
Book Reviews

Follmann, H.: Chemie und Biochemie der Evolution. Wie und wo entstand das Leben? Heidelberg: Quelle und Meyer 1981. 282 pp., 77 figs., 25 tabs. Soft bound DM 25,80.

Digging into the past to reconstruct events which have helped to shape a certain period becomes increasingly more of an adventurous task the further back in history the events have occurred. Archaeological reports often read like puzzling stories simply because their conclusions are actually drawn from bits and pieces which are reshuffled over and over again until the initial shape emerges. And there are always those pieces that do not fit or which could be reassembled into a different structure, or some other pieces missing which could thus result in a faulty reconstruction. These problems tend to expand enormously if one tries to recreate events which took place billions of years ago, a reconstruction of the first forms of life.

The author of this book is well aware of these problems and in his first section – “Discoveries and experiments” – he starts on firm ground by recapitulating what the “diggings” have revealed about the molecular traces of life. The first chapter summarizes the variety of changes to which compounds of biological origin have been exposed and the problem of how to distinguish telltale molecular fossils from those which are not. – The real story begins with the second chapter, the formation of the planets of our solar system, the conditions on earth during its early history and how organic compounds, as prerequisites for life, came into being. The author presents a broad view by describing the evolution of organic material from inorganic as the main pathway, but extraterrestrial sources – organic compounds in meteorites and interstellar dust – are also taken into account. In the following two chapters the chemical reactions by which the building blocks of life have come into existence are discussed in detail. In this context it is emphasized that selective mechanisms have been at work from the very beginning, resulting, for instance, in the preferential employment of only

one of the stereoisomeric forms of amino acids in biochemical reactions. The closing chapter of this section gives a critical view on the possible conclusions which can be drawn from microfossils with respect to the timetable of evolution.

A refreshingly critical approach is also reflected by the title of the following section: “Things probable and unknown.” Under this carefully chosen heading, the subtitles read like catch-phrases of a thriller: “The origin: RNA, protein, or both?” “How to get DNA”, “Genes in pieces and selfish DNA” and the excitement created by the quest for the emergence of the first forms of life is indeed well carried over. The five chapters of this section present a thorough insight in what is actually known about this subject and what is still contradictory or even mere speculation.

In the third section we are back on firm ground with “Biochemistry yesterday and today”, whereby the “yesterday” extends backward for at least 3 billion years. After a brief survey on procaryotic and eucaryotic (single) cells, the origin of the cell organelles of the latter (endosymbiosis), sexual reproduction and multicellular organization, the second chapter covers the origin and evolution of the genetic code, with detailed discussions on the early adaptor-nucleic acids. The third and fourth chapter deal with the phylogenetic tree of functional proteins as derived from amino acid sequencing and the evolutionary development of bioenergetic and metabolic pathways. In the closing chapter the chances for reconstructing the “Urzelle” is discussed and dismissed as quite unlikely.

The last section – “Evolution today and tomorrow” – presents an epilogue, reflecting the author’s view on things to come, including an admonition to the species homo sapiens.

Far from those lofty approaches one had to devour in years past, with fancy suggestive titles (“Biochemical Predestination”), this book presents sound and solid information on the state of affairs with regard to biochemical evolution.

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