way that this passage does. A chapter on "Molecules and the Constitution of Matter" concludes the volume.

The reviewer does not feel that the author has shown that the atomic theory, as it was twenty-five years ago, is a satisfactory medium for conveying modern views on such parts "of chemical theory * * * as bear directly upon the question of the constitution of matter."—*Preface.*

The author does not seem to favor modern views in regard to the methodology of science, a fact which, in a work dealing with a subject like this, necessarily shows itself in almost every sentence.

A. S.

KRITISCHE STUDIEN ÜBER DIE VORGÄNGE DER AUTOXYDATION. By C. ENGLER AND J. WEISSBERG. Vieweg und Sohn, Braunschweig, 1904. 197 pp. Price, 6 marks.

The two sides of the great problem of autoxidation or slow combination of compounds with oxygen at ordinary temperatures, are first the study of the mechanism of the processes in a qualitative sense, and second, the study of the dynamics of the reactions in a quantitative way in definite mathematical terms. In regard to the first of these problems the numberless theories that have been presented may be called variations, modified in details only, of two fundamental theories, those of C. F. Schönbein and of Moritz Traube. Schönbein believed that he had shown that ordinary oxygen must break down before it can oxidize any substance, into two oppositely polarized active modifications of oxygen, "ozone" and "antozone". In its more modern garb, this theory is that of the dissociation of the oxygen molecule into oppositely charged atoms or ions, $\overset{+\,+}{O}$ and $\overset{-\,-}{O}$, van't Hoff being the most prominent supporter of this view. According to Traube, on the other hand, oxidation is effected by the addition of atoms or radicals to the unsaturated molecule of oxygen, without any preliminary complete dissociation of the oxygen molecule, peroxides, R_2O_2, invariably resulting as primary oxidation products. Professor Engler, of the Polytechnische Hochschule in Karlsruhe, has made important original contributions supporting and modifying in some details Traube's views, and the present book is intended chiefly to arrange and discuss systematically all the more important oxidation processes from the point of view of the addition of molecular oxygen.

Although it appears not at all unlikely and not without precedent that oxygen may, according to conditions of concentrations and speeds of reactions, sometimes enter into combination through free valences of molecular oxygen, sometimes through atomic or ionic oxygen, the last, and probably the lesser product of progressive dissociation, according to

$$O_2 \rightleftarrows {}^{+\,+}_{-\,-}\!\!-O-O-\!\!{}^{-\,-}_{+\,+} \rightleftarrows O + O.$$

so that both theories may ultimately prove to be well-founded, nevertheless to-day Traube's theory is much the stronger of the two on the basis of experimental evidence, and many important oxidation processes have been proved to conform to it and others, such as the combustion of hydrogen in the oxy-hydrogen flame, are possibly processes of the same kind. Under these circumstances Engler and Weissberg's book is a timely and valuable summary and elucidation of a mass of facts and observations from the point of view of the predominant theory. It is to be hoped that we shall soon have an equally good book bringing together the investigations on the second great problem of oxidation, its dynamics, especially from the point of view of physico-chemical measurements of oxidation cells, free energy and the catalysis of oxidation reactions. JULIUS STIEGLITZ.

ELECTROCHEMISTRY. BY R. A. LEHFELDT. New York: Longmans, Green and Co. 1904. 268 pp. Price, $1.60.

This forms one of the eight text-books on Physical Chemistry edited by Sir William Ramsay.

Chapter II, on "The Relation of Chemical Constitution to Conductivity", was ably prepared by T. S. Moore and is very complete in itself.

The book as a whole is very carefully written by authors who show that they are perfectly familiar with the developments of the science. The work fulfils to the letter the wish of the editor of the series, that the subject be brought up to date. It is properly confined to the principles and theories of electrochemistry. Matters pertaining more particularly to other physical properties, such as osmotic phenomena, etc., are briefly but clearly touched upon. The technical side of the subject is also not given much weight.

The work has been well prepared for students and investigators, as distinct from readers and experimenters, and it covers practically