Evolution updated

Evolution. By T. Dobzhansky, F. J. Ayala, G. L. Stebbins and J. W. Valentine. Pp. 572 (Freeman: San Francisco and Reading, 1977.) £11.60.

EACH co-author has written four chapters in this book, setting forth his own ideas, and reflecting his own involvement with biology and genetics. I have a feeling that this has inevitably, although inadvertently, resulted in some overlap, not necessarily of illustrative material, but in the broad outlines of the ground covered. As might be expected, the most lucid passages are by Dobzhansky, to whose memory the book is dedicated. A notable 'one-liner' by him, "Nothing in biology makes sense except in the light of evolution", is on a flyleaf following the title page.

The chapter titles are as follows: "The Nature of Evolution", "Patterns of Speciation", "Evolution of Prokaryotes and Unicellular Eukaryotes", and "The Future of Evolution" by Stebbins; "The Genetic Structure of Populations", "The Origin of Hereditary Variation", "Phylogenies and Macromolecules", and "Philosophical Issues" by Ayala; "Natural Selection", "Populations, Races, Sub-species", "Species and Their Origins", and "Evolution of Mankind" by Dobzhansky; "Transspecific Evolution", "The Geological Record", "Cosmic Evolution and the Origin of Life", and "The Evolutionary History of Metazoa" by Valentine. These widely ranging topics certainly provide ample basis for a sweeping treatment of evolution.

Molecular matters have apparently been assigned to Ayala, who is a population geneticist. He also describes his studies of polymorphism in *Drosophila* populations of various localities. Valentine is a geologist and palaeobiologist, and he has provided an excellent discussion of the fossil record of evolutionary rates, and the record of ancient life and environment, including a welcome section on plate tectonics. Stebbins and Dobzhansky are both well known as authors of books and treatises on evolution.

In commenting on the 'evolutionary clock', Ayala discusses (p309) the comparison of amino acid differences between α-haemoglobins of mammals and carp. He says that "the most recent ancestor to the four-legged mammals lived some 70 million years ago", and therefore he concludes that the comparison is useful for only 10% of the 700 million years of evolution of the α chain. But this contention overlooks the fact that α-haemoglobin sequences are also available for kangaroo, echidna, chicken, viper and newt, and these fall in the intervening years. Ayala (p309) notes that differences between α-haemoglobins of man and mice (17) are less than between rabbits and mice (28). (These differences are actually 16 and 27.) From this, he speculates that the rates of amino acid replacement may be increased by shorter generation time. The data he cites, however, are too scanty. If the β chains are compared, the man–mouse difference is 28 and the rabbit–mouse difference is 29.

The subject of evolution embraces both the past and future of human beings. It therefore presents an irresistable temptation to indulge in philosophical discourse. Three of the authors have availed themselves of this opportunity, and Ayala holds forth on "Philosophical Issues" for the final 42 pages, in which he provides us with such insights as "Common sense tells one that children resemble their parents and that good seeds produce good crops", and "No organism can be truly independent of the environment". I felt that Stebbins, and, more especially, Dobzhansky, had provided sufficient (and excellent) treatment of dissertational matters in chapters 14 and 15, so that the last chapter was not needed.

In a comparison of cytochrome sequences, the table on pages 296 and 297 shows only 20 identical positions shaded in grey, but 36 positions should have been so indicated. In addition, the sequence of residues 27–34 in *Neurospora* cytochrome is erroneous.

Figure 2-3, page 26, depicts the anticodors for UUU and GGU as AAA and ACC. These should be GAA and GCC. Figure 3-1 shows an erroneous codon for methionine, and represents purines by "Y", which is the symbol for pyrimidines.

All in all, the book is an excellent and up-to-date treatment of evolution, the subject that has spread like a network to encompass all the biological sciences. I could not help contrasting the wealth of material in this book with the fact that creationists are still largely successful in their efforts to minimise the teaching of evolution in schools in the USA. In June 1977, a member of the California State Board of Education was able to expunge or garble certain sentences descriptive of evolution in the forthcoming new edition of *Science Framework*, a booklet of guidelines for teaching science. For, as Dobzhansky says (p439): "The mutually sustaining effects of biologists, paleontologists and anthropologists have made the theory of the evolutionary descent (or rather, ascent) of man impregnable . . . And yet some antievolutionists persist. Some of them are simply ignorant of the evidence, while others have so prejudged the question that no evidence is meaningful to them".

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Botanical heritage

Dictionary of British and Irish Botanists and Horticulturists: Including Plant Collectors and Botanical Artists. By Ray Desmond. Pp. xxvi+747. (Taylor and Francis: London, 1977.) £40.

IF there is one area in which the British Isles has been highly productive, it is in the generation of botanists, yet few of their names have survived except possibly in the specific names of certain obscure plants. Names like Ray, Gerard, Turner and Culpeper may still be familiar to many, especially those caught up in the recent general enthusiasm for health foods, herbs, and so on. But many more names have now passed into oblivion as botanical exploration and taxonomy have progressed. This *Dictionary* has grown out of a desire to catalogue our British and Irish botanical heritage and to collate what information can be recovered concerning the achievements of our deceased, plant-hunting forefathers.

Each entry is set out in the form of details of date and place of birth and death, education, qualification and selected publications. Information concerning biographies, obituaries, herbaria and species graced with the botanist's name are also given in abbreviated form. Only dead botanists are included, but all spheres of the subject are covered, from nurserymen to palaeobotanists and physiologists.

The obvious question one must ask when faced with this hefty and expensive tome, concerns the use to which the book may be put. It is not a collection of historical anecdotes, and will not, therefore, serve as a book into which one may dip for entertainment. Its value is likely to be appreciated only by those undertaking serious historical studies into the development of botany in Britain. It is a book which will thus find its way into specialist libraries, but at this price it is hardly likely to attract the attention of individual botanists. It is essentially a work of reference which will lead the historically minded to obscure sources which would not otherwise be easily traced.

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