Book review

Bendall, D.S. (ed.): Evolution from Molecules to Men. Cambridge, London, New York, New Rochelle, Sydney, Melbourne: Cambridge University Press 1983. xiii + 594 pp., several figs. and tabs. Hard bound £ 18.00.

A large number of books, special issues of journals and conferences marked the 1982 centennial of Darwin's death. The conference held in Cambridge in June was hailed by *Science* as the most official centennial celebration. Indeed, its Proceedings, entitled "Evolution from molecules to men", represents one of the most impressive contributions to the centennial. Apart from a mediocre prologue and an epilogue of a similar level, the book consists of 26 contributions, most of which are of a very high standard. The book is divided into four parts: the history of evolutionary theory, molecular and cellular evolution, evolution of whole organisms, and evolution of social behaviour.

During the last three decades, the most spectacular findings in biology seem to have been obtained in the field of molecular biology. Accordingly, the molecular biologists have made important contributions to evolutionary theory. These contributions are excellently dealt with in the second part of the book. It is remarkable how closely the molecular biologists touch on Darwin's ideas. This becomes particularly clear from Jacob's concept of evolution as a tinkerer (chapter 7): in contrast to the engineer, evolution does not produce innovations from scratch, but works on what already exists, either transforming a system to give it a new function or combining several systems to produce a more complex one. This is exactly the message of Darwin's book on the fertilization of orchids.

After the group-selectionists and the neutralists, the present dissidents in evolutionary theory are the punctuationalists. According to the punctuated model, most morphological evolution is associated with speciation events, which are geologically instantaneous. It has been pointed out many times by the neo-Darwinists – in this book by Ayala – that geologically instantaneous events may in fact involve several thousands of generations. However, that is not the end of the dispute and it seems that for the punctuationalists some of the fundamental concepts of neo-Darwinism are at stake. This point is especially brought home from the writings of Stephen Gould and Richard Lewontin, who contributed a chapter each.

Ernst Mayr emphasizes that the Darwinian revolution has been the most fundamental of all intellectual revolutions in the history of mankind (Chapter 2). It is not surprising, therefore, that in most – if not all – controversies on evolutionary theory, metaphysical issues play a key role. Unfortunately, however, the metaphysics of evolution are poorly developed. One of the scientists who contributed much to it is Mayr. His ideas have been further developed by Michael Ghiselin and David Hull. The chapter in this book written by Hull is indeed one of the most interesting and profound, dealing with Darwin's methodology of science and Ghiselin's transformation of the species concept. In the opinion of this reviewer, a philosophical developing of Darwin's theory of natural selection will not only clarify many of the disputes on evolutionary theory but, also, may solve some of the problems. This holds true, for example, for the species concept of the punctuationalists and the neo-Darwinists.

Darwin's theory of evolution has witnessed three centennials: 1909 (100 years after Darwin's birth and 50 year after the *Origin*'s first edition), 1959 (100 years after the *Origin*) and 1982. In his opening remarks to the Cambridge conference, Sydney Brenner said that Darwin died at a most propitious time (quoted in *Science* 217:717). Indeed, after the group-selection dispute, the neutralists-selectionists controversy, the first wave of the punctualism debate, the recent findings of the molecular biologists and ethologists, the large progress in the Darwin-industry of the historians of biology, and the first attempts to establish the metaphysics of evolution, 1982 was a good year to summarize. The separate chapters are written by outstanding specialists for a broad public and form together an excellent overview of the present state of Darwin's theory.

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