THE ELECTRICAL INDUSTRY

The Rise of the Electrical Industry during the Nineteenth Century. By MALCOLM MACLAREN. Princeton University Press. 1943.

PROFESSOR MACLAREN throughout his long career as an electrical engineer in industry and as professor of electrical engineering at Princeton University has had many opportunities to associate with men who have contributed during the late nineteenth century to the development of the electrical industry. His opportunities for analyzing this development have been enhanced by his close association with the excellent collection of old instruments, including experimental models used by Joseph Henry, in the Princeton Electrical Museum.

Professor MacLaren states in his preface that he has described the development of the electrical industry in non-technical terms "in the hope that it may appeal to the general reader"; he has, however, inserted an extensive bibliography so that readers may inquire further into technical details. It is the opinion of the reviewer that the book will be most interesting to those readers who have a knowledge of the technical basis of electrical engineering. The author's brief reviews of the developments of various kinds of apparatus do not appear to be easy reading for a layman, although such brevity is to be commended from the point of view of the technically trained reader.

The early history of electricity is very briefly reviewed in the first chapter. Professor MacLaren then goes on to chapters devoted to the description of the development during the nineteenth century of communications, illumination, direct-current motors and generators, measuring instruments, direct-current distribution systems and early developments of alternating currents. These chapters present clearly and concisely the facts related to each subject. The value of the text is further extended by more than 150 reproductions of photographs of specific pieces of apparatus. Many of these illustrations are photographs of experimental apparatus and of early commercial models of batteries, motors, generators, meters, control devices and switchboards. The value of these illustrations would be greatly increased if some means had been used in each case to indicate the linear dimensions of the apparatus.

Professor MacLaren has chosen to limit his discussion to the nineteenth century. This is perhaps necessary, because an adequate history of the development during the twentieth century could not have been compressed into a single volume. His plan, however, has brought about an interesting result; the reader is conducted through a fascinating story of the development of a particular electrical device up to the beginning of this century. This is the end of the chapter, so that the reader finds himself in the same state of mind as one who reads a serial novel and is forced to wait for another month to continue a particularly exciting episode.

It is quite probable that this book will be examined with great interest by historians of science. They will find not only a series of interesting facts treated briefly and objectively in the text, but they will also be stimulated to study the bibliography which Professor MacLaren has supplied, and find there the extensive literature to which such a bibliography naturally leads.

S. REID WARREN, JR.
MOORE SCHOOL OF ELECTRICAL ENGINEERING,
UNIVERSITY OF PENNSYLVANIA

SPECIAL ARTICLES

PURIFICATION AND CHARACTER OF THE SWINE INFLUENZA VIRUS[1]

RECENTLY, there were described the purification and characterization of the influenza viruses A (PR8 strain)[2] and B (Lee strain).[3,4] The influenza virus A was found to be a lipoprotein complex of rounded or ovoid particle shape and of variable size. The average diameter of the particles, as measured from electron micrographs, was 77.6 mμ. The sedimentation diagram revealed a slightly diffuse boundary moving at a rate corresponding to the constant $S_{20^\circ} = 724 \times 10^{-13}$, from which the particle diameter was calculated to be 80 mμ. The influenza virus B was somewhat similar in constitution and in appearance in electron micrographs, but the diameter of the particles, measured from electron micrographs, was 97.3 mμ and calculated from the sedimentation constant, $S_{20^\circ} = 832 \times$

[1] This work was aided by the Dorothy Beard Research Fund and by a grant to Duke University from Lederle Laboratories, Inc., Pearl River, N. Y. The investigation was also supported through the Commission on Acute Respiratory Diseases, Board for the Investigation and Control of Influenza and Other Epidemic Diseases in the Army, Preventive Medicine Division, Office of The Surgeon General, United States Army, and by grants from the Commonwealth Fund, the W. K. Kellogg Foundation, the John and Mary R. Markle Foundation and the International Health Division of the Rockefeller Foundation to the Board for the Investigation and Control of Influenza and Other Epidemic Diseases for the Commission on Acute Respiratory Diseases.

[2] A. R. Taylor, D. G. Sharp, D. Beard, J. W. Beard, J. H. Dingle and A. E. Feller, *Jour. Immunol.*, 47: 261, 1943.

[3] D. G. Sharp, A. R. Taylor, I. W. McLean, Jr., D. Beard, J. W. Beard, A. E. Feller and J. H. Dingle, SCIENCE, 98: 307, 1943.

[4] D. G. Sharp, A. R. Taylor, I. W. McLean, Jr., D. Beard, J. W. Beard, A. E. Feller and J. H. Dingle, *Jour. Immunol.*, in press.