structure, was beautifully crystallized. The stalactites were usually irregular cones with the altitude from five to ten times the diameter of the base.

In many cases the stalactite and stalagmite had become united forming an irregular cylindrical column.

The stalagmites examined were all granular in structure and usually less deeply stained than the corresponding stalactites. One specimen was white and very well crystallized. Like the stalactites they were usually more or less oxidized. The vertical axis was shorter, in proportion to the diameter of the base, and the apex more rounded, than in case of the stalactites.

The phenomenon is deserving of attention as an illustration of the well-known analogy between the sulphites and carbonates of the alkaline earth metals, as regards insolubility in water, but ready solubility in water containing sulphurous or carbon dioxide respectively. It is also interesting as showing a further analogy between two classes of salts which do not fall in the same period in the Mendelejeff classification.

DAVID HANCOCK.

CUMBERLAND, MD., January 18, 1895.

NEW BOOKS.

A TEXT-BOOK OF INORGANIC CHEMISTY. DESCRIPTIVE, THEORETICAL, AND PRACTICAL. A MANUAL FOR ADVANCED STUDENTS. BY ALFRED A. BENNETT, PROFESSOR OF CHEMISTRY IN THE IOWA COLLEGE OF SCIENCE, AGRICULTURE, AND THE MECHANIC ARTS. 2 Vols., 12 mo. 11 Illustrations. New York, Boston, Chicago: Silver, Burdette & Co. 1892 and 1894. Introductory price, $1.50 per volume.

It has lately been stated in a book review in these pages that there is doubtful room for new text-books on inorganic chemistry; and, in view of the important number of standard works of acknowledged value and usefulness extant, most instructors will heartily concur in this view. Every teacher, however, has his own ideas of how best to present the subject to his students to enable them to readily and intelligently grasp it, and whatever may be the text-book employed, it can in any case be followed only as a general guide and be adapted to the needs and conditions in each case. The work before us may fairly claim to be of such general adaptability as to be useful in most cases, and

particularly in those in which objective teaching, now properly so prevalent, has been adopted. It is essentially a laboratory guide rather than a lecture adjuvant, a manual rather than text-book, and its aim is to furnish such schemes for practical work with chemicals and apparatus in the hands of students as will lead them by actual practice and observation to grasp the fundamental principles of the science, describing the properties of the elements and compounds little further than is necessary to the development of these principles or to emphasize the facts that should be gleaned from observation and experiment.

The first volume (pp. 357) of the work is devoted to the so-called non-metallic elements, and after the usual brief discussion of matter and energy, the relations of physics and chemistry, and the conservation of matter and energy, begins with a study of hydrogen and the halogens and the combinations of the former with the latter. From the properties and reactions covered in this study are developed the hypotheses, theories, and laws which constitute, as it were, the axioms of chemistry. This general principle is followed throughout the work, and the facts concerning each element are studied in the following order: 1. Occurrence and distribution; 2. Methods of preparation; 3. Preparation; 4. Experimental study; 5. Physical properties; 6. Chemical properties; 7. Name, derivation, meaning, and symbol; 8. History; 9. Uses; 10. Special tests for recognition of the elements; 11. (For compounds.) The determination of molecular formulas. And along with this, theoretical considerations are developed in a logical manner.

Under the caption "Experimental Study" are offered directions for making experiments which, it is expected, will be explained to the class in the lecture room and will be carried out later in the laboratory by the students, who will likewise be required to keep copious notes of their operations and observations. Supplemental to these directions are offered certain arithmetical problems illustrative of the principle and properties developed, and unfinished equations which the student is directed to complete.

An interesting and novel feature of the book is the limited study of potassium and sodium in connection with, and imme-

diately following, that of the compounds of hydrogen, the halogens, and oxygen, thus "introduced in order that the learner may have some facts to use in the consideration of acids and bases."

The second volume (pp. 366) is devoted to the metallic elements, their properties, and reactions (pp. 299); the classification of the elements in accordance with the periodic law (pp. 18); a system of qualitative analysis, (pp. 47), concluding with a table of seventy-two elements with their atomic "masses," prepared by F. W. Clarke and a blank table of solubilities of salts to be filled by the student as he determines these properties in his experiments.

"Mass" is used in preference to weight and the system of spelling recommended by the committee of the American Association for the Advancement of Science followed throughout.

Having developed the significance of valence and atomic mass in the first volume, the author devotes considerable space in this volume, in connection with each metal, to the facts which determine its classification with regard to these properties; and in view of the difficulties which students frequently meet in acquiring familiarity with them, this provision will, in many cases, prove most valuable.

The volumes are, each of them, provided with excellently arranged indexes, are of such form and size as to be convenient for use either in the study, the lecture room, or the laboratory, and are offered in attractive style both as to binding and typography. WM. MCMURTRIE.

QUALITATIVE CHEMICAL ANALYSIS OF INORGANIC SUBSTANCES AS PRACTICED IN GEORGETOWN COLLEGE, D. C. pp. 61. New York: American Book Company. 1894. Price $1.50.

This small book is divided into four parts: I. Basic Analysis. II. Acid Analysis. III. Preliminary Examination. IV. Solution of Solid Substances.

The bases are grouped and numbered according to Fresenius. The method of describing the properties and characteristic reactions of the elements of each group is somewhat different from that commonly used. A brief note of the properties of the element itself is first given, then the names and formulas of the