

relations, and changes of wave-length by pressure and by motion in the line of sight, concluding with a description of Rowland's ruling engine. Complete tables of wave-lengths have wisely been omitted, although the wave-lengths of the most important lines of the common elements are given in the text. Space is also saved by the omission of detailed descriptions and reproductions of spectra, real knowledge of which can be gained only by direct personal observation. The elementary optical theory of spectroscopic apparatus and the methods of adjustment and investigation are discussed with great thoroughness, with many valuable practical suggestions. For the purposes of the general student, it might have been better to have abbreviated the descriptions of the less commonly used apparatus and methods and to have given more space to such matters as the radiation of black bodies, Kirchhoff's law and "luminescence," changes in spectra produced by changes in physical conditions, and the bearing of recent ionic and electron theories on radiation phenomena, particularly on the origin of multiple spectra.

The book is clearly and concisely written and attractively printed, but contains some typographical errors.

There has long been need of a compendious text-book in spectroscopy, thoroughly up-to-date and giving a really adequate working knowledge of instruments and methods of research. This work very satisfactorily supplies the need, and will be warmly welcomed by all teachers of the subject.

PERCIVAL LEWIS.

ELEMENTS OF APPLIED MICROSCOPY. By CHARLES-EDWARD AMORY WINSLOW, Instructor in Industrial Microscopy and Sanitary Biology in the Massachusetts Institute of Technology. 12mo. 183 pp. 60 illustrations. New York: John Wiley & Sons. Price, \$1.50.

This little book is intended for the beginner with the microscope. It meets a pedagogic need as a text in a course having for its object facility in manipulation of the microscope and acquaintance with the scope of its practical applications.

The first four chapters describe the function and manipulation of the principal parts and attachments of the modern compound microscope, and the general technique of microscopy. The remainder of the book—about 120 pages—is given to an interesting survey of the principal fields in which the microscope has been applied to practical affairs, *e. g.*, microscopy of starches,

foods, drugs and adulterants, textile fibers and paper; the microscope in medicine, sanitation, forensic cases, chemistry, petrography and metallography. Sixty figures elucidate the text.

The material is for the purpose of illustration and conservative suggestion rather than detailed description. The book contains but little original data and does not attempt to treat any single subject with completeness from the standpoint of the expert. A bibliography at the end of each chapter will be of use to the student stimulated to consult the more exhaustive works.

The book can be very helpful to beginning microscopy students of almost every class.

ROBERT E. LYONS.

THE POLARISCOPE IN THE CHEMICAL LABORATORY. By GEORGE WILLIAM ROLFE. New York: The Macmillan Company. Price, \$1.90.

At the present day no laboratory for ordinary research, commercial business, or teaching is considered complete without a good polariscope. There has long been need for a handbook less ponderous than Landolt's for the use of students and analysts. This work of Rolfe is intended to supply this want.

The author gives a short account of the fundamental principles of optical polariscopy. A brief history of the polariscope is given with a description of the ordinary types. The polariscope as a saccharimeter is next described with an account of the accuracy of saccharimetric uses. The methods of installing and caring for a saccharimeter are given in some detail and are of great value. Apparatus which are used in connection with the polariscope are briefly described. Special forms of polariscopes also receive a separate chapter. The general principles of polarization of cane-sugar for commercial purposes are set forth and the ordinary errors attending the commercial use of the polariscope for the determination of cane-sugars are pointed out. The author is of the opinion that the sum of the errors of ordinary commercial work is practically zero, since some of them, such as the presence of lead precipitate, tend to increase the polarization, and others tend to diminish it, as for instance, polarization at temperatures above that at which the instrument is standardized. This observation could hardly be applied with justice to the ordinary polarization of sugars for dutiable purposes. The great bulk of these sugars are centrifugal sugars of the first crystallization of an average polarization of about 95. The lead precipitate in these sugars is extremely minute. They, however, are often