Book Reviews

Niels Bohr in Science and in Politics

Niels Bohr. The Man, His Science, and the World They Changed. RUTH MOORE. Knopf, New York, 1966. 459 pp., illus. $6.95.

Niels Bohr must be a fascinating subject to a biographer. He was born and trained in a small country with no impressive current tradition in physical science, and he became the main figure in the greatest intellectual adventure of our time, the development of atomic physics. He built an institute that became a mecca for physicists. He created a view of life based on what he called complementarity, a concept suggested to him by quantum mechanics. He was a chief contributor to the study of atomic nuclei that threw physics into the arena of politics. When he was a member of the Manhattan Project during the war his greatest effort was to try to change statesmen's way of thinking so that they would avoid those traps of the nuclear age with which we are now all too familiar, the arms race and the cold war.

However, the wide scope of Bohr's activities makes severe problems for a biographer. To give a balanced account of all aspects of his work, a biographer must be able to discuss Bohr's contributions to quantum theory, explain the meaning of his philosophical ideas, and describe his political views. To give an impression of his intricate personality is even more demanding.

Ruth Moore's is the first comprehensive biography of Niels Bohr. Addressed to a wide circle of readers, it is well written, factual, and informative and is an enthusiastic and exciting piece of reporting.

In spite of the considerable success with which Moore has accomplished her task, however, the difficulties of her undertaking show up. In her description of Bohr's work on quantum theory she has not resolved the dilemma of a historical versus a popular account but has attempted a mixture which does not really give an impression of the nature of the quantum problems and of the *Kopenhagener Geist der Quantentheorie*. Nor does she discuss adequately Bohr's philosophical ideas. Her description of Bohr's personality is sketchy and sometimes stereotyped. In her sympathetic account of what happened, the events often seem closer than the person. She reveals little of what it was, apart from his scientific genius, that made Bohr a unique individual.

These and other shortcomings are greatly offset by Moore's brilliant description, more than 150 pages, of the period between 1938 and 1945. This is first-rate scientific and political reporting. She details the dramatic events following Hahn and Strassmann's discovery of the fission of uranium nuclei. She describes how Bohr escaped from Nazi-occupied Denmark in September 1943, how he tried to make the Swedish government take steps to dissuade the Nazis from arresting the Jews in Denmark, how he was flown to England in the bomb bay of a Mosquito plane, how he was appointed a "Consultant to the British Directorate of Tube Alloys" (the code name for the British atomic bomb program).

When Bohr was shown the bomb project, he immediately began to think about the long-term political effects of the bomb and the political changes it would necessitate. In the next 19 years this problem occupied him as intensely as the quantum problem had occupied him 30 years earlier. In England, and then in the United States, Bohr's prestige as a physicist opened political channels to national leaders. His view was that the new weapon made the old relations between nations impossible but that it also gave the opportunity to change these relations. He found Roosevelt sympathetic to his ideas. Churchill refused to see the situation in a long-term perspective.

Moore's account of Bohr's political crusade is thorough and impressive. Many of Bohr's hopes may seem naive now, but his voice during the war was a voice of wisdom and sanity in a very dark time.

AAGE PETERSEN
Belfer Graduate School of Science, Yeshiva University, New York City

A Comprehensive Text

Biological Chemistry. HENRY R. MAHLER and EUGENE H. CORDES. Harper and Row, New York, 1966. 890 pp., illus. $16.50.

This is a distinguished addition to the small group of important texts covering its field. Its major themes are, in brief, the structure, function, and biosynthesis of proteins and nucleic acids and the thermodynamics, kinetics, and mechanisms of biochemical processes. These themes are developed broadly, and worked out in searching detail. After a short introduction, three chapters (180 pages) deal with the structure and physical properties of proteins and nucleic acids, at such a level as to prepare the student for reading most of the current research papers on these macromolecules. Three substantial chapters on thermodynamics, enzyme kinetics, and enzyme mechanisms follow. There is then a long discussion of coenzymes, and an important chapter on the structure of cells and the fractionation of cell components, with a thoughtful discussion of the pitfalls that await the investigator in the borderland between biochemistry and cellular fine structure. Three of the longest chapters in the book deal with carbohydrate metabolism, with biological oxidations, and with amino acid metabolism; shorter but very substantial chapters deal with photosynthesis, lipid metabolism, and the citric acid cycle. The two last chapters are on nucleic acid metabolism and the biosynthesis of proteins; the latter runs to nearly 80 pages and includes a quite detailed presentation of biochemical genetics and the genetic code.

Within the broad area covered, the achievement is most impressive. I know of no general text that deals so thoroughly with the free energy changes of biochemical processes, and certainly of none that gives so searching an account of the mechanisms of metabolic processes. The chapter on enzyme kinetics deals with the subject in far more depth than most similar books attempt. It is a splendid discussion for one who already knows something of the subject, but the student encountering it for the first time may find it too abstract and mathematical; to assimilate it properly, he should read it in conjunction with some of the later chapters, where he can apply the general principles of kinetics to specific enzyme systems. Here, and in some later chapters, there is considerable