Book Reviews

Europe's Teacher

Herman Boerhaave. The Man and His Work. G. A. LINDEBOOM. Methuen, London, 1968 (U.S. distributor, Barnes and Noble, New York). xxiv + 454 pp. + plates. $22.50.

Albrecht von Haller once designated his teacher Herman Boerhaave as *communis Europae praeceptor*, the teacher of all Europe. Boerhaave's influence still survives today, since many 20th-century medical practitioners are his intellectual descendants. Yet how many medical students, and how many medical practitioners, are able to say more of him than that he was a great teacher?

Boerhaave was born just over 300 years ago, on 31 December 1668, near Leyden. He studied in the University of Leyden (though he took his degree in medicine at Harderwijk nearby), and he taught at Leyden from 1701 until his death in 1738. He was first lecturer in medicine (1701–1709), then, in 1709, was appointed professor of medicine and of botany. In 1718 he was appointed to a third chair, that of chemistry; he had been giving lectures in chemistry since 1702. In 1729 he resigned the chairs of chemistry and of botany, but he remained professor of medicine until he died. He also delivered clinical lectures at the Caecilia Hospital in Leyden from 1714 until 1738.

His *Institutiones Medicae*, published in 1708, summarized what was known of physiology and pathology; the pathology was considered from a physiological rather than a structural point of view. This was a highly influential textbook in its day, as was also his *Elementa Chemiae* (published in 1731 though dated 1732; an unauthorized, spurious edition had appeared in 1724). As a clinician, Boerhaave improved diagnostic methods; he was one of the earliest to use and to recommend the use of the thermometer. He laid strong emphasis on the importance of clinical observations at the bedside. As a chemist he, among other things, separated urea from urine before 1729; the discovery of urea is usually attributed to Rouelle (1773). As a botanist he devoted great effort to the enrichment of the already splendid botanical gardens at Leyden; he also planted a pleasure garden of his own which Linnaeus called a Paradise. Perhaps his greatest contribution to botany was the considerable aid he gave to Linnaeus, who dedicated to him his *Genera Plantarum*. If a historian is one who studies history, he might also be called a historian; he produced an edition of Vesalius' works, and he resurrected the manuscript to publish posthumously Swammerdam's *Biblia Naturae*.

Linnaeus was not the only student to come to him from afar in Europe. Of the 178 students who took degrees in medicine under his aegis, only 76 were Dutch. Others included Haller, van Swieten, and Alexander Munro, through whom his influence spread from Edinburgh to our own medical schools via the University of Pennsylvania.

Short biographies of Boerhaave have been published from time to time (one by Fontenelle, others by de La Mettrie and Samuel Johnson). This is the first one to deal exhaustively with his life and his work. The biographer, himself a professor of medicine and a medical historian, is admirably qualified to write the book. Dutch is his native language and he is expert in Latin; the primary sources are mainly in these two languages. He has already published an extensive Boerhaave bibliography (1959), a Boerhaave iconography (1963), and two volumes of Boerhaave letters (1962, 1964).

The biography is complete in itself, and it is all that a biography should be. The first section of the book discusses chronologically the events of Boerhaave's life; the second part, somewhat shorter, takes up in turn his personality, his philosophy, and then his work in the various separate though related fields in which he proved himself so brilliant and versatile. The English style is excellent; Lindeboom expresses gratitude on this and other accounts to E. Ashworth Underwood, who wrote the foreword. The text is satisfactorily annotated; the illustrations are excellent and delightful. The volume includes a 15-page list of references to works by and about Boerhaave, three short appendices (a *Commentariolus*, in Latin and English in parallel columns, compiled by William Burton from Boerhaave's autobiographical notes; genealogical tables; and a sale catalogue of some of Boerhaave's collections); it has good name and subject indexes.

Lindeboom in his preface expresses his belief that the biography is not definitive; this is the only place in the volume where we may question his judgment. The book is a monument not only to Boerhaave but also to the art of biography.

JANE OPPENHEIMER
Department of Biology,
Bryn Mawr College,
Bryn Mawr, Pennsylvania

Lives of the Naturalists

Eternal Quest. The Story of the Great Naturalists. ALEXANDER B. ADAMS. Putnam, New York, 1969. 512 pp. + 16 plates. $10.95.

The lives and accomplishments of a dozen or so of the major contributors to systematic biology are portrayed by Alexander Adams in a sequence of biographies. Each portrait seeks to present the character of its subject, his childhood and education, the intentions, successes, and shortcomings of his career, and something of his relationship to his times. The account of Linnaeus begins by detailing the origin and course of the wars of King Charles XII of Sweden. The descriptions of Buffon's work in developing the Jardin du Roi, Lamarck's failure to win students or secure an eminent position, and Cuvier's political activities tell much about the social aspects of science in France during a century of change. The history of travels by Humboldt, Darwin, and Wallace vividly portrays the difficulties of exploration and shows how their theoretical accomplishments arose from their observations. The other principal subjects are Alexander Wilson and Audubon, exemplifying the collectors (or field observers) on whom naturalists have

always relied; Charles Lyell and Louis Agassiz, for their contributions to geology, paleontology, and museums; and Gregor Mendel.

Throughout the book Adams uses well-selected quotations and absorbing background material to sustain the flow of his narrative. It is his intention to tell a story of discovery so as to illuminate the qualities of character which have made men great observers of nature, rather than to write a detailed chronicle of the progress of knowledge of the forms and processes of life. The book seems well suited to acquaint serious young naturalists with the history of systematics and may for some serve as a good introduction to the history of science as a whole. Its greatest appeal to professional readers will be to those who are interested in an appreciation of evolutionary biology couched in historical and biographical terms. It presents more detail than the book with which it might be compared, Donald Culross Peattie's *Green Laurels: The Lives and Achievements of the Great Naturalists* (1936). In contrast to the author of that book, who offers an esthetic appeal to the young reader's instinct for beauty, Adams claims that our disdain for the writings of the great naturalists contributes to the ecologic crisis of the present day, reaching for a moral which fails to fit his narrative. In fact, the biographical scaffolding of the book prevents it from dealing effectively with any ecological themes and excludes many of the most important aspects of the larger subject it purports to treat, such as instinct and behavior, oceanography, microbiology, botany, and morphology. The entire history of biology, even of systematic biology, cannot be presented in the compass of a single volume without turning it into a concise textbook, which Adams has sought to avoid. He has captured much of the fascination of the subject and adopted a means of presentation that will make the principal naturalists of previous centuries far more accessible to readers than previously, by drawing upon a wide array of their own works and recent scholarly writing. Readers may find their way to this other material through appended references in essay form, 10 pages of bibliography, and 18 pages of biographical sketches.

PHILIP C. RITTERBUSH
Office of Academic Programs, Smithsonian Institution, Washington, D.C.

Russian Work on Cancer

The Virology and Immunology of Cancer. L. A. ZILBER and G. I. ABELEV. Translated from the Russian edition (1962), with revisions by the authors, and edited by Ruth Schachter. Pergamon, New York, 1968. xii + 476 pp., illus. $21.

It was a Russian scientist, Ivanovski, who discovered viruses in 1892, but it was the role of another Russian investigator, the late L. A. Zilber, to become the father of Russian virology much as Thomas M. Rivers became the father of virology in the United States. This book serves as an appropriate memorial to Zilber, for it discusses much of the distinguished work to which he devoted a large part of his career. The volume was written in 1962 by Zilber together with G. I. Abelev, who pioneered in developing and adapting immunological techniques to the study of neoplasia and who discovered that hepatomas synthesize and secrete into the blood stream a specific embryonic alpha-globulin. It represents an effort by these two notable Russian scientists to present the significant experiences of their own laboratories over the course of 15 years of investigation concerned with the viral etiology and the immunology of cancer. In gathering together this material, they further set themselves the task of discussing their own work in relation to the salient developments, in both East and West, of experimental findings, conceptual approaches, and conjectural proposals on the role of viruses in carcinogenesis.

The book has been updated in this English translation, but only to 1964. Although it is therefore not a completely up-to-date text, it is of considerable value and interest as a broad review of the history and background of viral oncology, as well as in introducing, in context, many contributions that are relatively inaccessible to most of us because the original publications were written in Russian. Of note are the authors' conceptual approaches to their fields. For example, as early as 1945 Zilber predicted that viruses may initiate an oncogenic process but may not be required to maintain it.

The first part of the book is devoted to historical accounts of investigations of viral carcinogenesis, dealing chiefly with the virus-induced tumors of animals that had been most thoroughly investigated up to 1964, but also surveying efforts in the quest for viruses in human cancer. The animal viruses considered include the viruses of avian and mouse leucoses, polyoma, Rous sarcoma, mouse mammary tumors, and rabbit papilloma, with emphasis on the RNA-containing avian tumor viruses. This is a field in which Zilber made outstanding contributions, including the discovery that the avian sarcoma virus can cross species lines and produce tumors in mammals, even in primates. The DNA-containing tumor viruses are not discussed in detail, and also missing from the book are the newer concepts on defectiveness of tumor viruses. Special emphasis is given to the mechanisms by which infection with a virus can induce malignant transformation in cells. The chapter on the virogenetic concept of the origin of tumors is of particular note, and attempts are made to explain viral carcinogenesis at the molecular level.

The second section of the book is devoted to a survey of ways in which the methods of immunology and immunochemistry have been brought to bear on oncological problems. It is noteworthy that this section provides a comprehensive review of Abelev's important contributions to the study of tumor antigens. Included in the text and in an appendix are detailed descriptions of his techniques, particularly that of antigen-antibody precipitation in agar.

As an essential basis for dealing with tumor immunology, this section includes a good review chapter presenting the immunogenetics and variability of transplantable tumors, against background information on normal transplantation (histocompatibility) antigens and the genetic factors controlling their expression. Subsequent chapters deal with detection of tumor-specific antigens, and also with methods for studying antigenic structure of tissues. The discussion includes findings on antigenic structure of tumors, on immunological reactions of the organism to the tumor, and on immunological aspects of carcinogenesis. The work surveyed includes studies with experimental animals, studies in vitro, and investigations on human cancer patients.

The more than 60 pages of references at the end include not only publications from the Russian literature, particularly papers originating from Zilber's own institute, but also numerous citations selected from the Western literature.

JOSEPH L. MELNICK
Department of Virology and Epidemiology, Baylor College of Medicine, Houston, Texas