

The difficulties of the subject seem to result largely from the impediments which interfere with the immediate observation of electrical phenomena in gases. In almost every case, the aid of solids or liquids must be called in, to convey the phenomenon to the observer, and the question often arises as to whether such phenomenon is not produced upon the surface of such liquid or solid.

The first chapter is devoted to the methods that can be employed for conveying an electric charge to a gas,—no easy task, according to the authors: liberation of the gas from a liquid undergoing electrolysis, the splashing of liquids through the gas, and the Röntgen rays, are resorted to. The second chapter, entitled photoelectric effects, really embodies the little that is known about the electric conductivity of gases, and its variation under the influence of different forms of radiant energy. Thomson apparently ascribes gaseous conduction to electrolysis, either in the purely chemical sense of the decomposition into ions, or in that of the association or dissociation of molecular complexes. A rather short chapter on the cathode rays has apparently been added as an extension of this hypothesis to the explanation of the results obtained by Lenard, Röntgen, and so many others. Contrary to the views of most of these physicists, Thomson ascribes the phenomena outside the vacuum tube to motions of gaseous matter, rather than of the "ether." As carriers of the rays, he looks for small particles, traveling at a high rate of speed and encountering fewer obstacles than would molecules or atoms. He assumes that atoms in fact consist of particles bearing the same relation to the total atom that the molecule does to the ordinary gas volume. Lockyer imagined that such particles were torn asunder by the heat of the solar atmosphere. Thomson thinks it likely that some higher order of electrolysis shatters the atoms that impinge upon the highly electrified cathode.

This, and other suggestive matter, is set forth in clear language and attractive style. The book is well printed and finely illustrated.

MORRIS LOEB.

EASY EXPERIMENTS OF ORGANIC CHEMISTRY. BY JOHN HOWARD APPLETON. Providence, R. I.: Snow and Farnham. 1898. 107 pp. Price, 60 cents.

There seems to be a general agreement in the study of

chemistry that, while the text-book work should be explained and illustrated by lectures, it should also be supplemented by laboratory work on the part of the student. Several excellent text-books on organic chemistry are now to be found in which a considerable number of illustrative experiments are described, but they are arranged to be performed either by the lecturer or by the student or by both, and in the attempt to satisfy two conditions they fail to meet either to the best advantage.

The book under consideration is intended solely for the student and for use in the laboratory, and it is characterized by a marked simplicity, directness and clearness of style, and by the very simple character of the apparatus and the very moderate amounts of materials to be employed, conditions which enable the untrained observer the more readily to observe the phenomena that occur, and to distinguish the essential from the non-essential.

No doubt, with such a fund of experiments to draw upon, as is now at the command of chemists, each person who sets out to arrange a course of experiments would prepare one that differed in some particulars from this, but Professor Appleton has selected fairly typical and instructive examples which can be performed in an easy and rapid manner, and he has arranged them in the order in which the topics are usually treated in text-books on organic chemistry so that the book can be used in connection with any introductory course, and it will be found to be a safe one to put into the hands of a student. A very commendable feature of the book is the "cautions" that are appended to the description of each experiment which is attended with any danger in its performance, for the author has thus relieved the teacher, in these instances, of a very grave duty.

CHARLES E. MUNROE.

A SELECT BIBLIOGRAPHY OF CHEMISTRY, 1492-1897. BY H. CARRINGTON BOLTON. First Supplement. City of Washington: Published by the Smithsonian Institution. 1899. Large 8vo. ix + 489 pp..

This first supplement contains 5,554 titles in addition to the 12,031 contained in the volume issued in 1893. Of these, 2,050 titles were contributed by others. Many of the titles have, of course, been added by the author in bringing the book down to the close of 1897, but a considerable number have probably been