rabbits, pigeons, mice, a buffalo, and a sheep. Although the results in the sheep, mice, and pigeons were not sufficiently consistent to warrant a conclusion, the disease was found to be definitely transmissible to the rest of the experimental animals. A similar encephalomyelitis could be produced in the buffalo and goats by intravenous inoculation and in guinea pigs and rabbits by intracranial inoculation. Serial passage, however, was possible only for three generations in the guinea pig and two generations in the rabbit and goat. In the case of the buffalo, extensive experimentation was prohibited by its high cost, but judging from the typical symptoms and severe lesions produced in the only buffalo used, serial passage in this animal seemed to be easier than in any other host.

The incubation period among the experimental animals varied from 1 to 58 days and was shortest in the goat. The experimental disease in the buffalo resembled in every respect the natural infection. It developed suddenly on the twelfth day after injection, with subnormal temperature, paralysis of the legs, rigidity of the neck, and anesthesia of the body surface. The animal died about 14 hours after the onset of the symptoms. In the other animals, the course of the disease was even shorter, most of them dying within several hours. Invariably included among the symptoms were a lowering of the body temperature and a paralysis of the extremities. Upon histological examination, encephalomyelitic changes were always present. Cultures of the blood and central nervous system have never yielded any bacterial growth.

Attempts to cultivate the virus were not successful. Chick embryos of 8–10 days were inoculated on the allantoic membrane according to the method of Burnet. The birds seemed to be little affected by the virus and were hatched just as usual. Whether the titer of the virus had increased in the embryos was, however, not determined.

The disease seemed to be nontransmissible to human beings. In areas where the disease is prevalent, no human case has ever been reported. In our experimental work, the author and his assistants have never worn any rubber gloves or observed any other precautions, and yet none of us has ever contracted the disease.

Judging from its seasonal incidence, symptomatology, pathology, and infectivity to other animals, the author believes the disease to be a separate entity and different from all other known forms of encephalomyelitis. Further experimentation on the disease is still in progress, and a detailed report is in preparation.

T. S. SHENG, M.D., D.V.M.
Department of Animal Husbandry and Veterinary Medicine
National Central University, Chengtu, China

Book Reviews

Principles of physics III: optics. Francis Weston Sears. Cambridge, Mass.: Addison-Wesley Press, 1945. Pp. viii + 331. (Illustrated.)

The first course in physics at the Massachusetts Institute of Technology requires two years and is taken concurrently with analytical geometry and calculus. The result is that the present volume and the two earlier companion volumes of Sears' *Principles of physics* series, which serve as texts for this course, are far above the usual one-year elementary text in scope, rigor, and detail. Indeed, this book promises to be a competitor to the usual intermediate texts in optics, and will probably be considered in this connection by schools whose physics majors have not had the benefit of a first course as thorough as that at M.I.T.

It has much to recommend it. The unconscious technical slang and conventions of the usual textbook presentation are here carefully translated into operational meaning. Well-chosen plates (on color and on diffraction), and three-dimensional line drawings which have a rare feeling for space and projection, aid in setting a new standard in clarity of explanation. An attempt is made to justify qualitatively the few equations which cannot be derived by first-year calculus.

Much care was evidently spent in bringing the book up to date. The results are especially noteworthy in the chapters on Photometry and Color, which are better even than those of any current *intermediate* text, by virtue of the recent discussion and clarification in these areas. These two chapters on psychophysical units perhaps belong where they are, at the end of the book; but one may hope that optics, even in elementary courses, will some day be swallowed up by radiometrics, in which the quantities will all be measured in *physical* units, which can be then be discussed at the place where they belong in an exact science—that is, at the beginning of the course.

Some minor objections may be noted. Rigorous physicists will find fault with several equations which are dimensionally sloppy. Spectroscopists should protest against new texts which continue the emphasis on wave lengths rather than frequency or energy, but, of course, the author cannot be blamed for following the custom. Students will find difficult, as always, the unfamiliar thermodynamic point of view in the chapter on Thermal Radiation, as well as the unnecessary proliferation of units and symbols in Photometry and Color.

There are only a few mistakes. Several of them occur in the chapter on Polarization which, though good, seems less carefully written than the others. In particular, reflection and refraction are confused in discussing mirages and "looming." Fermat's principle of "extreme time" is restricted to "least time," thus making impossible the seeing of inverted images in a concave mirror! The false statement is made that the wave fronts in a biaxial crystal are ellipsoids.

On the whole, the book is one of the finest of elementary-intermediate texts now in the field and should be one of the easiest from which to teach, except perhaps for three or four less superior chapters out of the thirteen. The present volume suffers somewhat in attractiveness as a result of wartime paper restrictions.

JOHN R. PLATT

University of Chicago

The chemical process industries. R. Norris Shreve. New York: McGraw-Hill, 1945. Pp. xiii + 957. (Illustrated.) $6.00.

This is a most worthwhile reference text for all chemists, chemical engineers, chemical executives, chemistry and chemical engineering students, and others who are interested in an up-to-date and detailed account of the production methods for the manufacture of most of the more common chemicals and chemical products. Shreve's book is a welcome addition to our industrial chemical references, of which there are several excellent books of recent edition, for it brings together for the first time a closer relationship of the unit operations and unit processes involved with the actual industrial procedures. This is most essential for a better scientific and engineering understanding of these chemical processes.

The book is written from the viewpoint of the teacher and therefore serves well as a text for industrial chemistry courses. A discussion of the fundamental principles of chemical engineering as treated in a general way in the early chapters will provide the student with a better appreciation of the design, operation, and control features of the processes to be discussed later. Instead of arranging the processes in the usual order of sulfuric acid, phosphorus, soda, methyl alcohol, or aniline, the author covers these processes in a more logical fashion under groupings according to related manufacturing industries involving similar raw materials and chemical changes, such as fuels, ceramics, sodium salts, electrolytic products, paints, soaps, plastics, organic intermediates, etc. These are presented from an over-all standpoint to include the fundamental chemistry involved in the transformation of the raw materials into finished products, the process operations with specific conditions required, the essential design and construction features of the equipment, properties and industrial applications of the chemical products, and the economic aspects of the process. Interspersed with the descriptive material are many illustrations of the plant equipment as well as typical flow sheets of the processes which are of help in obtaining a clearer idea of the manufacturing methods. At the end of each chapter are problems and questions concerning the processes under discussion which enable the student or reader to determine in a practical way his mastery of these subjects.

There are few errors to be found in the text, which is a compliment to the author and aides for their careful collection of information, compilation of data, and painstaking presentation of intricate details of so many chemical processes. The only criticism to be offered by the reviewer is the reduced size of the flow sheets, which