Chapter 11 treats of the apparatus and general principles involved in the determination of metals by electrolysis. From the historical résumé it appears that Davy in 1808 was the first to deposit a metal by the aid of the current, he having obtained potassium in an amalgam, from potassium hydrate, and Luckow in 1869 was the first to employ electrolysis as a method for the determination and separation of metals.

Chapter 12 treats of volumetric analysis. The apparatus and solutions employed in volumetric work including a very useful section on indicators.

Chapter 13 gives color methods including an excellent description of the Dubosq colorimeter.

Chapter 14 describes gas analysis. This chapter which is very thorough includes a section on the qualitative determinations of gases, dividing them into groups of combustible and non-combustible, and under each head those that are absorbed and those not absorbed by potassium hydroxide, with tables of the reactions of the different gases under each group. The section on incompatible gases, or those that cannot exist together in a mixture, is very much to the point and is indicative of the thorough way in which M. Carnot treats every portion of his subject.

The publisher's part has been admirably done, the type is large and the pages look beautifully clear, while the cuts which are nearly all line drawings are easily understood.

It is quite impossible to mention all the admirable features of this volume, but what strikes me most forcibly is the clearness and thoroughness which characterize the descriptions of methods and the absolute mastery of detail shown throughout.

ANDREW A. BLAIR.

A TEXT-BOOK OF ELEMENTARY ANALYTICAL CHEMISTRY, QUALITATIVE AND VOLUMETRIC. By J. H. LONG, M.S., Sc.D., Chicago: E. H. Colegrove. 1898. 278 pp. Price $1.50.

The proper presentation of the subject of this book is always difficult, and must vary with the needs of each particular class or instructor. In general, the brief courses of qualitative analysis—the short cuts to a knowledge of the system—are dangerous and tend to loose work on the part of students in that they are led to mechanical performance of the so-called practical methods, rather than to the thoughtful, and thorough

study of the properties and reactions of the elements and compounds, which the methods themselves should serve to illustrate, and upon which they must be based. But the book before us is the sequel to a careful study of the properties of bodies and of the fundamental laws as set forth in the author's excellent work, "Elements of General Chemistry," and therefore in a larger measure free from this objection.

It is divided into two parts, Qualitative Analysis and Volumetric Analysis. In the first part the discussion of the group separations and reactions is preceded by an introduction in which the *raison d' être* for the grouping is briefly but completely and logically set forth, and the illustrative table, presented on page 5, must prove invaluable to the student by offering most comprehensively an exposition of this most important principle of analytical work.

In the discussion of each group we find first the most important and characteristic reactions of the elements constituting it, all well chosen and clearly described; and second the methods for separation of the individual elements of the group. In this latter connection most faithful attention is given to the details to be followed, and precautions to be observed at each step.

The acids are treated in the same manner as the bases and their treatment is followed by two chapters on the systematic analysis of unknown complex substances, brief, but sufficient, constant reference being made to preceding chapters.

The chapter on reactions of a few organic substances, most of the latter having pharmaceutical importance, and that on examination for poisons will find useful application.

In the second part of the work, volumetric analysis is treated in the same logical, thoughtful, painstaking way. The general theory of volumetric methods is clearly set forth and it is fully illustrated in the applications of the principles to the determination of well-known elements. These illustrative methods are followed by special methods which find extensive use, for instance for determination of sugars, starch, glycerol, and for the sanitary analysis of waters.

An appendix giving tabular schemes for the group separations and tests, tables of weights and measures, and tables of solubilities, will be found useful for reference.

The book will be particularly useful in the hands of many instructors who, like Dr. Long, have to do with students who can give but limited time to the study of chemistry and use it merely as auxiliary to the study of other subjects, as medicine, pharmacy, engineering. It is so concise, so complete, so logical in its arrangements, and so clear in the description of the reactions and methods, that our prejudice against the smaller works on these subjects is largely removed, and we are glad to commend it to the careful consideration of those instructors for whom the larger works are too bulky, and who cannot devote to the subject the time these larger works necessarily require.

W. McMURTRIE.

LIGHTING BY ACETYLENE. By WM. E. GIBBS, M. E. New York: D. Van Nostrand Co. 1898. 141 pp. Price $1.50.

This is a popular rather than a scientific exposition of the work which has been done in the effort to make artificial lighting by means of a acetylene a practical success. The author in his preface claims that "the safe, efficient, and cheap lighting of houses by acetylene is an accomplished fact," a claim which many doubless would be ready to dispute.

Short chapters are devoted to the history, dangers, and purification of acetylene; but the bulk of the volume is devoted to descriptions of electric furnaces for the production of the carbide, and generators for effecting its decomposition and the storing of the resulting acetylene gas.

Acetylene lamps and burners claim some twenty pages, and the volume closes with the requirements of the New York fire underwriters, and a list of the U. S. patents relating to this subject. Unfortunately the book has no index.

It is rather surprising to note the amount of brain power which has been devoted to the devising of acetylene generators, and yet the author assures us that "the ideal machine has certainly not yet been invented."

Most gas companies in this county would resent the author's rating of their gas at sixteen candles.

The volume will be found useful by those wishing to try acetylene lighting on a small scale, but we think its value would have been increased if the author had omitted some of the impossible generators and had said something on the details of