

compose these atoms. The indivisible is thus rendered, in a way, smaller and smaller, but we are still unacquainted with what its substance may be. The notion of an electric charge which we substitute for that of a material mass will permit phenomena to be united which we thought separate, but it cannot be considered a definite explanation or as the term at which science must stop. It is probable, however, that for a few years still physics will not travel beyond it. The present hypothesis suffices for grouping known facts, and it will doubtless enable many more to be foreseen, while new successes will further increase its possessions.

"Then the day will arrive when, like all those which have shone before it, this seductive hypothesis will lead to more errors than discoveries. It will, however, have been improved, and it will have become a very vast and very complete edifice which some will not willingly abandon; for those who have made to themselves a comfortable dwelling-place on the ruins of ancient monuments are often too loth to leave it."

This is a good book. The author has selected his material well and has presented it in a satisfactory form. Unfortunately, the unknown translator has done his work very badly. Such foot-notes as the one on p. 25 make one wonder how much the nameless editor has understood of the book he was supposed to edit.

Wilder D. Bancroft.

Qualitative Analyse vom Standpunkte der Ionenlehre. By Wilhelm Böttger. Zweite, umgearbeitete und stark erweiterte Auflage. 16 X 24 cm; pp. xvi + 524. Leipzig: Wilhelm Engelmann, 1908. Price: paper, 10 marks; bound, 20 marks.—The first edition was reviewed (6, 267) in 1902. The arrangement of the second edition differs to a certain extent from that of the first, the special and the general parts now being kept separate. The book is divided into the following sections; general principles; manipulation; characteristic reactions of the cations and their salts; scheme of qualitative analysis for cations; scheme of qualitative analysis for anions; preliminary tests in qualitative analysis; dissolving and leaching of solids for qualitative analysis; rare elements.

It is perhaps a question whether this book is suitable for an introductory course in qualitative analysis; but it would unquestionably be useful for a more advanced course and it is a book which every one interested in chemistry should look through at some time or other. Some of the experiments in the section on general principles are admirable. As instances of this, I cite the action of cobalt salts on hypochlorites, p. 109; the filtration of silver chlorides, p. 116; the testing of a potassium chrome oxalate solution for potassium, chromium and oxalate ions, p. 89.

Wilder D. Bancroft

Kurzes Lehrbuch der organischen Chemie. By William A. Noyes. Mit Genehmigung des Verfassers ins Deutsche übertragen von Walter Ostwald und mit einer Vorrede von Wilhelm Ostwald. 14 X 21 cm; pp. xxiv + 722. Leipzig: Akademische Verlagsgesellschaft m. b. H., 1907.—The interesting feature of this book is that the author has dropped the usual distinction between aliphatic and aromatic compounds. He treats all the hydrocarbons together, then all the alcohols and phenols, and so on. This is unquestionably a logical arrangement; but so was the old arrangement. It seems to the reviewer that the treatment adopted in this book is not a good one for elementary students. Take toluene

as an instance. The behavior of hydrogen in the side chain is different from that of the so-called ring hydrogen. The properties of benzyl bromide and the bromtoluenes differ radically. It is easier for the student to grasp these distinctions if he has the general characteristics of the aliphatic series before he starts in on the aromatic compounds. On the other hand, this book will be a valuable aid to the advanced student. It is not only desirable but important to look at any subject from as many different view-points as possible. This book gives us a new one for organic chemistry and is therefore valuable. As an elementary text, it will probably not achieve a great success.

Wilder D. Bancroft

The Electric Furnace, its Evolution, Theory and Practice. By Alfred Stansfield. 15 X 23 cm; pp. xi + 211. New York: Hill Publishing Company, 1907. Price: \$2.00 net.—This is an unpretentious book which does very well what it sets out to do. The subject is treated under the following heads: history of the electric furnace; description and classification of electric furnaces; efficiency of electric and other furnaces, and relative cost of electrical and fuel heat; electric furnace design, construction and operation; production of iron and steel in the electric furnace; other uses of the electric furnace; future developments of the electric furnace.

It makes comparisons quite simple to remember that one ton of good coal will produce approximately the same quantity of heat as one kilowatt year, p. 33. On p. 35 there is a very instructive diagram showing the heat utilized and wasted in crucible steel furnaces, in reverberatory furnaces, in open-hearth furnaces, in shaft furnaces, and in electric furnaces. The section on materials of furnace construction is good and so is that on the production of heat in electric furnaces, while the one on the production of iron and steel in the electric furnace is better still. In the chapter on other uses of the electric furnace the author takes up the ferro alloys, graphite and the carbides, electrothermal production of zinc, silicon, quartz, alundum, nitric acid, phosphorus, carbon bisulphide, the Acker process, sodium, and aluminum.

The chapter on the future developments of the electric furnace is so interesting that I quote the following paragraphs from it:

"Until a few years ago the electric furnace was a wonderful and expensive commodity, and the idea of using it for heating on a commercial scale was preposterous. About 13 tons of coal were needed to produce one electrical horse-power for a year, and this electrical energy would furnish less heat than one ton of the original coal. Such a method of using coal was evidently extremely wasteful. The greater efficiency of electrical heating somewhat reduces this difference, and together with the smaller cost of water-power has made it cheaper in some cases to use 'white coal' instead of black, in the furnace.

"In comparing the supplies and prices of coal and electrical energy, it should be remembered that one ton of good coal produces as much heat as 1½ horse-power years of electrical energy, but that the efficiency of the electrical furnace is from 2 to 30 times as great as the efficiency of ordinary metallurgical furnaces, so that an electrical horse-power year will produce as much effective heat as several tons of coal.

"The world's production of coal at the present time is about 1,000 million