



senting the facts of inorganic chemistry. The compounds described are not classified according to the metals which they contain, but according to the negative element which is present, or the acid from which they are derived. The elements are first considered, and then the oxides, sulphides, nitrates, sulphates, etc. The classification within these groups is according to the Periodic Law.

In the first chapter the student is introduced to chemical phenomena through experiments, which are described in detail. These are selected to illustrate the fundamental concepts and laws of chemistry, which are appropriately emphasized. A brief chapter on the chemical elements follows, and then certain typical elements and compounds, together with their more important reactions are described at some length. Chapters are devoted to hydrogen, oxygen, water, the halogens, the halogen acids, alkali metals, nitrogen and ammonia, the air, carbon, carbon hydrides, carbon oxides, and valence. A study of these chapters prepares the student for the more logical treatment of the elements and compounds which follows. The Periodic Law is next discussed in some detail, and then the elements are described according to the relationships indicated by the law. The compounds are next considered in the order, halides, oxides, hydroxides, sulphides, hydrosulphides, carbonates, silicates, nitrogen oxides and hydroxides, sulphates, oxides and sulphides of manganese, oxides and sulphides of Group VII, binary compounds of Group IV and V, and compounds of carbon and nitrogen. There are unusually full chapters on radium and alloys.

The novel order of treatment which has been adopted has many apparent advantages and some disadvantages. Among the advantages is the readiness with which relationships between compounds of analogous composition can be pointed out, and the effect of the nature of the more positive element in a compound on reactivity and general chemical properties can be emphasized. Among the disadvantages is one of pedagogical importance. In the usual method of presenting compounds according to the metal which they contain, the discussions of oxides, sulphides, nitrates, etc., which come at intervals, make it possible to review frequently, in a brief manner, the facts already acquired. Repetition is an important factor in memory. According to the author's arrangement a great many related facts are learned at one time, and then more or less dismissed. The proof of the method is in its application, and according to the author, the method has led to successful results with a large number of students, over a period of several years.

The arrangement of facts in the way adopted has led to the description of a great many compounds which are not ordinarily considered in elementary textbooks. The book contains a mass of facts, stated very

briefly. Although the text contains but 336 pages, the index covers 20 pages, each containing two columns.

The theoretical considerations are contained in two chapters placed in about the middle of the book: one on molecular weights (six pages), and one on the theory of electrolytic dissociation (five pages). In addition, there are a few brief references to such subjects as valence, reversible reactions, etc., scattered throughout the text. The theory appears to be given for the sake of the theory itself, and not on account of its value in interpreting chemical phenomena; little application is made of it in the treatment of compounds or reactions which are discussed in subsequent chapters.

The book is strikingly original and will, no doubt, appeal to many teachers. A student who has mastered its contents will know more facts of inorganic chemistry than can be learned by a study of many books twice its size.

JAMES F. NORRIS.

**Experimentelle Untersuchungen über Atomgewichte.** VON THEODORE WILLIAM RICHARDS und seinen Mitarbeitern, 1887-1908. Mit 34 Abbildungen im Text. Deutsche Ausgabe besorgt von J. Koppel. Hamburg und Leipzig. Verlag von Leopold Voss. 1909. vi + 890 pp. Price, 35 marks.

A felicitous outcome of the delivery of a course of lectures in the University of Berlin by Professor Richards has been the publication of this substantial and important volume. About a fifth of its pages now appear for the first time in a German translation; the matter reprinted from a previous translation has been revised only to make it more faithful to the English original.

The first article is entitled "Die in Harvard ausgeführten Atomgewichtsbestimmungen"; the included bibliography gives the titles of 63 papers. Four of these contain the work of Cooke on antimony and of Huntington on cadmium, and antedate Richards' activity. Nine of the more recent do not mention his name as author. Of the remainder, 43 papers, filling 850 pages of this reprint, bear his name, and 19 of them, with their 330 pages, bear his name alone. These 43 together with three others needed for completeness of presentation, contain determinations of the atomic weights of no less than 19 elements: a magnificent body of work of the highest attainable accuracy.

EDWARD W. MORLEY.

**Treatise on Qualitative Analysis.** By J. F. SELLERS. Second revised edition, 173 pp. Ginn & Company. 1909. Price, \$1.00.

Treatise is the proper title for this little work. It deals with qualitative analysis from all sides. Almost half of the book is taken up with theoretical considerations, explanations of analytical operations and additional notes. The application of physical chemistry to analytical chem-