chemical constitution of their constituent amino acids is extensively discussed and the methods by which each of these amino acids has been synthesized is described. The differentiation of the proteins by means of the proportion of the various types of nitrogen which they yield on hydrolysis is given in detail, as well as the recent methods for estimating amino nitrogen and also the nitrogen belonging to the different groups of amino acids.

The book contains the first practically complete compilation yet published of analyses thus far made of the products of hydrolysis of all the various individual proteins, a feature which will be appreciated by those working in this field of protein chemistry. In commenting on these analyses the author very properly emphasizes the fact that the percentages reported are in almost all cases minimal, and that none of the analyses represents the true amino acid make-up of the protein; a fact too often overlooked by those who have previously attempted to compile such analyses, which simply reveal gross differences between proteins of different origin.

Plimmer's monograph, like the others of this series, contains a very full bibliography; but, unfortunately, references in the text are not made in such a way as to readily show the papers which are authority for the statements made. This defect is especially apparent in connection with the tables of analyses of the proteins. Those who wish to quickly and pleasantly inform themselves of what is known of the chemical constitution of the proteins, and of the methods by which this has been learned, will find this monograph exceedingly satisfactory. As an experienced teacher of physiological chemistry recently wrote the reviewer, "It strikes me as a remarkably useful book; and it has more human touches than most reviews of this type."

THOMAS B. OSBORNE

Physiologisches Praktikum für Mediziner. By MAX VERWORN. Second edition. Jena, Gustav Fischer. 1912. Pp. xii + 262; 141 illustrations.

It is a curious fact that Germany, the country in which the science of physiology has undergone its greatest development, has been backward in providing laboratory instruction in that science. And now that it is being provided it is to be regretted that it is on a lower pedagogic and scientific plane than in the English and especially the American universities. The book before us is a second edition from Bonn of a work, the first edition of which was issued from Göttingen five years ago. It is a combination of the chemical and the physical, about one fourth of the text being devoted to the former. There is an average of one illustration for less than two pages of text. Each main topic is introduced by a brief, concise and usually excellent summary of its physiology, and this is followed by an elaborate account of the procedures to be pursued in performing a series of selected experiments. Most of the experiments are well known to university teachers of the subject; but some are new, and a perusal of the book will prove suggestive. Many experiments which are frequently performed by students in American universities are wanting, and the only mammals employed, besides man, are the rabbit, the guinea-pig and the white rat. But the most striking feature of the book is the elaborateness of the directions for laboratory work, something with which we in America are not familiar. The student is never left to determine a procedure for himself, but is told exactly how to do the thing desired. He must, for example, hold his scalpel thus and so, the verbal directions being supplemented by a nearly life-sized picture of a hand holding the instrument; and he must make "not little, shallow, short, hurried cuts with the point of the knife, but long, firm, quiet, deep incisions with its blade." In order to tell how to make a frog's muscle-nerve preparation two pages of text are required and two additional pages of life-sized illustrations. Eight pages, including illustrations, are employed in describing the customary method of measuring the blood pressure in a mammal with the simple action of the vagus nerve on

the blood pressure, the simple action of atropin on the heart, and final asphyxia. One can not examine the book without recalling Mr. Abraham Flexner's discussion of physiological instruction in Germany in his valuable report to the Carnegie Foundation on medical education in Europe. He says:

> The practical course in Germany is a thing by itself, and is still unsatisfactorily carried on. . . . Consisting as it does of certain exercises specified and minutely described in a syllabus, the practical course tends to be an isolated series of experiments mechanically executed rather than a stimulating and successful application of scientific method to physiological problems. . . . If, then, physiology is to be taught as an experimental science, as a science of function, the student must be allowed to run risks, to calculate, to observe, to verify, to conclude. Eliminate risk and the experiment becomes a mechanical toy: it may amuse, it does not discipline.

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Short Course in Electrical Testing. By Morecroft and Hehre. New York, D. Van Nostrand Company. 1911. Pp. 154. Price, $1.50 net.

This book is designed primarily for the use of students of other branches of engineering than electrical engineering. As such students are usually none too well versed in the theory of electrical engineering, due to the short time available for the study of this subject, the authors have included with the description of the experiments a brief statement of the more important principles involved. This feature should appeal to any teacher giving laboratory instruction in electrical engineering to students of another department.

The direct current experiments described deal with the measurements of the resistance of wires, of lamps and of the dynamos; the characteristics of the shunt and of the compound generator; the characteristics of the shunt and of the series motor, and the parallel operation of shunt generators and of compound generators. The alternating current experiments deal with determination of wave shape; phase displacement and power; the effect of inductance, capacity and frequency; the regulation of an alternator; transformer losses; characteristics of the induction and synchronous motors, and of the rotary converter; the parallel operation of alternators, and currents, voltages and power in three-phase circuits.

At the end of each experiment is given a number of questions concerning the principles involved and the reasons for the behavior of the various types of machines. It is to be regretted that the authors have not included in these queries more questions designed to bring out the bearing of the various characteristics upon the commercial application of the machines. Particularly for non-electrical students is it desirable, both for its inherent value and to keep the interest of the students, to bring out repeatedly the uses of the various types of machines and the features limiting their application. In some of the questions the premises are only partially stated. For example, on page 65, is the following: "Explain . . . why a series motor of the same horsepower rating as a shunt motor exerts a greater full load torque." In this connection, it may also be noted that nothing is said as to the difference in the methods of rating shunt and series motors. In fact, the question of rating and temperatures seems to be omitted entirely from the book.

In the alternating current section there are certain features which are not altogether desirable. In the first place the clockwise system of vector notation is employed. Again, the terms "impedance" and "reactance" seem to be avoided, although frequent mention is made of "conservative" and "dissipative" reactions, inductance and capacity reactions, etc. It is also to be regretted that the authors have given no index to the book.

The experiments selected and the directions given are in the main entirely satisfactory. On the whole the book should prove very useful for the purpose for which it is primarily intended, *i. e.*, a laboratory manual for non-electrical students.

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