Book Reviews

Biochemical Literature

Protozoan Nutrition. R. P. Hall. Blaisdell (Ginn), New York, 1965. viii + 90 pp. Illus. $3.50.

Essays in Biochemistry. vol. 1, P. N. Campbell and G. D. Greville, Eds. Published for the Biochemical Society. Academic Press, London, 1965. xii + 170 pp. Illus. Paper, 18s. 6d.

Studies in Comparative Biochemistry. K. A. Munday, Ed. Pergamon, London, 1965. viii + 207 pp. Illus. $9.70.

The appearance of the eminently successful series, Foundations of Modern Biology (Prentice-Hall), opened up a new and apparently lucrative area for many publishing houses. As a result, many short monographs are now finding their way into print. The first of the three volumes reviewed here, *Protozoan Nutrition* by Richard P. Hall, is an example of this trend.

The title promises much more than is delivered in the 90 pages of this booklet, which is written at an elementary level. The introductory chapter is followed by a popularized and illustrated discourse on how protozoa obtain food. Various ways by which species of the Sarcodina, Sporozoa, Flagellates, and Ciliates snare food are described. A few puzzling statements are made—for example, "An environment with only a little food in solution would not necessarily be barred to phagotrophs because they have become adapted to eating concentrated packages of food. The primary tasks, uptake and concentration of raw materials and *synthesis of protoplasm* [my italics], have already been completed by microorganisms representing the food supply of the phagotrophs" (p. 4). Saprozoic feeding and pinocytosis are superficially discussed.

The next chapter, which deals with the foods used by protozoa, appears to be a condensation of chapter 7, "Physiology," from Hall's book *Protozoology* (1953), with sketchy new information added. The requirements for minerals, amino acids, purines, pyrimidines, carbohydrates, and vitamins are given for several species of *Tetrahymena*, *Euglena*, and *Amoeba* and for the Flagellates. The wealth of data published on the nutrition of *Paramecium aurelia* is completely overlooked.

The last chapter, which is concerned with protozoan nutrition in applied protozoology, discusses the use of *Euglena gracilis, Ochromonas malhamensis, Ochromonas danica, Tetrahymena pyriformis*, and *Crithidia fasciculata* for the assay of B_{12}, thiamine, biotin, nicotinic acid, pantothenic acid, thioctic acid, and pteridines. The chapter ends with a discussion of the uses of protozoa in answering questions of general biochemical interest—for example, in tracing certain aspects of metabolism and in testing drug action (tranquilizers, antihistamines, tumor inhibitors, and antimalarials, among others). The important work in which Soldo used axenically grown particle-bearing *Paramecium aurelia* for screening antibiotics is not mentioned.

The value of such short and, necessarily, incomplete monographs is questionable. I doubt whether "this monograph will be of great interest to workers in the field, as well as teachers and students of Protozoology" (a quotation from the flyleaf).

The Biochemical Society of Great Britain, in cooperation with the Academic Press, has launched a new series of publications on biochemical subjects aimed at the advanced student of biochemistry. It was felt, and with justification, that the student would get lost in the many details of the specialized reviews now being published. Furthermore such review tomes are far too expensive for the student.

Essays in Biochemistry, the first volume in this new series, contains five chapters: "The role of CO_2 fixation in metabolism" (H. G. Wood and M. F. Utter); "On the mechanism of muscular contraction" (R. E. Davies); "Sequence determination in nucleic acids" (K. Burton); "Oxidative phosphorylation" (D. E. Griffiths); and "The biochemists' green mansion: Photosynthetic electron transport chain in plants" (R. Hill). All chapters contain a wealth of information, not only for the advanced student, but also for teachers and research workers. A central theme of comparative biochemistry is discernible throughout the booklet.

In order to fulfill the requirements set forth by the editors the various essays should be succinct and should present an overall view of the subject, indicating its origin, present status, and likely future developments. The chapter on muscular contraction does not meet these requirements. A summary of the literature in the field will not provide exciting reading, and the 229-item bibliography will overwhelm even the most astute student.

The Biochemical Society and Academic Press are to be congratulated for this undertaking, and one hopes these small volumes will be warmly welcomed by students.

Studies in Comparative Biochemistry is an example of another trend in present-day publication ventures, the publication of symposia. The papers in this volume were presented at the Comparative Biochemistry Meeting of the Biochemical Society of Great Britain, which was held at Southampton in October 1963. After a delay of almost 2 years, these papers have now been published by the Pergamon Press in their International Series of Monographs on Pure and Applied Biology, Zoology Division.

The book begins with Ernest Baldwin's clarion call for study of all organisms together with their environments, and for study of similarities and differences. Unfortunately, what follows does not live up to his call. Florkin and Schoffeniels present a paper on euryhalinity and the concept of physiological radiation, a detailed and documented review of the work done in Florkin's laboratories. This work has been discussed before, and one wonders how many times summaries of work done in one's laboratory can be reviewed for different audiences. The second chapter, "Amino acids

and related substances in fish" by C. B. Cowey, adds little to our knowledge of comparative biochemistry because very little if any of the underlying differences in metabolism, or of the specific mechanisms involved, is revealed. On the other hand, Jean Roche presents an excellent résumé of electron microscope studies on the high molecular weight erythrocruorins and chlorocruorins of Annelids. The postulate that these respiratory proteins might represent the first stages in the evolution of the red blood corpuscles is attractive indeed.

Among the next chapters, "The comparative physiology of the transfer of substance between the blood and central nervous system" (J. E. Treherne), "Comparative metabolism and toxicology of organic insecticides" (F. P. W. Winteringham), "Distribution of phosphagens in errant and sedentary Polychaeta" (N. V. Thoai and Y. Robin), and "Evolutionary implications of enzyme structure and function" (D. C. Watts), the last chapter is the most provocative field of comparative biochemistry covered in this volume.

One wonders about the value of publishing such symposia. First, publication is usually delayed for more than a year. Added to this is the usual requirement that the papers must be in the hands of the organizing committee many months before actual delivery at the symposium. This makes most of the material a rehash of papers previously given at other meetings and published in many journals. Second, in some cases only very specialized topics are discussed (the chapter on insecticides is an example). And third, a specific topic might be developed more fully, and to a much greater advantage to the reader, than is possible in the necessarily short form of a symposium paper (evolutionary implications of enzyme structure and function is an example of this).

In summary, this is a very heterogeneous volume that may in some instances serve to stimulate workers in this field to follow the call of Ernest Baldwin. But I doubt whether "the book will prove extremely valuable to all concerned with the study of aspects of comparative biochemistry."

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A Matter of Focus

Focus on Bacteria. Emmy Klieneberger-Nobel. With a chapter by Ruth M. Lemcke. Academic Press, London, 1965. viii + 145 pp. Illus. $5.50.

In her foreword the author explains that "The purpose of this book is first and foremost to show that nature has a quality of beauty even in her smallest manifestations. Aesthetic considerations have therefore more or less decided the choice of the photographs. However, most of the constituent elements of bacteria can be seen in the pictures presented. Knowledge usually enhances enjoyment; therefore, brief information on the structure, arrangement, and some properties and activities of the bacteria have been given. The sequence of the pictures and descriptions as well as the informative text follow a scientific trend, yet this book must by no means be regarded as a textbook. Its main object will be abundantly fulfilled if it gives a certain amount of pleasure to the reader."

Because it is primarily a "picture book," the chosen title is apt. About one-half of the 125 pages (this excludes the glossary, references, and index) are covered by the 61 photo- and electron micrographs that serve to illustrate the gross morphology and anatomical details of bacterial cells. They are supplemented with 19 poorly executed sketches and with the "informative text," which is riddled with technical terms. The 14-page glossary contains their definitions, mostly quite primitive and sometimes erroneous. The following are examples of the latter: "Butyric fermentation" is defined as "Formation of butyric acid in butter, a process caused by a ferment of *Clostridium butyricum*. Consequently the butter develops a rancid taste and smell"; inosine and thiamine are listed as amino acids, and arabinose and rhamnose as polysaccharides.

Considered as an effort aimed at generating the "knowledge [that] usually enhances enjoyment," I find the contents of the book badly out of focus. It seems to me that the author's stated purpose could have been achieved more successfully if far less space had been devoted to illustrations, many of which are redundant, and if instead she had presented a more balanced picture of bacterial activities. From the start, the emphasis is on bacteria that cause diseases in animals; this is immediately apparent from the statement on pages 3 and 4: "For a long time Leeuwenhoek's observations were not followed up in a fruitful way to enlarge our knowledge of bacteriology any further, and, in particular, they were not applied to promote a better understanding of infectious diseases." Wherever possible, the association of a specific microbe mentioned in the text with a particular, even obscure, disease is mentioned, while scant attention is paid to the more general and fundamental activities of bacteria. This attitude reflects the training of the author as a medical bacteriologist not conversant with the current status of microbial physiology. Besides, it may well be true that pathogenicity is a property that strongly appeals to the lay reader, so that the hope expressed in the preface "that the subjects most interesting to the reader have been referred to in this book" may be justified. Nevertheless, seen in its proper perspective, this property is but a very minor aspect of the essential role played by the bacteria in perpetuating the cycle of matter, through which life on earth could persist and evolve. An attempt to inculcate a sound appreciation of this significant fact would have revealed that the vast majority of bacteria, rather than being menaces to human health, are indispensable to our very existence.

The latter kind of approach can be found in the masterly little treatise, *Microbial Life*, by Sistrom [Modern Biology Series (Holt, Rinehart, and Winston, 1962. 106 pp.)]. It covers a vastly broader area than Klieneberger-Nobel's booklet, and is, in my opinion, much more likely to create the knowledge that enhances enjoyment than the enumeration and designation in technical terminology of morphological and anatomical details.

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Introductory Textbook

Biological Effects of Radiation. Daniel S. Grosch. Blaisdell (Ginn), New York, 1965. xiv + 293 pp. Illus. Paper, $3.50.

This is a textbook for advanced undergraduate biology students or begin-