Molecular trees

Molecular Anthropology: Genes and Proteins in the Evolutionary Ascent of the Primates. Edited by M. Goodman, R. E. Tashian and J. H. Tashian. Pp. 466 (Plenum: New York and London, 1977.) $42.

THIS volume contains 20 chapters, most of which were presented at a symposium in Austria during July 1975. The chapters are grouped under five headings: "Background to Some Key Issues"; "Molecular Evolution as Interpreted by Mathematical Models"; "Primate Phylogeny and the Molecular Clock Controversy;" "Primate Evolution Inferred from Amino Acid Sequence Data"; and "Multigene Families and Genetic Regulation in the Evolution of Man". Forty-nine authors contributed to the compilation, which provides an excellent interplay between scientists in various fields, especially biochemistry, anthropology and genetics.

There is a chapter by E. L. Simons, a palaeontologist, on the fossil record of primate phylogeny, and one on splitting times among hominoids as deduced from the fossil record, by Alan Walker. These provide an interesting and necessary counterpoint for a host of molecular and biochemical phylogenetic trees that are constructed, by authors of other chapters, on the basis of differences between homologous proteins. Various monkeys and other vertebrates have kindly furnished the proteins, especially globins, whose amino acid sequences and immunological cross-relationships are used for the construction of these trees. There is also a short chapter on satellite DNA and ribosomal genes in primates. G. W. Lasker gives us his ideas on what "molecular anthropology" is, with the help of an imaginary dialogue.

The use of comparisons of protein sequences for measuring evolutionary divergence in primates, to which most of this book is devoted, depends on acceptance of the concept of the "molecular evolutionary clock". This concept states that amino acid substitutions in protein molecules take place at an approximately uniform rate during evolution. There is much debate as to how "uniform" this rate is for a given protein. The general consensus is that it runs at different rates at various times. Most molecular evolutionists use the "clock" to some extent because of its obvious relationship to phylogeny.

In chapter 2, Vogel, Kopun and Rathenberg discuss transitions and transversions in haemoglobin variants. They say that: "CT transitions in the DNA code corresponding to AG transitions in the mRNA code are more frequently observed than would be expected with random substitutions." So-called "CT transitions in the DNA code" are, however, actually base-pair substitutions in which there has been an interchange between an A.T pair and a G.C pair, The decision as to which DNA strand is transcribed depends on which strand contains the binding site for RNA polymerase; and this decision is unaffected by the amino acid composition of the protein that is subsequently synthesised. There is no way of deducing, from an amino acid substitution, which member of the corresponding DNA base-pair underwent the mutation, and which was changed when replication next took place. As the authors correctly note, their compilations are indeed biased, because haemoglobin variants are detected by electrophoresis, which does not measure changes that are not accompanied by an alteration in charge. In their Table 9, Vogel *et al.* have written alanine codons as the complementary DNA codons. To be consistent with polarity of DNA strands, they should have been written from right to left. Also, one of the codons is wrong.

In Chapter 11, by Matsuda, Table 4 shows the amino acid exchanges and minimum mutation distances in the opposite order from the caption to the table. Chapter 17, by Goodman, presents a lucid account of primate genealogy as deduced from globins and cytochrome *c*.

The book contains extensive compilations of amino acid substitutions in homologous proteins, especially globins, obtained from various primates. It also contains chapters on random and non-random processes in molecular evolution, maximum parsimony, carbonic anhydrase, antibody specificity and gene action.

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● *Science, Technology and Society: A Cross-Disciplinary Perspective* (reviewed in the 10 November issue of *Nature:* **270**, 126; 1977) is published for the ICSPS by Sage Publications: London and Beverly Hills, California.

● *Theory of Computer Science* (reviewed in the 3 November issue of *Nature:* **270**, 85; 1977) is published by Chapman and Hall: London and distributed in the USA by Halsted: New York.

Expertise in analytical chemistry

Analytical Chemistry: Essays in Memory of Anders Ringbom. Edited by E. Wannien. Pp. xiv+607. (Pergamon, Oxford and New York, 1977.) £27.50.

THIS volume consists of a judicious mixture of authoritative reviews, stimulating and often entertaining essays, and a sprinkling of original papers. The topics are spread across the face of modern analytical chemistry with particular stress on those areas with which the late Professor Anders Ringbom has been most actively associated.

The most homogeneous section is the first, containing some sixteen articles on or related to the stability constants and structures of complexes in solution. They succeed in presenting a very adequate and well-blended picture of the present state of the art, with a significant proportion devoted to the question of mixed complexes which have been so actively investigated in the last decade. In the various reviews, the many technical problems which can so readily disturb or mislead the newcomer to this rather exacting field of study are laid out clearly and amply documented. This section should thus be of particular value to the non-specialist who wishes to update himself, but will I am sure also be read with considerable interest by those with long experience and greater expertise.

The second section is composed of eight articles on various titration procedures and three on colorimetric indicators. This is followed by four articles on aspects of electrochemistry (polarography, electrometric titrations and ion-selective electrodes), five on separation techniques (metal chelates in gas-liquid chromatography, ion-exchangers and extraction), seven on trace analysis (for example, activation, anodic-stripping voltammetry, fluorescence and atomic absorption) and three on kinetic methods of analysis. Finally, there is a miscellaneous section with articles on sampling, the writing of a scientific paper, photoelectron spectroscopy, statistical analysis, capillary electrophoresis, and the history of analytical chemistry.

The 600 closely packed pages provide a curious and varied mine of information and expertise in analytical chemistry, and the list of authors (for example, Kolthoff, Bates, Reilley, Freiser, Margerum, Elving, Laitinen, Anderegg, Beck, Nasanen, Osterberg, Perrin, Pribil, Bjerrum, Irving, Tanaka, Pungor, Alimarin, Yatsimirskii, and Flaschka) contains many of the outstanding names in analytical chemistry. This book is a must for the appropriate libraries and should be placed in such a position that chemists, and analytical chemists in particular, are tempted to browse among its pages.

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