excess of three and one-quarter million gallons of tar per annum. And on the basis of an output of 5 pounds of ammonia (NH_3), equivalent to say 20 pounds figured as ammonium sulphate, per ton of coal carbonized, the same plant would add to the present production a further amount in excess of seven million pounds of sulphate per annum, so that any general and sudden increase in the number of by-product coke ovens would apparently result in depriving that type of construction, not only in the new plants but also in those previously erected, of the greater part if not all of the advantages resulting from its output of by-products, for these plants themselves involve a much larger initial investment, and thereafter cost more to operate, than those of the bee-hive type, the returns from the by-products being relied on, with the increased yield of coke, to cover these extra charges and show some net gain in the final result. In other words, it seems entirely probable that it is only in proportion to the gradual enlargement of the field in the marketing and use of tar and pitch, as well as ammonia, that the substitution of by-product for bee-hive ovens can be expected to take place. Nevertheless, the by-product oven has already established itself, within the commercial limits thus imposed, as a thorough success in the economical production of the best grades of coke, and as time goes on there will undoubtedly ensue a large but gradual increase in its use.

PHYSICAL CHEMISTRY FOR ELECTRICAL ENGINEERS. By J. LIVINGSTON R. MORGAN, PH.D. 230 pp. New York: John Wiley & Sons. Price: $1.50.

This work is as compact a compilation of the conceptions now constituting physical chemistry as could be connectedly written. In the reviewer's opinion it is so condensed that the average engineer would find a little trouble in understanding it. The first chapter deals with fundamental principles, among which are included the author's decision to use in his book the term "combining weight, meaning by it that combining weight which is usually designated as the atomic weight," and "formula weight," instead of the "so-called molecular weight." This is to free the work from any conception of an hypothesis or inaccuracy. This laudable ambition has, in general, cost as much or more than it is worth. The common terms of the average physical chemist are the ones which the electrical engineer ought naturally to wish to learn.

The subject-matter is developed along the lines usually employed; A Consideration of the Laws of Gases, Energy and Its Laws, Solutions and Electrolytic Dissociation, Chemical Mechanics, Equilibrium and Electrochemistry. The choice of material considered under these different heads has been well made. No padding with useless commercial processes is visible. The book is a scientific treatise somewhat cramped for room. It may serve well when used in connection with a course of lectures or together with some more general work on the subject. A collection of 78 problems, with answers, completes the book. These problems are well selected to illustrate the most important laws of physical chemistry. W. R. WHITNEY.

PHYSICAL CHEMISTRY AND ITS APPLICATIONS IN MEDICAL AND BIOLOGICAL SCIENCE. By ALEX. FINDLAY, M.A., PH.D., D.Sc., Lecturer on Physical Chemistry, University of Birmingham. London, New York and Bombay: Longmans, Green & Co. 68 pages. Price, 75 cents.

The matter in this little book was presented to students interested in subjects related to medicine, in the form of lectures which were later printed in the *Birmingham Medical Review*. As they now appear in book form they afford a very readable exposition of the elementary principles of physical chemistry in non-mathematical treatment. The author has made a good selection of material and has given enough of fact and theory to satisfy the needs of many students whose work touches chemistry but incidentally. J. H. LONG.

RECENT PUBLICATIONS.

THE CYANIDE INDUSTRY THEORETICALLY AND PRACTICALLY CONSIDERED. By R. Robine and M. Lenglien. Translated by J. Arthur LeClerc with an appendix by C. E. Munroe. New York: J. Wiley & Sons. 1906. 11+408 pp. $4.00.

ELECTRIC FURNACES AND THEIR INDUSTRIAL APPLICATIONS. By J. Wright. New York: Norman W. Henley Pub. Co. 1905. 10+288 pp. $5.00.

URINARY ANALYSIS AND DIAGNOSIS BY MICROSCOPICAL EXAMINATION. By L. Heitzmann. Second edition. New York: W. Wood & Co. 1906. $2.50.

TEXT-BOOK OF PHARMACOLOGY. By A. R. Cushny. Fourth edition. London: Rebman. 1906. 17/6.

THIRD TREATISE ON THE EFFECTS OF BORAX AND BORIC ACID ON THE HUMAN SYSTEM. BEING A CRITICAL REVIEW OF THE REPORT OF DR. H. W. WILEY, CHIEF OF THE BUREAU OF CHEMISTRY OF THE U. S. DEPARTMENT OF AGRICULTURE. By O. Liebreich. London: Churchill. 1906. 78 pp. 5/.