

## BOOK REVIEW

Martino Rizzotti: **Early Evolution: From the appearance of the first cell to the first modern organisms** (60 figs., 5 tabs., VI + 175 pp., 440 g, Softcover, CHF 68). ISBN 3-7643-6191-3; Birkhäuser Verlag, Basel, Boston, Berlin, 2000.

„This book aims to fill a gap in our representation of the evolution of living things. Actually, over the last few decades there has been increasing interest in the astronomical and physicochemical problems involved in the events which determined the appearance of the first cell: for almost two centuries the evolution of present-day and past species has given rise to a great many investigations and much discussion: moreover, in the last few years important contributions have come from the discoveries about their DNA. By contrast, there has been very little investment in attempts to understand the evolutionary processes which linked the first cell to the first modern organisms, of which are included even the most ancient fossils. In this field, even simple working hypotheses are often lacking. This book discusses at length these missing links and the origin of the basic structures of modern cells ranging from the propelling organelles of bacteria and nucleated cells to the organelles that the nucleated cells acquired by engulfing special bacteria. What emerges from this discussion tends to favor the view that many of these refined evolutionary processes were driven by prosaic alimentary efficiency." So far the author. The titles of the 13 chapters of this book are given within the following list. In view to characterize somewhat the author's procedere and style the subtitles of the first five chapters are added, hoping to raise the interest in the other chapters too:

### 1. Introduction

### 2. The First Cell

Properties attributed to the first cell: reproduction/ Properties other than reproduction/ Derivation of the first cell from a precellular aggregate/ There are many kinds of putative aggregates/ A detailed hypothesis on the formation of the first cell/ Properties attributed to modern cells/ Temporal frame.

### 3. Modern Cells: Prokaryotic and Eukaryotic Descents

The general pattern of descent lineages remains controversial/ Descent is traditionally inferred from morphological comparison/ Descent inferred from gene sequences is not truly universal/ The possible origin of a protein complex/ What was the cellular organization of the common ancestor?/ Major evolutionary transitions.

### 4. Prokaryotes: The Flagellum

The bacterial flagellum is a complex structure/ Complex structures appear only once/ From what did the flagellum derive?/ Possible derivation series.

## 5. Prokaryotes: The Outer Membrane

The outer membrane is also a complex structure/ Was the outer membrane an alimentary adaptation?/ Did the outer membrane appear in a flagellated bacterium?/ The role of interspecific gene transfers.

## 6. Prokaryotes: Trends towards Complexity / 7. The Appearance of the Nucleus / 8. Eukaryotes: Dictyosomes / 9. Eukaryotes: The Mitochondrial Symbiosis / 10. Eukaryotes: Plastidial Symbioses / 11. Eukaryotes: The Cilium / 12. Eukaryotes: Complexity and Gigantism / 13. Conclusions

The work is rounded by a list of 133 well selected references (far more than half are among the best review articles and mostly of the late Nineties), and by an Index. The titles and subtitles of chapters are to the point, and certainly, they awake the readers' curiosity. The text is supported by many schematic and clear understandable graphs, and with only two photographs (both instructive and impressive). The book is very stimulating, and although it is easy to read, the problematic difficulties of the matter are not reduced to triviality. One of the authors working thesis is to show the things from more than one side, also formulated in the following sentence:

„It seems to be excessive to reject *a priori* the idea that some important traits of evolution are unavoidable and thus determined. To state that evolutionary results are only due to chance means to raise to the status of fact our present-day ignorance (this is truly contingent) and discourage the search for possible causes of fundamental aspects.“

The clear formulations are fascinating as is also the determination to use a consistent terminology. Shining examples are the two chapters 4 and 5 about the flagellum and the outer membrane of distinct bacteria. Only in few formulations (see e.g. chapters 9 and 10) the author has not found this intellectual clearness. Besides other questions the following may be allowed: What is a „stable“ endosymbiosis, is it an obligate one? or is it the result of transformation processes leading to a new genetic and taxonic entity with a „stable“ cell organelle? Is a cell organelle really able to form a symbiosis? Apart from this, the author gives us an admirable overview and excellent insight into an immense growing research field. Therefore, all biologists interested in the evolution of modern types of cells and looking for new starting points in this area of evolutionary cell biology should have benefit by reading this book. Additionally, it gives a superabundance of the best information for hot debates in the labs as well as in seminars with graduate students.

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