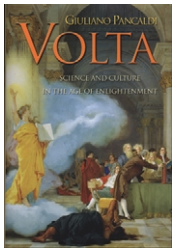


Sparking off the Enlightenment

Volta: Science and Culture in the Age of Enlightenment by Giuliano Pancaldi. Princeton University Press, 2003. US\$35.00/UK£22.95 (384 pages) ISBN 0691096856

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The celebrated invention of the electric (Voltaic) battery was a momentous event in the history of science, with deep and long-lasting consequences for humankind. However, the primary focus of this book is not the scientific endeavour of the Italian scientist Alessandro Volta (1745–1827), but a consideration of a crucial phase of the passage from the

ancien régime to the modern era. Giuliano Pancaldi achieves this by drawing out the scientific, social, cultural and human events associated with this prominent man.

Volta achieved social and cultural recognition beyond all expectations. In his lifetime he received honours rarely bestowed on scientists before him, crowned of course, by his demonstration of the battery in Paris before Napoleon. In posterity, he became a scientific hero, celebrated together with such giants such as Copernicus, Galileo and Kepler. Indeed, as Pancaldi points out, in 1849 Volta was given a place alongside these great scientists among the ‘saints’ of Auguste Comte’s *Calendrier positiviste*. With the personal transformation that accompanied his success, Pancaldi sees a kind of epochal mutation in scientific attitude and endeavour from the amateur inclination to science, typified by the ‘natural philosopher’ of the 18th century, to the professional ‘scientist’ that was to dominate the scientific programme from the next century onwards.

Using a variety of published and unpublished sources, Pancaldi retraces many important aspects of Volta’s biography – personal, familiar and social. The offspring of an aristocratic and passably well-off family from Como in Northern Italy, Volta could easily have spent his life as a *rentier*, enjoying literature, art and perhaps, in the style of the *grand siècle*, geometry as his intellectual amusements. However, he decides to enter the scientific arena at 18, and starts a correspondence with leading figures working on electricity, such as Nollet and Beccaria. Then, without any formal university education, he becomes professor of experimental physics at the University of Pavia, and subsequently, apparently without any laboratory apprenticeship, one of the leading figures of the experimental science of his era – some called him a ‘Newton of electricity’.

Pancaldi is particularly successful at reconstructing the scientific networks of enlightened Europe in which Volta’s endeavours flourished and within which the Italian scientist established important links that led to his invention of the battery. Moreover, the chapter dealing with the reception of the battery in Europe is particularly interesting, revealing the diverse reactions to the new and intriguing instrument. By contrast to the instantaneous discharge typical of frictional electric machines and Leyden jars, Volta’s battery produced instead a continuous flow of electric current. This was a mysterious electric machine whose working mechanism could not be explained.

Less convincing is the way in which Pancaldi envisions the main characteristics of Volta’s electric science, particularly his insistence that Volta was an exceptional instrument builder who was less committed to the theory behind his work. Admittedly, Volta’s success depended largely on the invention of some extraordinary instruments, such as the electrophore and the *condensatore*. But his achievements were also the result of a strong intellect, although not one oriented (at least in public) to the construction of a new comprehensive theory of electric phenomena. For example, it emerges clearly from Volta’s papers on electrical investigation that he had an extraordinary talent for grasping and visualizing some of the essential theoretical tools necessary to understand his results and to inform the direction of later experiments. This strength is particularly evident when he tries to account, using his concepts of tension and quantity of charge, for the apparent paradox that the commotion produced by the discharge of the electric organ of fish could be strong even if other typical electric signs (and notably sparks) were absent or weak.

The same ability also emerges from Volta’s analysis of a series of electrophysiological phenomena, particularly in the post-battery period. These pages, which represent a very important aspect of Volta’s studies, unfortunately do not find their way to Pancaldi’s book.

Volta: Science and Culture in the Age of Enlightenment is nevertheless a delightfully perceptive and personal insight into fascinating aspects of the Enlightenment society and culture.