as the pyrophosphate, and a very clear and useful chapter of 17 pages on the theories of solution and some of their applications to analytical chemistry. A note on the capacities of beakers, referred to in the text by numbers, will be appreciated. The paragraphs on temperature of calibration have been rewritten. Of the first edition as an introduction to the principles and practice of quantitative analysis, the present reviewer wrote two years ago: "It is hardly too much to say that it is difficult to see how a better book could be prepared for this purpose than the one before us." After the practical demonstration of two years' use of the book with his classes, his opinion is unchanged, and the additions in the present edition increase the value of the book. JAS. LEWIS HOWE.

INORGANIC CHEMISTRY ACCORDING TO THE PERIODIC LAW. By F. P. VENABLE AND JAS. LEWIS HOWE. Easton, Pa.: The Chemical Publishing Co. 1898. v+266 pp. 12mo. Price, $1.50.

Professor Venable's studies on the development of the Periodic Law have made so firm an impress on his mind that he has prepared a text-book for beginners in inorganic chemistry which takes the Periodic System as a guiding principle. The professor in the University of North Carolina has associated with him another experienced teacher in the person of Professor Howe, of the Washington and Lee University, and the two have produced a very systematic and accurate work quite up to date. In the hands of enthusiastic teachers the book cannot fail to prove useful in classes, especially if oral explanations supplement the concise and dogmatic statements. Whether beginners in chemistry are competent to appreciate the beauties of the Periodic System before they have learned something of the nature of chemical bodies in general, can be best determined by using the volume; but in any case the study of the terse introduction can be repeated after having read the first fifty or sixty pages. As the distinctive feature of this text-book is the order in which the elements and their compounds are treated, this review will endeavor to do it justice. After giving the history, methods of preparation, and the salient properties of hydrogen, as "the standard element," the elements of the negative subseries of Group VII of Mendeléeff's table are considered; this subseries includes fluorine, chlorine, bromine, and iodine.

Then follow the elements of the negative subseries of Groups VI and V; of Group IV both the positive and the negative series are included; of Group III, chiefly rare elements, only boron and aluminum are discussed; of Groups II and I both series are included. Then Group VIII is taken up, embracing the iron metals and the platinum metals. Part III is devoted to the hydrogen compounds of the elements and under the caption "Hydrids of Group VI" the student first makes the acquaintance of water. Part IV is devoted to halides, and Part V to oxides and sulphides, in which the student is introduced to carbon dioxide, lime, soda, nitrogen oxides, and sulphur oxides, including the important body sulphuric acid. Near the close of the volume there is a summary of the laws of constant proportion, of interproportionality, and of multiple proportions. Part VI deals with binary compounds of Groups V, IV, and with alloys.

The groups of the Periodic System, it will be observed, are discussed in the reverse order in which they appear in Mendeléeff's table, and the positive subseries are not taken up until after the negative. This inversion has been found necessary, probably, to avoid placing before the students the metals (sodium and associates, magnesium and associates, etc.), before the learner has made the acquaintance of the important bodies in Groups I and II (chlorine, bromine, iodine, oxygen, and sulphur). The necessity of consistently treating the elements in the order assigned to them by the Periodic Law leads to some curious results; thus the student finds himself studying selenium and tellurium before he has learned the most simple facts about the atmosphere; and in the same way tungsten, uranium, vanadium, columbium, and tantalum are met with before water. The oxides being in a section by themselves, are separated from the metals of which they form important compounds; thus it happens that between the account of the metal calcium and that of lime there are no less than eighty-six pages, and between lime and limestone there are twenty pages additional. Again the process of smelting iron is explained in connection with the description of the metal, just 150 pages before the characteristics of the oxides of the metal are given.

More attention is given in this book to the comparatively rare elements than is usual; thus more space is given to titanium

and germanium than to all the oxides of iron, and the elements molybdenum, tungsten, and uranium, with their compounds, occupy more space than calcium and its compounds in the several sections where they appear.

The book is clearly printed and quite free from typographical errors. The spelling recommended by the American Association for the Advancement of Science has been adopted only in part. Professor Howe, one of the committee on spelling and pronunciation, does not seem to have persuaded his colleague to accept the only rational orthography "sulfur."

Students using this volume will certainly not be misled and will become impressed with the importance of the Periodic Law.

H. CARRINGTON BOLTON.

COMMERCIAL ORGANIC ANALYSIS. VOL. II, PART I. BY ALFRED H. ALLEN, F.I.C., F.C.S., with revisions and addenda by the AUTHOR and HENRY LEFFMANN, M.A., M.D., Third Edition. Philadelphia: P. Blakiston's Son and Co. 8vo. 387 pp. Price $3.50.

The second edition of Volume II of Mr. Allen's valuable work appeared in 1886 and revision at this time was badly needed owing to the rapid advances which had been made in organic analysis. On this account the revision is quite thorough, almost every page and paragraph having been changed to meet the modern requirements. It has also been deemed necessary to divide the volume into two parts to avoid an unwieldy bulk and we now have before us, Part I.

The author and reviser have been compelled to cooperate at such long range, and the demand for the book has been so pressing that Dr. Leffmann has seen fit to assume the responsibility for any statements that do not meet the approval of the author and for any errors which may have crept into the book.

The work is exceptionally well done in every respect and reflects great credit upon the author and the reviser.

This part of Vol. II treats of the fixed oils and fats, glycerine, nitroglycerine, dynamites and smokeless powders, wool fats, dégras, etc. It contains also a list of corrections of the few errors found in Vol. I. Part II, which is now in press, will treat of the hydrocarbons and their immediate derivatives.

The most important additions made to the subjects treated in the volume before us, are: The bromine thermal method, meth-