

Natural chemistry

Peter Karlson

A History of Biochemistry: Molecular Correlates of Biological Concepts. Comprehensive Biochemistry Volume 34A. By Pierre Laszlo. Elsevier: 1986. Pp.520. \$110, Dfl. 275.

THE subtitle of this book is somewhat misleading: "biological concepts" are phenomena such as hormonal regulation, nervous control of physiological function, interaction in embryonic development, physiological genetics and the immune response, to mention some examples. None of these fields is touched upon here. The subtitle was actually chosen by Florkin, the author of the volumes of *Comprehensive Biochemistry*. When Florkin died, Pierre Laszlo agreed to write this volume, and he felt there was "no good reason not to maintain [the subtitle]" (p. 485). But, as a chemist, he emphasizes the development of our knowledge of the chemical structures of molecules — protein molecules — rather than their biological function. Nevertheless, he tells an interesting story.

In part I, Laszlo discusses the structures of organic molecules in terms of their geometry, beginning with the ideas of the late eighteenth century, including the contributions of Kekulé (the benzene ring) and the concept of macromolecules (Staudinger, 1922); it also includes a discussion of mechanism versus vitalism over the centuries. Part II, "Proteins as Molecules", tells the story from the name 'protein', the contributions of Mulder and Berzelius in coining the name, to the identification of amino acids and the concept of peptides, and culminating in various proposals for protein structures. One chapter is devoted to Dorothy Wrinch and her cyclol theory, another to the contributions of Linus Pauling, and another to the sequence analysis of insulin by Fred Sanger. Part III discusses the history of our knowledge of proteins, using haemoglobin as an example, and part IV, "Enzymes as Proteins", contains a very interesting discussion of the old story of fermentation, the concept of enzymes as catalysts and the famous experiment of Buchner. It continues with binding of substrates to enzymes, the question of enzyme kinetics and finally X-ray studies on enzymes. Part V is a tentative comparative sketch of historical development in the haemoglobin and enzyme fields.

One criticism of the book is that it emphasizes the contribution of only a few scientists; many others are not mentioned at all. Consider, for example, the description of the haemoglobin story. The elucidation of the structure of haem as the prosthetic group of this pigment is

completely omitted, and the names of W. Küster and Hans Fischer are not mentioned. The elucidation of the three dimensional structure of haemoglobin by Perutz was greatly aided by the knowledge of the amino-acid sequence, elucidated by G. Braunitzer and his co-workers in 1959–61, again not mentioned. This is not the only case of imbalance and injustice. For example, Willstätter is described only as a man who, for a long time, pretended that enzymes are not proteins. It is true that this description of him, often repeated with his authority, held up the discovery of the true nature of enzymes. But one should give credit to Willstätter for his large amount of experimental work on various enzymes, including attempts at purification. It is mentioned briefly that Willstätter used saccharase as his favourite enzyme, the action of which could be measured by optical means, that is, the change in optical rotation. But from a

chemical point of view, this was a very poor choice.

On the other hand, many of the facts discussed in the text are well documented and illustrated by quotations in part from original work, in part from the Nobel lectures giving reflections of the Nobel laureates from the very beginning of their important work. The book also uses to a large extent quotations from other treatises on the history of biochemistry, providing the reader with a useful comparison of different views.

The reader will be delighted to find a lucidly written account of the ideas of various important scientists, including quotations from the original literature. But this book should not be relied upon entirely for the history of those aspects of biochemistry it describes. □

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Modern mammals

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BEING surrounded by a very diverse mammalian fauna that was relatively little studied until well into this century, it is understandable that many North American universities developed mammalogy as a discrete subject to a much greater extent than was normal in Europe. As a subject it performs two very useful compensatory roles: by encouraging consideration of the great diversity of mammals (over 4,000 species) it counters the tendency to use one or two 'types' to represent the class, whether in teaching or research; and it acts as a unifying agent, bringing together data and ideas from physiology, ethology, ecology, molecular biology and many other disciplines that employ mammals as subjects of study.

Mammalogy is already served by a number of more-or-less international journals devoted to research results and, to a lesser extent, review papers. However because of the dominant role of mammals in many disciplines, the volume of output of research far outstrips the capacity of existing review journals to effect a satisfactory synthesis. Symposium volumes go some way towards meeting this need but are usually on a very limited theme, comprise incomplete research reports or are produced in too much of a hurry to constitute adequate reviews of the subject. So there is indeed a niche for a series such as *Current Mammalogy* — provided of course that the articles meet a number of basic criteria, for example choice

of subject matter, thoroughness and authority.

Of the 13 chapters in this first volume (by 27 contributors, all but two from the United States) most are comprehensive, well-researched and refereed reviews of particular topics. Some chapters cover a broad spectrum, for example "Mammalian Evolution at the Cellular Level" and "Role of Chromosome Banding Patterns in Understanding Mammalian Evolution"; others are more specific, such as "The Behavior, Physiology and Anatomy of Lactation in the Pinnipedia". One chapter, "The Social Structure of Free-ranging Bottle-nose Dolphins", is in effect a research report, but it deals with a particularly thorough and long-term project that has been operating in Florida since 1970.

Ecological reviews are represented by a chapter entitled "Ants and Termites as Food", which tabulates data on 216 mammalian species, including such unexpected ones as the duiker antelope (*Cephalophus monticola*), in which 11 per cent dry weight of the diet consists of ants, and the mouse-deer (*Hyemoschus aquaticus*). A more wide-ranging subject is dealt with in "A Review of Density Dependence in Populations of Large Mammals", and applied ecology is covered by "Current Management Strategies for Commensal Rodents".

No predictions are made on the frequency with which subsequent volumes will appear, but if the high standards of this volume can be maintained the series will indeed provide a useful synthesis of a literature that is very widely scattered and highly fragmented. □

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