

order approximation theory—that is, paraxial optics. Unfortunately, the author, like most textbook writers, considers it as a special case of a collineation. (This concept was shown by Allvar Gullstrand in 1907 to be in contradiction to optical laws, especially the law of Malus.) The author develops in this chapter the well-known formulas for the position of object and image in thin lenses, thick lenses, and general optical systems.

The third chapter, "Optical instruments," deals with the basic types of instruments, their paraxial data, and the chromatic axial aberrations (longitudinal and lateral).

Chapter 4 deals with the wave nature of light, elementary problems of diffraction, and the resolution of optical instruments. The optical sine theorem of Abbe is also discussed.

Chapter 5, "The observation and recording of images," discusses the elementary properties of the human eye and the use of spectacles, whereas Chapter 6, "Photometry," discusses problems of illumination, the radiation diagram of light sources, and photometry.

The last chapter discusses the third-order aberration figures.

Numerous short appendixes deal with the vectorial form of the refraction law, with depth of focus, with some dispersion formulas, and with the derivation of Euler's formulas for the light path in nonhomogeneous media.

Examples are given at the end of each chapter. The book is clearly written and is a very good elementary introduction to the subject.

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**The Systematic Identification of Organic Compounds.** A laboratory manual. Ralph L. Shriner, Reynold C. Fuson, and David Y. Curtin. Wiley, New York; Chapman & Hall, London, ed. 4, 1956. 426 pp. \$6.

The excellent features of this popular laboratory manual are well known, and the present review will be concerned only with a comparison of the third (1948) and fourth editions.

Perhaps the most conspicuous innovation is the introduction of a chapter (8) on "The use of spectroscopic methods for functional group determination." The chapter is concisely written and at the level of the student for whom the textbook is designed. Six classification tests (Chapter 2), of doubtful value, have been omitted. The suggestions for the examination of the literature have been improved, and ample warning is given

concerning the reliability of certain formula indices. Some parts of Chapter 6 ("The solubility classes") have been largely rewritten. The discussion on "Generalizations from solubility data" has been simplified and placed on a more rational basis, even within the present limitations of solubility theory. A much needed section on "Electronic effects on acidity and basicity" is included. The treatment of amphoteric compounds remains unsatisfactory.

Although Chapter 7 ("Application of classifications tests") retains its general aspect, it is evident that considerable attention has been given to the chemical details of the classification tests (note experiment 2). The new approach is best illustrated in experiment 21 (silver nitrite solution test), in which a rather comprehensive discussion of the theory of replacement reactions is presented. No significant change has been introduced in the 15 sets of problems. Some of the more abstruse examples were omitted, but no new problems were added. This textbook has gained considerably in its new edition.

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## Books Reviewed in

### The Scientific Monthly, August

*Science and the Course of History*, P. Jordan, translated by R. Manheim (Yale University Press; Oxford University Press). Reviewed by I. B. Cohen.

*Celebrated American Caves*, C. E. Mohr and H. N. Sloane (Rutgers University Press).

*Viral and Rickettsial Diseases of the Skin, Eye, and Mucous Membranes of Man*, H. Blank and G. Rake (Little, Brown). Reviewed by H. Koprowski.

*The Navajos*, R. M. Underhill (University of Oklahoma Press). Reviewed by D. F. Aberle.

*Chemical Calculations*, H. V. Anderson (McGraw-Hill). Reviewed by F. J. Llewellyn.

*The Thirteen Books of Euclid's Elements*, translated from the text of Heiberg with introduction and commentary by T. L. Heath (Dover).

*Atlas of Paleogeographic Maps of North America*, C. Schuchert (Wiley; Chapman & Hall). Reviewed by E. W. Berry.

*Geology: Principles and Processes*, W. H. Emmons, G. A. Thiel, C. R. Stauffer, and I. S. Allison (McGraw-Hill). Reviewed by H. R. Gault.

## New Books

*Basic Chemistry of Textile Colouring and Finishing*. 191 pp. \$6. *Basic Chemistry of Textile Preparation*. 197 pp. \$6. S. R. Cockett and K. A. Hilton. Philosophical Library, New York, 1956.

*The Chemistry and Mode of Action of Plant Growth Substances*. Proceedings of a symposium held at Wye College (University of London), July, 1955. R. L. Wain and F. Wightman, Eds. Academic Press, New York; Butterworths, London, 1956. 312 pp. \$9.50.

*The Fighting Cheyennes*. George Bird Grinnell. University of Oklahoma Press, Norman, 1956. 453 pp. \$5.

*The Classification of Lower Organisms*. Herbert F. Copeland. Pacific Books, Palo Alto, Calif., 1956. 302 pp. \$7.50.

*A Handbook for the Identification of Insects of Medical Importance*. John Smart. Chapters on fleas by Karl Jordan and on arachnids by R. J. Whittick. British Museum (Natural History), London, ed. 3, 1956. 303 pp. £2.

*Flow of Gases through Porous Media*. P. C. Carman. Academic Press, New York; Butterworths, London, 1956. 182 pp. \$6.

*A Dictionary of English Domestic Architecture*. A. L. Osborne. Philosophical Library, New York, 1956. 111 pp. \$6.

*Asymptotic Expansions*. A. Erdélyi. Dover, New York, 1956. 108 pp. Paper, \$1.35.

*An Essay on the Foundations of Geometry*. Bertrand A. W. Russell. Dover, New York, 1956. 201 pp. Paper, \$1.50.

*Experiment and Theory in Physics*. Max Born. Dover, New York, 1956. 43 pp. Paper, \$0.60.

*Electrical Interference*. A. P. Hale. Philosophical Library, New York, 1956. 122 pp. \$4.75.

*Annual Review of Plant Physiology*. vol. 7. Lawrence R. Blinks, Ed. Annual Reviews, Stanford, Calif., 1956. 456 pp. \$7.

*Illustrations of the Huttonian Theory of the Earth*. John Playfair. Facsimile reprint, with an introduction by George W. White, of 1802 edition published by Cadell and Davies, London and William Creech, Edinburgh. University of Illinois Press, Urbana, 1956. 528 pp. \$4.50.

*Mechanical Vibrations*. J. P. Den Hartog. McGraw-Hill, New York, ed. 4, 1956. 436 pp. \$9.

*Hydrodynamics*. Hugh L. Dryden, Francis D. Murnaghan, H. Bateman. Dover, New York, 1956. 634 pp. Paper, \$2.50.

*Chromosome Botany*. C. D. Darlington. Allen & Unwin, London, 1956 (order from Macmillan, New York). 186 pp. \$2.75.

*Health for the American People, a Symposium*. Presented 21 Nov. 1955. Massachusetts Memorial Hospitals Centennial Celebration. Little, Brown, Boston, 1956. 105 pp. \$1.

*Some Clinical Applications of Electroneurophysiology, Especially Electrodiagnosis and Electromyography*. Sidney Licht, Ed. Elizabeth Licht, New Haven, Conn., 1956. 272 pp. \$10.

*Secret Enemy*. The story of a disease. James Cleugh. Thomas Yoseloff, New York, 1956. 273 pp. \$5.

*J. C. Poggendorff Biographisch-Literarisches Handwörterbuch der Exakten Naturwissenschaften*. vol. VIIa (two sections), pt. 1, A-E. Rudolph Zaunick and Hans Salie. Akademie, Berlin, 1955. 256 pp. DM. 12 per section.