Supercontinental supposition

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Palaeomagnetism and the Continental Crust. By J.D.A. Piper. *Open University Press, Milton Keynes/Halsted Press, New York:1987. Pp.434. £35, $59.95.*

IT IS nearly 15 years since the appearance of the last major text on palaeomagnetism in which the available data were used to review past geometries and movements of the crust through geological time. There has been a great expansion of data in these years, and a book reviewing and updating the situation would generally be considered very timely. It was therefore with considerable interest that I read this new text of 374 pages plus 45 pages of references.

The first six chapters (150 pages) are an introduction to palaeomagnetism as a subject, and include discussion of the basic principles of rock and mineral magnetism, magnetic minerals, the theory of rock magnetism and a particularly good chapter on magnetization in rocks. The method of acquisition of magnetization by different rock types is presented in a way that should be helpful for those wishing to learn something of the background to an area that is generally not well understood by the non-specialist.

The following chapter on field and laboratory methods is less satisfactory. In particular, in the discussion of demagnetization techniques no attempt is made to relate theory and experiment in any substantive way; current procedures are complex, and the uninitiated will not get a feel for the intricacies of the analysis of demagnetization diagrams, a matter of great importance when results have to be interpreted. Things do not improve in a subsequent chapter when the identification and separation of magnetic components is considered in more detail.

In the following five chapters global palaeomagnetic data are analysed from Archaean to Cenozoic times, and the geological implications are discussed. Unfortunately (and in his introduction the author explicitly makes no apology for this) the synthesis is based entirely on the supposition that a single supercontinent existed throughout most of Precambrian time. All the analyses are based on this model and the resulting diagrams are extremely difficult to follow; for example, it is not easy to isolate in one's mind the data from any one continent as a set. There are also a large number of errors in the spelling of formation names, and altogether following these diagrams requires what I can only describe as intestinal fortitude.

Only a small minority of palaeomagnetists agree with the supercontinent model, and I personally do not believe the data support it in the way that Piper claims. The main criticism is that the analysis of Precambrian pole paths is still the same as that used a decade or more ago; in my view this is not now an appropriate method or approach to the subject. It would have been interesting if the author had produced some computer simulations of the effect on Precambrian pole paths of applying the various crustal models he puts forward in Chapter 6. It seems obvious that the analysis, if applied to Phanerozoic data, would have missed the opening of the Atlantic Ocean! Yet we are continually led to believe the data support the supercontinent model and in many instances the contention becomes hard to sustain.

Piper has clearly done an enormous amount of work in putting the text and analysis together. But he presents a personal view, one that is not at all widely accepted by his peers and one which demands critical assessment on the part of the reader. Unfortunately such an assessment will not be at all easy for the non-specialist in palaeomagnetism. □

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Out of sequence

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The Gene: Its Structure, Function and Evolution. By Lawrence S. Dillon. *Plenum: 1987. Pp. 896. $95 (North America); $114 (elsewhere).*

FOR obvious reasons, much of the exciting progress in modern biology has centred on 'the gene'. New insights into gene structure and function have been frequent and often surprising in the past decade. The potential for direct application of molecular genetics in biotechnology and its importance for the understanding of human disease, including cancer, has stimulated activity in the field and promises to provide patent lawyers with a steady source of income.

In this major new treatise, Lawrence Dillon has aimed to help our understanding "by thoroughly analyzing the genes and their surrounding sequences from a broad spectrum of organisms". His approach boils down to comparative analysis of nucleotide sequence data, by which he believes that "it is *inevitable* that new general characteristics and interrelationships among genes . . . should be disclosed" (my italics).

Well, there's nothing wrong with being optimistic at the outset of a long and arduous journey; but the traveller had better be prepared for difficulties on the way and disappointment on arrival. Here many of the difficulties are unfortunately imposed by the author himself. Some authors are easy to read because they write well. William Hayes's early classic *The Genetics of Bacteria and Their Viruses* and Mark Ptashne's recent monograph *A Genetic Switch: Gene Control and Phage* λ provide contrasting examples of authoritative scientific books that were a pleasure to read.

Dillon manages the opposite effect, using and abusing words so profligately as to obscure the meaning of the text. He introduces new uses for long-accepted terms: thus nucleotide pairs in the genetic sequence become "sites", while conventional sites, such as operator sequences or other *cis*-specific elements, are frequently referred to as genes. Structural genes, their transcripts and their encoded proteins are frequently transposed by careless and confusing use of the language.

All the known types of genes are chronicled and catalogued, with many of their sequences presented in lengthy tables. Dillon has an obsession with molecular phylogeny, going to extremes to try to fit gene sequences into some arcane classification. The subdivisions are often based more on the protein product than the gene itself, and brash new terms are coined in attempts to give them substance. We are introduced to "diplomorphic" and "cryptomorphic" genes, differentiated by the ways in which the gene products are post-translationally processed. The repetitive *Alu* elements, elevated to the status of genes, are subdivided into "monalus", "diplalus", "triplalus" and "analus" based on the number of discernible sequence-repetitions.

Dillon is not averse to admonishing the molecular biologist, often wrongly, for missing some seemingly important feature of sequence information. Unfortunately the coverage of the literature does not extend beyond 1985, so that many of the questions he poses have now been answered or supplanted. And although many of the sequences considered are involved in controlling gene expression, Dillon has chosen to give the topic of regulation only the most cursory treatment.

Nature's entreaty to reviewers that "Although book reviews should be informative, they should not be dull" would be equally sound advice to authors of scientific texts. □

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