

## BOOK REVIEWS

### BERTHOLLET AND HIS CIRCLE

#### The Society of Arcueil

A View of French Science at the Time of Napoleon I. By Maurice Crosland. (Heinemann Books in the History of Science.) Pp. xx + 514 + 20 plates. (London: Heinemann Educational Books, Ltd., 1967.) 84s. net.

WHEN Napoleon in accepting the dedication to himself of Laplace's third great volume wrote in reply, "I should like future generations when reading your *Mécanique Céleste* not to forget the esteem and friendship which I have borne for its author" he doubtless recalled that General Bonaparte had been elected a member of the "First Class" of the Institut. It has been suggested that the science of Imperial France was stifled by interference and constrained by direction to practical ends, but this is not Dr Crosland's opinion. Whereas, he admits, dissident writers were driven from France, scientists "were loaded with honours and given pensions. Moreover, Bonaparte went out of his way to attract scientists from other countries". If allowance be made for a little complacency, a trifle of condescension in the Head of State, then (it seems) Napoleon felt himself at home in the scientific world. He believed in science (mostly, but perhaps not solely, for utilitarian reasons as an ex-engineer might) and he put money into it. It is hard for any scientist not to find some good in a dictator who does that.

Dr Crosland's book sets out to show what Napoleon's interest and patronage accomplished, partly through a general review of science and its organization in France during the Empire, but chiefly through a detailed study of the activities of the chemist Claude Louis Berthollet (1748–1822) and of the circle associated with his country home at Arcueil, conveniently outside Paris, where in summertime the use of Berthollet's laboratory and scientific discussions at the highest level were relieved by games of prisoner's base (also popular with the young Marcel Proust). If Napoleon had not supported Berthollet the Society of Arcueil would not have existed; without it (neglecting possible effects on the older members, among them Laplace, Humboldt and Biot besides Berthollet himself) the careers of Gay-Lussac, Arago, Candellet, Poisson and Dulong might have well been different, and so might science have been. . . . However this may be, it is certain that for a brief space after 1807 the Society effectively dominated French science, usually (it may be judged) on behalf of youth, ability and productivity. But, as Dr Crosland honestly points out, the favouritism of such private power-groups is not invariably just.

With these objects, his book is necessarily complex. He has to review French science from the time of Berthollet's youth and association with Lavoisier in relation to the Revolution and Napoleon, to the institutions imposed on it (the Institut, the *École Polytechnique* and so on), and its societies; then he has to consider the Society of Arcueil in particular also from several points of view: its membership, activities, publications and so on. There is inevitably a good deal of movement back and forth in the story as well as repetition. This is a well-written book, but the complex interweaving of its parts makes it difficult to read. It is also a long book, for Dr Crosland's account is full and detailed. And this is also the great virtue of a work, making scrupulous use of sources, which can only enhance Dr Crosland's reputation as a careful and thorough historian of science.

Although everyone is familiar with the outstanding position of French science in the early decades of the nineteenth century, and with the earlier work of Laplace and Berthollet especially, the detailed achievements of the Society of Arcueil are less familiar; furthermore, we have few such studies of scientists as a group and of the position of science in the community at large at the moment when, at the beginning of the second stage of the industrial revolution, the question of the utility of science and of its connexions with government had once more come to the fore. Further, Dr Crosland shows how yet more personal traits can affect the course of science, as in the closing words of this book where he describes excessive partisanship as an evil legacy of Arcueil. While interest in the character of the scientific world, in its structure and impact on the community, tends steadily to increase, so historical studies like this considering such issues must be of great interest. A. RUPERT HALL

### HEISENBERG FIELD THEORY

#### Introduction to the Unified Field Theory of Elementary Particles

By W. Heisenberg. Pp. ix + 177. (London and New York: Interscience Publishers, a Division of John Wiley and Sons, 1966.) 47s.

ONE of the most striking phenomena in theoretical elementary particle physics is the speed with which fashions change. A new idea, particularly if it is associated with a familiar name, has only to be mentioned, and immediately there appears a vast number of theorists (who presumably have all just finished other work and are therefore eager for new employment) ready to work on it. In this atmosphere, W. Heisenberg and his group at the Max Planck Institute have for many years faithfully pursued a unified field theory of elementary particles which has found little acceptance among the many other theoretical physicists around the world who are seeking to provide explanations of the same set of experimental facts. Many theoreticians have presumably dismissed the ideas—without bothering to read them in detail—as merely showing the refusal of one steeped in the ideas of one age to make the necessary accommodation to the facts of life of a new one; yet there must always have remained the doubt that perhaps Heisenberg has, as in the early days of quantum mechanics, been able to see things others have missed and the fear that one day soon we shall all be doing unified field theory. If only for this reason this book, which unashamedly is an advocate for the work of Heisenberg's school, should be welcomed. In slightly more than 100 pages Professor Heisenberg has given us a very readable and lively account of his ideas and their present state of development. On the whole, it is an impressive performance; the experimental facts are kept well to the fore, analogies from other physical theories keep us happy when we might become doubtful, and the numbers which are calculated are very close (too close?) to the known values. It is now possible to be familiar with the basic ideas and methods of calculation without having to study long original papers.

Although this book is described as an introduction, it is certainly not for the beginner. An extremely thorough knowledge of conventional field theory is required if the reader is to make much progress with the book. Also some familiarity with recent developments in many body theory—together with some patience—is required if the approximation methods of the sixth chapter are to be understood. Even the initial discussion of elementary facts would not have much meaning to a reader who was not already familiar with most of them; indeed, the introduction is written more to establish a particular way of thinking about these facts than to teach the facts themselves.