Preface

This volume of the *Nuova Voltiana* series adds new important elements to those already offered in the previous two volumes.

Three of the six articles here collected resume the topic of the effects produced by the battery. Additional facets of the conceptual debate stimulated by Volta's invention, especially in the first half of the nineteenth century, are brought to light. New information is also provided on the early developments, applications and experiments to which the instrument gave rise.

Various features of Volta's quantitative conceptualisation of electricity, a matter already addressed in the first volume, are highlighted in one of the other three articles. Original issues are tackled in the remaining two articles: the history of Volta's physics cabinet and his efforts to establish modern ideas and methods in meteorological science.

In the first article GIULIANO BELLODI and PAOLO BRENNI provide new information on several aspects of Volta's involvement with scientific instruments. Their work is based on four main sources: Volta's published correspondence, the surviving instruments of his physics cabinet at Pavia University and two inventories of this cabinet which have been recently identified. On these grounds, the authors cast substantial light not only on Volta's specific role in the development of the Pavia cabinet but also on more general issues such as the trade of scientific instruments and the network of foreign and local manufacturers.

MARCO CIARDI focuses on relevant facets of Volta's meteorological work. He shows that Volta rejected the common view that bolides and falling stars are purely electrical phenomena. The response of instruments played a major part in drawing him to this conclusion. He suggested, on the contrary, that such phenomena result from the combustion of flammable material. We are further shown that Volta also opposed the conviction, held especially by Italian naturalists, that the ancient authors could still be depended upon in meteorological matters. He pointed instead to the development of a wide network of well-equipped meteorological observatories.

JÜRGEN TEICHMANN starts exploring Volta's quantitative conceptualisation of electricity in the first purely electrostatic stages of his work. Special attention is focused on the concepts of load, tension, capacity and resistance, on which Volta based his elaborations, and a comparison is established with Beccaria and Cavendish,

who had already used similar concepts. In the remainder of the article the author studies the way in which Volta extended his electrostatic conceptualisation to galvanic phenomena, the battery and circuits, arguing that along this path he ended with no less than an anticipation of Ohm's famous conduction law. Interesting considerations are offered in the final part of the article about the influence of social and technological factors on the evolution of electrical science.

ROBERTO DE ANDRADE MARTINS tackles the matter of the discovery of electromagnetism. According to some old and recent interpretations, the real discoverer of electromagnetism was not Ørsted in 1820, but the Italian lawyer Gian Domenico Romagnosi, after a series of experiments he carried out in 1802 with Volta's battery and a magnetic needle. By framing this episode in the context of the early researches on the battery, the author argues that Romagnosi did not detect an electromagnetic effect but only the electrostatic actions produced by the new apparatus.

WILLEM HACKMANN discusses the realisation and development of the "dry pile" in the framework of the general debates on the source of voltaic electricity. The development of the new device is described in detail and we are shown that it soon found interesting applications, especially in horology and in the construction of very sensitive electrometers. On the conceptual side, we learn that it was inconclusive in deciding between the contact and the chemical interpretations of voltaic electricity. The author also describes how this inability to play a crucial role and other factors made the dry pile drop out of the main debate.

NAHUM KIPNIS supplies us with fundamental insights into the debates on the nature of voltaic electricity in the years 1800-1850. He shows that, while the contact versus the chemical interpretation of the effect remained the principal bone of contention, none of the parties had decisive arguments against the other because appropriate experimental or/and conceptual adjustments always made it possible to counter the objections raised by the opponents. Due to this impasse, the idea that some sort of synthesis was needed started to be considered. Particularly fruitful in this regard was the assimilation by some "chemists" of the concepts and quantitative methods developed by the "contactists". This fertile interaction established an important basis for the future development of electrochemistry.

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