with directions for viewing the transits of 2004 and 2012 and a discussion of transits as viewed from other planets of our solar system.

JAMES EVANS