tion in question. For this reason the number of the specimens from which the photograph has been made is given in parentheses usually following the description of the species. These specimens and photographs, then, become of nearly, if not quite, equal value to type specimens.

The purpose of the book is to present the important characters which it is necessary to observe, in an intelligible way; to present life-size photographic reproductions accompanied by plain and accurate descriptions, so that by careful observation of the plant, and by comparison with the illustrations and text, even a beginner will be able to add many species to the list of edible ones, where now, perhaps, the collections are confined to the 'pink unders.' The number of people in America who interest themselves in the collection of mushrooms for the table is small compared with those in some European countries. This number, however, is increasing, and if a little more attention were given to the observation of these plants and the discrimination of the more common kinds, many persons could add greatly to the variety of foods and relishes with comparatively no cost. The quest for these plants in the fields and woods would also afford a most delightful and needed recreation to many, and there is no subject in nature more fascinating to engage one's interest and powers of observation.

In addition to the purposes named above, the book has others. There are many important problems for the student in this group of plants. Many of our species and the names of the plants are still in great confusion, owing to the very careless way in which these plants have usually been preserved, and the meagerness of recorded observations on the characters of the fresh plants, or of the different stages of development. The study has also an important relation to agriculture and forestry, for there are numerous species which cause decay of valuable timber, or by causing 'heart rot' entail immense losses through the annual decretion occurring in standing timber. If the book contributes to the general interest in these plants as objects of nature worthy of observation; if it succeeds in aiding those who are seeking for information of the edible kinds; and stimulates some students to undertake the advancement of our knowledge of the group which may form a more scientific basis for their arrangement, it will serve the purposes the author had in mind in its preparation.

Geo. F. Atkinson.

Engine Tests. By George S. Barrus, S.B., New York, D. van Nostrand Co. 1900. 8vo. Illustrated. Pp. 338.

This work is of a kind always welcomed by the scientific practitioner in engineering; it is a collection of experimental data gathered together by a well-known and skilled expert of rare experience and, what is still more rare, one who is accustomed to compel every scientific device and method to his service in his professional work. Mr. Barrus was one of the first in his profession to make use of the laboratory and exact scientific methods of determining the quality of steam supplied by the boiler and received at the engine, and to correct the previously always approximate figures for engine and boiler efficiency by reference to this datum. He had the exceeding good fortune to be engaged in some of the first and most important of the scientific studies of engine and boiler efficiency made at the Massachusetts Institute of Technology. He went out into an extensive and varied and fruitful practice as consulting engineer for New England steam users and carried with him that knowledge of scientific methods and that appreciation of their value which made him a pioneer in the introduction of precise measurements into the practical work of the engineer. His publications represent the outcome of twenty-five years of excellent scientific work.

In 1891 Mr. Barrus published a volume of selected reports upon steam-boiler efficiencies, and its reception was such as to induce him to publish this volume on steam-engine data. The two volumes probably contain a larger body of recent and exact data of this kind than any similar mass of existing technical literature.

The introductory portion includes a carefully written account of the methods employed in securing the data submitted, as of measuring the feed-water, determining leakage, calibration of

the delicate instruments employed, conduct of the work of collecting data, method in detail of working up results from the logs and indicator diagrams, and methods of adjustment of system of test to character of engines and boilers in hand.

A second part presents the details of tests of simple, compound and triple expansion engines, summaries of the work, and a review in which are given his deductions as to magnitude and character of internal thermal wastes, effects of varying engine-speeds, steam-pressures, superheating, condensing, and the relative values of the types of engine described, effects of steam-jacketing and of reheating in multiple-cylinder engines and of variations of proportion. The pressure diagrams taken with the indicator from the steam-chest or the steam-pipe of the engine constitute a rare collection of useful data. Sample indicator-diagrams are given from all the engines and are admirably reproduced by the engraver. The book is printed upon heavy calendared paper and is a good piece of work.

The deductions and conclusions of the author are likely to be very helpful to the practitioner and there still is left for the reader the opportunity to study out many interesting, and some valuable, practical and scientific facts, laws and important conclusions.

R. H. THURSTON.

Experimental Chemistry. By LYMAN C. NEWELL, Ph.D. (Johns Hopkins), Instructor in Chemistry in the State Normal School, Lowell, Mass. Boston, D. C. Heath & Co. 1900. Price, $1.10.

The aim of this book as expressed in the preface is 'to provide a course in chemistry which shall be a judicious combination of the inductive and deductive methods.' The author has selected representative experiments and has left many of the properties, of the substances experimented with, to be determined in the laboratory by the student. A number of simple quantitative experiments and problems are given and several features are added which give considerable choice in the selection of topics for discussion. A number of subjects, suggested by the experiments, are given for discussion in the laboratory and a number of classroom exercises, in the shape of subjects concerning the historical and descriptive side of chemistry, suggest different phases of the science upon which emphasis can be laid. The book is clearly written and the explanations are sharp and to the point, and it will no doubt prove of value in normal schools and colleges. A teachers' supplement accompanies it.

J. E. G.

The Arithmetic of Chemistry. By JOHN WADDELL, B.Sc. (London), Ph.D. (Heidelberg), D.Sc. (Edin.), formerly assistant to the Professor of Chemistry in Edinburgh University. New York, The Macmillan Co. 1899. Pp. 136.

This book is intended to assist students in overcoming the difficulties they encounter in making chemical calculations. After describing the methods of calculating simple and complex weight relations, the author devotes chapters to the volume of gases, calculations involving weight and volume, calculations of analytical analysis and of formulæ. An appendix contains tables which may have to be consulted in making the calculations. In each chapter the principle is clearly explained by a number of examples, and a variety of problems taken from examination papers of different universities are given, which can be solved by the student. One who has worked through this book should have a good grasp of the principles involved.

J. E. G.

Die Chemie im täglichen Leben. Von PROFESSOR LASSAR-COHN. Vierte Verbesserte auflage. Hamburg, Leopold Voss. 1900. 4 Marks.

Few popular works on chemistry have earned recognition in as short a time and in such degree as this. Not a text-book, its popularity is solely due to its acceptance by the general reader. The first edition appeared in December, 1895, an English translation by M. M. Patterson Muir, with title, 'Chemistry in Daily Life,' being published shortly after by the J. P. Lippincott Co. Since then a Russian and an Italian translation have appeared, and also a second English edition, while translations into Servian, Portuguese, Bohemian, Swedish and Polish are announced.