

those of Servetus. He provides a useful history of the reception of Servetus's thought in England, in particular through a study of the Kentish clergyman John Lewis and his writings, before discussing the role of the passions in the novelists that he has chosen to examine. Readers of this journal will, however, be surprised by the paucity of Sill's coverage of late seventeenth-century considerations of passion and action, particularly those to be found in the work of the Cambridge Platonists, of Thomas Willis, and of John Locke. Their ideas have the advantage over those of Monro in having been known to Defoe, the author on whom Sill concentrates. Readers also may be puzzled by the Shandyesque digression to which Sill treats himself in an exposition of a letter found among John Lewis's papers but written in an unknown hand by an unknown author to an unknown recipient. For what it is worth, I remain unconvinced by the conclusions concerning that letter that Sill reaches. His book is nevertheless a brave and invigorating attempt to breathe new life into a tired subject.

SCOTT MANDELBROTE

#### ■ Modern (Nineteenth Century to 1950)

**Giuliano Pancaldi.** *Volta: Science and Culture in the Age of Enlightenment.* xv + 381 pp., illus., bibl., index. Princeton, N.J.: Princeton University Press, 2003. \$35 (cloth).

The colorful jacket illustration tells it all. It represents a fresco, *The Triumph of Science*, painted by the Italian artist Nicolò Barabino in 1876. The scene depicts a heroic vision of the scientific and industrial revolutions where the main figure, a beautiful and athletic female symbol of Science, is swathed in light and holds a geometry book. Groveling at her feet is a man draped in black, unmistakably a representative of ignorance and obscurantism. Alessandro Volta is seen standing on the right, demonstrating his electric battery to his assembled peers, an assortment of natural philosophers from earlier times, as well as scientists and engineers who have already entered the new age of steam and electricity.

Michael Faraday described Volta's battery as a magnificent instrument of philosophic research, and Giuliano Pancaldi places this great discovery in its historical context. He examines Volta's intellectual and social background in Austrian Lombardy, his training as a natural philosopher and civil servant, his interaction with the community of eighteenth-century electricians, and his dealings with patrons who shared

his Enlightenment ideals. The pattern to which Volta's career conforms is described by Pancaldi as "competitive imitation." For instance, Volta's invention of the electrophorus, what he called "a perpetual carrier of electricity" (p. 73), was an imitation of and an improvement on Franz Aepinus's sulfur and cup apparatus, but it was developed in the context of a lively controversy with his colleague Giambattista Beccaria. In the case of the battery, Volta imitated and improved on William Nicholson's model for the torpedo fish, and he was urged on by his controversy with Luigi Galvani. Reading Pancaldi's account of Volta's involvement in expert and amateur circles of electricians, one is impressed by the diversity of strategies adopted in the investigation of electricity. When compared with the systematic research with which Volta became acquainted in Paris in 1782 and again in 1801, his own approach appears eclectic. It had one great advantage, however. It was open-ended, and Volta was always ready to entertain new ideas and to be challenged by amateurs as well as professionals. The lesson that Pancaldi would have us draw is that the strength of science lies in its freedom from the bondage of "research programs." "Diversity and contingency," he writes, "were just as important as the Enlightenment ideal of 'useful knowledge' and the 'quantifying spirit' in bringing about the battery" (p. 285). The rapid transformations of the battery had not been foreseen. From a strictly physical instrument, as conceived by Volta in 1799, it was turned into a mainly chemical apparatus by Nicholson the following year in London, and it became a kind of mathematical instrument for Jean-Baptiste Biot in Paris in 1801. Volta never fully grasped the technological implications of his discovery, and it was only some twenty years after the introduction of the battery that the University of Pavia, where he taught, added a course on technology to the syllabus. It took time to grasp that the modern world would be fashioned by those who mastered the new instruments of science. If we return to the illustration on the jacket, we note that Volta turns his back on the symbolic figure of Science. He does not look her in the eye, but it is in the light of her radiance that he explains his invention to his fellow scientists. Pancaldi's book is as eloquent and as enjoyable as the fresco.

WILLIAM R. SHEA

**Antonio González Bueno; Alberto Gomis Blanco.** *Los naturalistas españoles en el África Hispana (1860–1936).* (Serie Histórica.)