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patients. The demonstration led to the realization that an exotoxin was produced in the experimental animal but it took many experiments and much subsequent work to define the conditions whereby such an exotoxin could be isolated and purified under laboratory conditions. The work was slow because there were many who did not believe that such an exotoxin could possibly exist.

Simultaneously, particularly under the leadership of William Phillips, a former naval officer, a team began investigations of the physiological consequences of the disease and demonstrated the chemical content of the fluid that was being passed in such huge volumes. That it was essentially a filtrate of plasma, with added bicarbonate, became evident. Research stations began to pour back balanced fluids. Earlier attempts to return electrolyte and fluid to the blood were considered failures. This was because when the patients became somewhat rehydrated, the diarrhoea returned. Soon, however, it was realized that this was to be expected. However, biochemical studies had led some to use hypertonic fluids and others hypotonic fluids with sometimes disastrous results. Finally, came the realization that a balanced mixture of salts could be returned to the body of the affected victim, in volumes equal to those that were being lost and that, almost miraculously, the mortality rate was then reduced to negligible proportions. Not much later, in consequence of the availability of the exotoxin and the intestinal loop of the experimental animal, it could be demonstrated that in the presence of glucose, the electrolytes and the fluids would re-enter the body from the intestinal tract and oral rehydration was instituted. It was not all that simple. Each of the steps was opposed by many, for what seemed to be adequate scientific reasons at the time. Perhaps the most important scientific failing was the absence of carefully controlled clinical trials of the type that would now be considered virtually a necessity before any treatment could be evaluated. This was a time, not yet completely gone, when the laboratory observation reigned supreme and the techniques of large-scale clinical observation through controlled trials had not received widespread acceptance, particularly among those who fancied themselves as "hard" scientists. These are chapters from which all may learn, the most important lesson being that the closed intellect, no matter how skilled and highly trained, will make errors in judgement if the guiding principle is not empirical results of carefully conducted experiments.

This is a good book. It tells what happened in a manner that is rarely told about a major scientific process. It tells it from the viewpoint of expert participants, and it leaves out little, although it deals delicately with the foibles and errors in judgement that, in retrospect, may have delayed the process of saving lives. Once again we are impressed by the wisdom of Santayana's words—if we do not absorb all of the lessons of this tale, we will be condemned to repeat the errors of the past.

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GIULIANO PANCALDI, *Darwin in Italia*, Bologna, Il Mulino, 1983, 8vo, pp. 294, L.25.000 (paperback).

GIULIANO PANCALDI (editor), *I congressi degli scienziati italiani nell'età del positivismo*, Bologna, Cooperativa Libreria Universitaria Editrice, 1983, 8vo, pp. 225, L.16.000.

Giuliano Pancaldi, one of the leading Italian historians of biology, has produced almost simultaneously two highly attractive books. The first is an original contribution, whilst the second consists of a collection of essays edited by Pancaldi.

Darwin in Italia is a further step towards an understanding of the relationship of Darwin's thought to the works of some of the important Italian scientists of the nineteenth century. Glick's *Comparative reception of Darwinism* (1974) did not include a chapter devoted to Italy. A few subsequent studies have contributed to filling that gap, such as those by Giovanni Landucci in 1977 and 1981, and that by Pancaldi himself in 1977. *Darwin in Italia* consists of essays on five scientists who, in different times and with different perspectives and motivations, are related to Darwin's works. The first essay is concerned with Giambattista Brocchi, the geologist whose views on extinction were favourably received by Lyell and

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therefore indirectly influenced Darwin himself. Apart from any connexion with Darwin, this essay is important as the most recent study of this Italian geologist, a distinguished scientist in his own right. Pancaldi clearly outlines Brocchi's work and opinions, and his approach to such thinkers as Lamarck and Bonnet. Especially relevant is the basic incompatibility noted by Brocchi between the concept of extinction and that of the chain of being, a point of Brocchi's understanding on which Pancaldi throws much light and which is of vital importance for the rejection of the Platonic view of nature that helped to pave the way for Darwin's non-Platonic approach to evolution. Another central idea of Brocchi's was an analogy between individuals and species, a highly debated topic of the mid-nineteenth century, with contributions by Huxley and Forbes.

The second essay deals with what seems to be Pancaldi's present hobby-horse: Luciano Bonaparte. In discussing this influential naturalist, Pancaldi manages to give a vivid picture of some of the debates that excited Italy—by then rather on the edge of European culture—concerning the problem of species and classification from Cuvier to Darwin. Pancaldi also touches on a topic which should be carefully considered by all historians of nineteenth-century natural science, namely *Naturphilosophie*. The third essay deals more directly with the actual reception of Darwin's ideas in Italy, and focuses mainly on Giovanni Canestrini, showing both his agreements and his disagreements with Darwin, especially concerning the origin of man. The fourth essay is, in my opinion, the most important in the book, since it provides not only insight into the work of Federico Delpino but also helps towards an understanding of one of Darwin's least-studied aspects, the theory of pangenesis. Pancaldi has based his study of the relationship between the two naturalists on manuscript sources available in Cambridge, such as the correspondence between them, and Darwin's comments on the margin of Delpino's books, which he read with the help of his wife Emma. There is no doubt that Darwin took Delpino very seriously and was influenced by him. Pancaldi manages to finish on a high note, with a brilliant piece on Cesare Lombroso and the connexion between his thought and not only "Darwinism" but, more broadly, the positivistic approach to science and culture at the time. Pancaldi writes clearly, despite a few ugly and unnecessary neologisms. His is a good and useful book, although it is not the fully-fledged history of natural science in nineteenth-century Italy for which there is a great need. An English translation of this book would be most welcome.

I Congressi degli scienziati contains contributions by a number of Italian historians of science, including Pancaldi himself. As he points out in the introduction, the book cannot compare with, say, Morrell's and Thackray's *Gentlemen of science*, or MacLeod's and Collins' *The parliament of science*, which give a complete view of the scientific influences at work in nineteenth-century Britain. Yet it is a welcome contribution, since it helps to throw light on an aspect hitherto little considered. Although the quality of the contributions is generally good, the length of the papers varies considerably. For example, Bottazzini's paper on mathematics is a thorough and technical essay, whilst other contributions are more lightweight. Personally, I enjoyed most Calcagno's paper on conferences concerning technology, especially agricultural technology. Nicoletta Morello outlines briefly but cogently the geological conferences; Giorgio Tabarroni gives a good account of the origin of the Società Italiana per il Progresso delle Scienze; Minuz and Tagliavini inform us of who the congressmen were; and Pancaldi himself makes a contribution to the knowledge of Hugh Strickland, one of the most important but least known naturalists of the period immediately before the appearance of the *Origin of species*, and considers his correspondence with Luciano Bonaparte.

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ALEXANDER TODD, *A time to remember. The autobiography of a chemist*, Cambridge University Press, 1983, 8vo, pp. viii, 257, £15.00.

Alexander Todd is one of the few chemists in the old baronial style. For many years he dominated organic chemistry and university appointments therein in this country before, at a relatively early age, departing the laboratory for the power structures of science politics; for