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-