Schedules and indexes in English, French, German and Italian, (2) an author's catalogue, and (3) a subject catalogue. It is evident, from a careful examination of the present volume, that this international undertaking deserves the hearty support and cooperation of all scientific investigators, who will be kept fully and quickly informed of all new discoveries. The chemical volumes will be of real service to all chemists, and the entire catalogue should find a place in every library. S.

QUALITATIVE ANALYSIS, A MANUAL FOR THE USE OF STUDENTS OF CHEMISTRY IN SCHOOLS AND COLLEGES. BY L. M. DENNIS, Professor of Analytical and Inorganic Chemistry, and THEODORE WHITTELSEY, Instructor in Analytical Chemistry, Cornell University. Ginn and Co. 1902. pp. 142.

The aim of the authors is to offer "a work in qualitative analysis that shall be both exact and compendious, avoiding on the one hand the diffuseness of the larger treatises and on the other the incompleteness of the smaller manuals." Their method of instruction is to have the student observe the behavior of known substances in solution toward the following reagents: Potassium hydroxide, ammonium hydroxide, sodium carbonate, hydrogen sulphide, ammonium sulphide, hydrochloric acid, and sulphuric acid. This gives the basis for grouping, separation and identification. The analytical methods are generally well chosen and the directions clearly expressed. Following the latter, under the heading "Discussion," are given with suitable fulness the reasons for the various steps and also some consideration of the special difficulties which may be met in practice. The authors have been successful in maintaining a wise balance in the fulness of detail whereby the student receives sufficient information to work intelligently but is still called upon to exercise judgment and discrimination in the application of facts to special conditions. One might wish that the preliminary descriptions were made to include something more than reactions in solution. For example, some statement concerning oxides and their relation to acids, bases, and salts would seem desirable in order that the phenomena of oxidation and reduction might be better understood. It may perhaps be assumed that such information has been secured in a preceding course of general chemistry.

"The Introduction," in the words of the preface, "discusses in

considerable detail the principles and operations involved in qualitative analysis, but it does not include the consideration of the dissociation theory." For this, in the opinion of the writer, the authors are to be distinctly commended. Although the presentation of the ionization theory may accompany not unsuitably the subject of qualitative analysis, yet to base instruction upon it, to translate the statements of fact in so eminently practical a subject into the terms of a theory so hypothetical and still so controverted is, to say the least, not in the interest of sane teaching. The book is commended as one of the best of its class. A. V. E. YOUNG.

THE ELEMENTS OF PHYSICS. BY EDWARD L. NICHOLS AND WILLIAM S. FRANKLIN, in three volumes. New York: The Macmillan Company, reprinted 1901. Vol. I, MECHANICS AND HEAT, pp. 220; price, $1.50 (electrotyped 1898.) Vol. II, ELECTRICITY AND MAGNETISM, pp. 272; price, $1.90 (electrotyped 1896).

This work is not intended to include all the aspects of physical instruction. It contains only, as the preface indicates, "concise statements of physical laws, and a systematic development of principles." Without demonstrations of phenomena and an additional course of physical measurements, its excellence must be largely lost upon the student of physics. On the other hand within the compass of its contemplated field, and considering its real date, the work is unusually well balanced and adequate.

The mathematical method is sufficiently modern, and the lucid explanations of vector calculation and distributed quantity will be helpful to those not already familiar with these concepts. A knowledge of the calculus is of course presupposed. The treatment of physical dimension (in the technical sense) is important and not often so adequately emphasized. In view of this fact it is surprising to find occasionally such an equation as the following, (properly applied, of course, to unit volume): Work = Pressure (Vol. I, p. 117). This type of equation, by ignoring one dimension, seems to indicate the equality of two radically different dimensions. The data are less modern than the treatment. For example the weight of a cubic centimeter of hydrogen is recorded as 0.00008954 gram (Vol. I, p. 179). On page 8 the definition of *mass* does not seem to be convincing, and the importance of Newton's and Bessel's pendulum experiments in showing