sium bichromate, reduced to chromic chloride by hydrochloric acid and alcohol, added.

These solutions were boiled down until little more than a moist cake was left, and the analysis in each case, further conducted exactly as described in the modified method, above given.

PERCENTAGE OF CHROMIUM.

True.	Found.
1.55	1.54
1.55	1.52
1.03	1.04
1.03	1.04
3.09	3.11

Addendum—Gravimetric Determination of Manganese in Steel.—The manganese precipitate collected upon a paper filter is a convenient starting-point for its gravimetric estimation. The solution of the precipitate in hydrochloric acid is to be treated in the customary way, the trace of iron being precipitated as basic acetate, and the manganese as manganous ammonium phosphate in the filtrate therefrom. R. W. MAHON.

NEW BOOKS.

THE DISCHARGE OF ELECTRICITY THROUGH GASES. By J. J. THOMSON, Professor in the University of Cambridge. New York: Charles Scribner's Sons. 1898. 203 pp.

This work of Prof. Thomson's represents the material of lectures delivered by him in October, 1896, at the sesquicentennial celebration of Princeton University, but amplified with a record of later observations. As the subject is one of comparatively recent date, it is hardly to be expected that the ground should have been so uniformly covered as to enable the writer to give a thoroughly connected account of the peculiar phenomena, that he and others have observed, in the fashion of a text-book. On the other hand, the fact that the essays were to be delivered orally precluded a purely historical presentation of discoveries, with a detailed account of the author's own work upon the subject. In place of these, we have a very lucid and fair exposition of the most striking facts, and an impartial statement of the most noteworthy hypotheses involved. The book is therefore chiefly useful as a guide through the intricate meshwork of hypotheses, which recent years have produced.

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