

and even to fire on the riotous crowd. As for the negroes, whom the United States have always with them, he suggests only the need for training in the simpler arts and handicrafts; for a literary education, in his judgment, they are still wholly unfit.

#### PRACTICAL ORGANIC CHEMISTRY.

*A Systematic Course of Practical Organic Chemistry.*

By Lionel Guy Radcliffe, with the assistance of Frank Sturdy Sinnatt. Pp. xi+264. (London: Longmans, Green and Co., 1905.) Price 4s. 6d.

THIS book is intended mainly for students of elementary organic chemistry. The students are supposed to work about five hours per week, and, consequently, experiments which take a longer time, and must be finished without interruption, are omitted.

The exercises include a variety of important reactions and involve work with many of the more common compounds and reagents in organic chemistry. There is a set of exercises on the fatty compounds, and another on benzene; these include instructions in the observation of melting point and boiling point, in the determination of specific gravity, of the equivalent of an acid, and of sugar by the use of Fehling's solution.

This course worked through, there is a higher course, including the preparation of such substances as anisol, benzyl chloride, and benzaldehyde, the determination of equivalents and molecular weights, and of carbon, hydrogen, nitrogen, &c.

More care might have been spent on the finish of the book. The punctuation has been neglected; e.g. "recrystallise until the m.p.'s do not change" (p. 16), and "recrystallise the hydrobenzamide, formed from hot alcohol" (p. 110). The diction is not what it ought to be. "Heated alone succinic acid *sublimates*" (p. 196). "See if the *example* obtained [of methyl orange] is sensitive to acids" (p. 96).

The instructions for experiments are fairly detailed and generally good. Certain mistakes have been made. The student is repeatedly directed, after having dried a preparation by calcium chloride, to distil it in presence of the drying agent (e.g. pp. 54, 176). If a dry distillate is desired, the distillation should be carried out after removing the calcium chloride. Again, in determining molecular weight by Victor Meyer's method, the volume and temperature of the expelled gas may surely be read without waiting so long as an hour (p. 120). Is a minute not long enough?

Under protest, the authors give a section on the qualitative analysis of organic mixtures, "for the sake of students who are taking certain examinations." "The authors are quite sensible of the fact that the analysis of such mixtures cannot be regarded as useful practical organic chemistry" (p. 172). Surely this is an impatient verdict. Qualitative analysis is a valuable training in so far as the student is led to bring book knowledge to bear on work in the laboratory, and is prevented from taking suspicion for proof. The teacher should re-

quire him, in every case, to produce a specimen (or a derivative) of each constituent of the mixture. With this stipulation, knowledge, resource and judgment are needed in organic qualitative analysis even more than in inorganic. How many different ways are available for the separation of organic substances from one another:—precipitation, the use of different solvents, ordinary and steam distillation, extraction by ether from acid and alkaline solution, hydrolysis, oxidation, &c.! Surely time spent in mastering these methods of analysis is not wasted. A. N. M.

#### OUR BOOK SHELF.

*Die Entwicklung der electrischen Messungen.* By Dr. O. Frölich. Pp. xii+192; 124 illustrations. (Brunswick: Vieweg and Son, 1905.) Price 6 marks.

THIS is the fifth of a series of scientific monographs published under the general heading *Die Wissenschaft*. It consists of an historical sketch of the development of physical measurements, especially of those connected with electrotechnics. It must be admitted that in this go-ahead age the technical man finds little time to make a retrospect of his subject; he is too much concerned with its developed aspect. Even in colleges and schools, as the publisher states, the historical side of the subject is too much neglected. The present volume is intended to remove this reproach.

To give an idea of the book, we will outline here the first chapter (on current measurement). In its first section it deals with the first galvanometer, starting with the work of Oersted and Schweigger on the action of a current on a magnetic needle. Then follow the fundamental laws of constant currents as developed by Ohm, Ampère, Biot-Savart, and the methods of demonstrating them. The astatic needles of Nobili and Davy and the measurements of Faraday are next described, and this section concludes with the methods devised for calibrating the early types of galvanometer.

The second section is called the mirror galvanometer. It describes the work of Gauss and Weber on absolute measurements, the first telegraph of Gauss and Weber (1833), and the Atlantic cable furnished with mirror galvanometers by Lord Kelvin (1858). The remainder of the section deals with improvements effected in the control of the moving system (damping, &c.), and describes the galvanometers of Wiedemann, Siemens, and Kelvin, and the more recent variants of du Bois and Rubens, Paschen, Hartman and Braun, d'Arsonval, Edelmann, and Siemens and Halske.

When it is mentioned that all this is included in thirty pages it will be realised that the descriptions are exceedingly brief. The general impression conveyed is that for a book of this kind to be of much use, fuller treatment is necessary. Still, it will serve to direct attention to the general trend of advance, and to indicate the names of those that share the chief honour of it. Its value would be considerably increased by a larger number of references to original sources of information. These are given sometimes only.

*Zoologischer Jahresbericht für 1904.* Edited by Prof. P. Mayer. (Berlin: Friedländer and Son, 1905.)

THE zoological station at Naples, for which this bulky volume, like its predecessors, is published, is to be congratulated on the early date of its issue and the thoroughness with which the various contributors