

book of Botany," to commemorate the original founder of the work. The general plan of the book remains the same. The first part, entitled "General Botany," includes morphology and physiology; the second part, "Special Botany," is also in two divisions, the first dealing with Thallophyta, Bryophyta, and Pteridophyta, and the second with the Spermatophyta.

The division on morphology, which is contributed by Prof. Fitting, has been entirely rearranged and largely rewritten. It now begins with a consideration of the cell, tissues and tissue systems, and then under the heading of "Organography" deals with the external form and internal structure of the members of the plant. This arrangement permits of a logical development of the subject, in which some consideration is given to form in relation to function. It is clear, however, that the subjects included in this division cannot be adequately treated in the 206 pages devoted to it. Such subjects, for example, as leaf fall, structure of the hypocotyl, and the phylogeny of the vascular system, receive very scanty treatment.

In a new section six pages are devoted to the theory of descent and the origin of new species. It is doubtful whether such a condensed account of this subject will be of value to the student even for examination purposes. It is true that, as in other sections of the book, there are references to the more important publications on this subject, but since both here and in the sub-section of physiology dealing with heredity and variability the references are almost exclusively to German authors, these will be of limited use to the English student.

The section on physiology, by Prof. Jost, is on the same general lines as that in the fourth edition. It has, however, been very carefully revised and brought up to date, and provides an excellent survey of the subject.

In the Cryptogamic section, for which Prof. Schenck is responsible, the most recent additions to the subject have been brought under review. Among the Thallophytes, alternation of generations is described and figured in the Laminariaceæ, and Kniep's work on the Hymenomycetes is included. The treatment of the vascular cryptogams has been much improved by the insertion of the more important fossil forms in their natural positions among the existing families.

The work as a whole presents a comprehensive and accurate account of the subject. Its main defect is that, in including so much within the limits of a single volume, the treatment of the various sections has suffered from undue compression. The book was written for German students and it cannot fully satisfy the requirements of English teachers, since it does not give prominence to those aspects of the

subject with which the English School of botanists has been identified. Nevertheless, it has already established itself as a standard text-book, and in its present revised form and at its extremely moderate price it will meet the needs of many different types of student.

R. J. T.

German Monographs on Biochemistry.

Die Biochemie in Einzeldarstellungen. Herausgegeben von Dr. A. Kanitz.

- (1) *Temperatur und Lebensvorgänge.* Von Dr. A. Kanitz. Pp. x+175. 54 marks.
- (2) *Über künstliche Ernährung und Vitamine.* Von Prof. Dr. F. Röhmnn. Pp. vi+150+2 plates. 42 marks.
- (3) *Über partielle Eiweißhydrolyse.* Von Prof. Dr. M. Siegfried. Pp. iv+64. 15 marks.
- (4) *Die Einwirkung von Mikroorganismen auf die Eiweißkörper.* Von Dr. P. Hirsch. Pp. x+256. 63 marks.

(Berlin: Gebrüder Borntraeger, 1915-1918.)

THE present may be emphatically termed the period of Monographs of Science. The vast accumulation of facts has long passed the bounds prescribed by the general treatises on physics or chemistry, in which it was formerly possible to find a readable and critical treatment of the subject as a whole. These were succeeded by encyclopædic dictionaries, of the type of Beilstein, which, however useful and indeed invaluable for reference, make no claim to be readable or even critical. In all branches of science, however, the demand is insistent for a comparatively brief and comprehensive account of the present state of knowledge, and it is to meet this that the various series of sectional monographs have sprung up. Among the first of these were the admirable monographs on biochemistry edited by Hopkins and Plimmer from 1908 onwards, and in the series now under review we have the German equivalent of these. Originated as late as 1915, comparatively few volumes have as yet been issued, but the promised list of publications indicates, both by the subjects proposed and the distinction of the authors, that they will form a valuable addition to the biochemist's bookshelf.

(1) The effect of temperature on life processes is here discussed in great detail. After a general introduction in which the physical chemistry of the subject is considered the characteristic optimum effect produced in living organisms is fully analysed. A special part follows in which a summary of the literature is made and the data are incorporated in tables, each class of phenomenon, such as the heart-beat, the action of

poisons, the duration of life, etc., being separately discussed. This provides a very valuable compendium of the existing information on the subject. Among the most remarkable results recorded are the enormous values of the temperature coefficient ($Q_{10}=1000-4000$) in many cases of the duration of life, especially among invertebrates. In this connection the suggestive fact must be borne in mind that high values of Q_{10} are also characteristic of the denaturation of proteins and the inactivation of enzymes. These high values are the more remarkable as in the majority of cases physiological phenomena fall into line with ordinary chemical reactions, the rate of which is increased 2 or 3 times by a temperature rise of 10°C ., although in many cases the coefficient falls with increasing temperature.

(2) Criticism, especially of the fundamental propositions enunciated in a new and rapidly expanding branch of knowledge, is useful because it prompts the investigator to re-examine the experimental foundations on which he has based his conclusions. In this way Dr. Röhmann's work has doubtless done good service, but the theses which he maintains, that accessory food factors or vitamins have no existence in fact and that "deficiency" diseases such as beriberi and scurvy are due to prolonged and one-sided feeding with "imperfect" proteins, can no longer be seriously maintained. The author's experimental material has already been very carefully analysed and criticised by Osborne and Mendel, who have pointed out in what directions the "purified" diets of Röhmann fell short of the standard which is now known to be required.

Since the date of publication of this book (1916) overwhelming evidence has been produced—largely in this country and America—that Hopkins was fully justified in his original conception of accessory food factors which cannot be synthesised by the animal but are necessary for the proper utilisation of its diet, however complete this may be in the fat, carbohydrate, protein and salts which form its main constituents. Röhmann has turned his face back towards the ideas of the older physiologists and his book remains as a monument beside the path by which the newer doctrine has been reached.

(3) The hydrolysis of proteins by enzymes is a highly complex process, the exact course of which is by no means fully understood. In the present work a full account is given only of the later stages of this decomposition, commencing with the peptones and proceeding downwards through the kyrines to the peptides. The term peptone is often used vaguely to designate various mixtures of the hydrolysis products of protein, often including the albumoses. We

are here given an excellent account of the work, largely due to the author, by which the peptones, in the narrower sense, have been isolated from the products not precipitated by ammonium sulphate, and have been characterised by their chemical and physical properties. Their composition varies with their origin but is always relatively simple, although the author hints at the existence of modes of union between their constituents other than the characteristic peptide linkings to which so much importance has been attached in the structure of the proteins.

(4) The physiological importance of many of the bases formed by the action of bacteria on the amino-acids has made them of great interest to the biochemist. English readers have already at hand, in Prof. Barger's monograph on "The Simpler Natural Bases," a work which includes a great part of the matter dealt with by Dr. Hirsch. In the present volume the subject is approached from the point of view of bacterial action and a full account of the products which have been recognised is given. In addition to descriptive matter, practical methods are also included and a considerable amount of attention is given to the physiological properties of the substances concerned. Interesting sections treat of the pathological effects of bacterial products derived from the proteins and of their therapeutic application.

The author also includes a short but suggestive chapter on the relation between these products and various substances of a basic character which occur in animal and vegetable organisms. There is little doubt that many of the latter have been formed from amino-acids by reactions similar to those produced by micro-organisms, if not actually by their active intervention. A copious bibliography is appended to the work.

ARTHUR HARDEN.

Our Bookshelf.

Alumni Cantabrigienses: A Biographical List of all known Students, Graduates, and Holders of Office at the University of Cambridge, from the Earliest Times to 1900. By Dr. J. Venn and J. A. Venn. Part I., *From the Earliest Times to 1751*. Vol. 1, *Abbas-Cutts*. Pp. xxviii+437. (Cambridge: At the University Press, 1922.) 150s. net.

THE President of Gonville and Caius College and his son have undertaken an immense task in the preparation of the volumes, the first of which is under notice. Dr. Venn has by previous work on the archives of his own College prepared himself for this investigation, and it is as much due to him as to the wise rules of Dr. Caius that the Caius records of past members can be described as "much the best of the series." There are 76,000 names dealt with up to the date 1751 covered by Part I., and details have been gathered together from many sources. For instance, John Ward of