

ical description of the occurrence of shale. The theory of the process of manufacture is then discussed: it is shown that the oil does not exist in the shale as such but is formed by destructive distillation. This gives rise to oily bases and phenols which have to be removed. The refining of shale oil is therefore a much more difficult and delicate process than that of petroleum.

The main part of the book is taken up with the practical treatment: the operations of distilling, refining, treating, and pressing are minutely described and discussed, the size of the apparatus, the yield, and the costs being given. The by-products and recovered products, ammonia, soda, acid, and waste water, are next detailed.

The last chapter deals with the tests applied in the process, from time to time, and the laboratory method of testing wax, oil, and ammonia. The work closes with an appendix giving an abstract of all the patents which have been obtained in connection with this industry.

A. H. GILL.

A SHORT HANDBOOK OF OIL ANALYSIS. BY AUGUSTUS H. GILL, S.B., PH.D. Philadelphia: J. B. Lippincott Co. 1898. Cloth. 139 pp. Price, \$1.50.

This little volume is evidently written with the idea of furnishing students with brief outlines of the best methods of oil analysis known at the present time, and also short descriptions of the oils in common use, their properties and the sources from which they are derived.

As an introduction to the study of oils, and for practical use in the laboratory, it will be found an admirable text-book, while the copious reference notes will enable the student to readily follow the subject further, if he so desires.

Part I is devoted to the physical and chemical tests used to identify the various oils, determine their purity, and ascertain their fitness for a given purpose. Petroleum products are first discussed, one chapter being devoted to burning oils and the tests commonly applied to them, and another to lubricating oils. Then follows a chapter on animal and vegetable oils, and the tests used to identify them, determine their purity, and detect adulterants.

The author has rightly emphasized the desirability of having

samples of undoubted purity with which to compare the oil under process of identification, as even the so-called "constants" are so variable in the case of oils, that one may be easily misled, especially where only a small amount of an adulterant is present. On the general subject of lubrication the author is a little too brief to leave a clear impression in the mind of the student.

The rank which is given mineral oils as having greater adhesion and less cohesion than animal and vegetable oils is open to question, for while this may be true at ordinary temperatures, it will not be found the case when the parts requiring lubrication become warm from any cause, and the lubricant is most needed. At high temperatures nothing but the most viscous fat oil we can obtain will adhere to the heated surfaces, and it is for this reason that a percentage of an animal or vegetable oil is added to cylinder oils—in order to give the adhesiveness which is wanting in petroleum products at cylinder temperatures. This emphasizes the desirability of determining the viscosity of an oil at the temperature at which it is to be used.

Part II contains brief descriptions of the various oils in common use, giving their source, preparation, constants, adulterants, and uses, in a concise and comprehensive manner.

The appendix contains much valuable information in tabulated form.

O. S. DOOLITTLE.

AN INTRODUCTORY COURSE IN QUANTITATIVE ANALYSIS. BY PERCY W. EVANS, PH.D., Associate Professor of Chemistry, Purdue University. Boston: Ginn & Co. 1897. iv + 83 pp. Price, 55 cents.

The little book of Prof. Evans offers within a scope of eighty pages a very instructive course in quantitative analysis, including gravimetric and volumetric methods, together with a discussion of the various manipulations with which every student of this branch should become familiar as a preliminary. The exercises are well chosen and the explanations clear and comprehensive. As a handbook it might well find use in many college laboratories.

F. C. PHILLIPS.

EXERCISES IN PRACTICAL PHYSIOLOGY. PART III. PHYSIOLOGY OF THE NERVOUS SYSTEM. ELECTRO-PHYSIOLOGY. By Augustus D. Waller, M.D., F.R.S. London, New York, and Bombay: Longmans, Green & Co. 91 pp. Price, 90 cents.

As the title indicates, this is a practical or laboratory hand-