

Biostratigraphy

The World of Martin F. Glaessner. B. P. Radhakrishna, ed. Geological Society of India, P. B. No 1922, Gavipuram, Bangalore 560 019, India. 1991. Rs 450.

**The World of
Martin F. Glaessner**



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The Geological Society of India has, by bringing out this publication, honoured (late) Prof. M. F. Glaessner, who was a beacon of light for Indian and South-East Asian stratigraphy and micropalaeontology.

The biographical sketches, anecdotes, career highlights and contributions of Prof. Glaessner are vividly brought out by Brian McGowran, N. H. Ludbrook, Tina Glaessner (wife), Preston Cloud, R. C. Sprigg and B. P. Radhakrishna.

Glaessner's articles on new trends, status of micropalaeontology and petroleum exploration are aptly reproduced in order to recapitulate his views.

Brian McGowran's authoritative article 'Evolution and environment in the Early Palaeogene times', should be of interest to Indian stratigraphers in particular. He sees a three-part crustal tectonic succession with natural turning points at the Palaeocene/Eocene boundary and at Late Middle Eocene. He cites geochronological correlation between tectonic succession, stratigraphic

pattern and a three-part biostratigraphic succession. The fossil record of early Palaeogene shows a link between global warming (greenhouse effect), increased evolutionary changes and biosphere fragility. The paper is profusely illustrated by graphs, charts, etc. showing global climatic changes vs terrestrial plants; sedimentary facies in Indian Ocean; crustal changes in early Palaeogene; palaeolatitude and foraminifera; Palaeogene bio-events and biospheric impacts; and many more aspects in the form of charts, graphs, etc.

An original research paper on late Neogene planktonic foraminiferal datum, from five DSDP sites from the southwest Pacific, by M. S. Srinivasan and D. K. Sinha, adds value to the book. The authors opine that planktonic foraminiferal datums are time transgressive and not always useful for precise correlation. Two categories of datums—first and second order datums—are proposed. The first order is reliable for cross latitudinal correlation, while the second order is not fit for wide latitudinal correlation. The paper deals with a number of foraminifera (some illustrated) and contains a large number of zonation, correlation and allied charts.

A paper on giant oil accumulations in deltas of the world by V. R. Rao gives an overview of some published geoscientific information on the subject. The reader is left to project the ideas on Indian scenario.

B. J. Cooper has given an account on Permo-Carboniferous spore-pollen stratigraphy and zonation in Australia, which is useful for comparing East Coast of India with Australia.

A new species of Late Cambrian trilobite from SW Australia is described by J. G. Jago.

The reprinting of an earlier paper (1982) by Preston Cloud and M. F. Glaessner on the Ediacaran Period, is indeed a thoughtful and welcome addition to the book.

M. Shukla, M. Sharma, R. Bansal and B. S. Venkatachala have brought out significant finds of pre-Ediacaran fossils from India.

A case is made out by J. G. Gehling to restudy the Ediacara fossils, reported so far, by specialists in palaeobiology and taphonomy and that such a review will throw light on the Precambrian boundary. Did the Ediacaran organisms

become extinct before the Cambrian? Were they benthic? Were there strong phylogenetic links between Ediacaran and Cambrian organisms? The paper is well illustrated.

An interesting and well-illustrated paper on Gondwana landscapes, definition, dating and implications, by C. R. Tinidale, is a fitting finale to the book. He traces back Glaessner's concepts on Gondwanaland and its break-up. He reconstructed the landscapes and topography of some areas of Gondwanaland before its break-up.

The 287 page book, superbly edited by B. P. Radhakrishna, deserves a prominent place in the bookshelves of all geoscientific libraries and of serious-minded geoscientists.

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Chromosomes

Chromosomes (3rd edn), Archana Sharma, Oxford and IBH Publishing Company Pvt Ltd., 66 Janpath, New Delhi 110 001. 1991. 416 pp. Rs 135.

An earlier edition of this book caused concern for its poor quality and inaccuracies. It was expected that the third edition would be better and useful. Unfortunately, the present edition, although it has more pages, has more factual and conceptual errors. It is full of inaccuracies and erroneous statements. To illustrate the point, I cite a few random examples.

1. Fig. I:1.1 would make us believe that genes/viruses are about 100 Å in dimension and that these can be resolved with a light microscope.

2. Discussion about polynemy vs uniploidy of mitotic chromosomes on p. 42 leaves the reader totally confused about the various historical concepts and the presently accepted model; e.g. the last sentence of para 5 on p. 42: 'The metaphase chromosome is seen to be multifibrillar with a structural unit of 125 Å thick filament, paired successively with units of equal thickness to

make up a whole chromosome (fig. II.1.1)', and this is followed by 'chromosome < chromatid < subchromatid < hemisubchromatid etc'. The reader is never told that this concept was proposed once upon a time. It is all the more confusing since fig. II. 1.1 apparently shows the modern concept of chromatid structure taking into account the nucleosome, solenoid, loops and so on. Fig. II. 1.1, to which a reference is made, makes us believe that there are 160 bp per nucleosomal core, while, on p. 65, at one place the number of base pairs per core is stated to be 140 and at another place on the same page $146 \pm 2!$ Fig. II. 1.1 also suggests that there are 50 (solenoid) turns per bp. This diagram is stated to be illustrating 'Structural organization of mammalian gene showing levels of DNA packing'. One hopes that difference between 'gene' and 'chromosome' is not to be obliterated!

3. Heterochromatin has remained an enigma. This book makes it more complicated. Consider the following sentences: 'What transpires at the gene or molecular level, when the heterochromatin becomes visible under the microscope, is mainly unknown' (p. 56), 'During the last part of the S-phase, however, heterochromatic satellite DNA, rich in A-T, appears and occupies the regions around the centromeres and short arms of chromosomes' (p. 57). I did not know that heterochromatin or satellite DNA makes its appearance only during late S-phase!

4. A statement on p. 62 (para 2) reads 'In *Drosophila* it has been estimated that in four chromosomes more than 200 replicons are present'. A minimal estimate based on published papers would be many times more than this.

5. Para 3 on p. 98 would make us believe that the 'very long' genomes of higher organisms often contain more than '1010' base pairs, which in unravelled state 'may reach 3 meters' and which 'must be compacted into a nucleus about 10-5 m in diameter'. Who is to be blamed for such gross errors, the printer or the author?

6. Consider this sentence on p. 224

(para 6): 'DNA is the primer for both DNA and RNA polymerases. For production of DNA polymerase, the two strands of the double helix separate to replicate, while for the production of RNA polymerase, they may remain as duplex.' Students learn from their school days that during DNA replication in cells, the DNA polymerase requires an RNA primer. I believe so far no one has shown DNA to be required as primer. However, the more serious problem in this statement is regarding the processes of replication and transcription: neither did we know that these two processes 'produce' DNA polymerase and RNA polymerase respectively nor that RNA polymerase is 'produced' by 'duplex' DNA!

7. Definition of *roentgen* on p. 270 would leave one wondering about '1 ml of matter' and '1 million million ionisations'. (Incidentally, one *roentgen* is known to produce 2.1×10^9 ion pairs per cubic centimetre of air at N.T.P.)

8. The final chapter (chapter VI) of the book is intended to be a summary of present ideas of chromosomes and the reader is advised to refer to individual chapters for details of specific topics. However, this summary presents many topics for the first time in the book and includes figures which supposedly illustrate these topics. But as in the case of most other figures throughout the book, these figures are also not explained. The reader is left to keep on guessing (one would have wished these figures to be so self-explanatory that no description was required). The various topics in this chapter follow an arbitrary and incoherent order. To cite an example, a section dealing with 'Additional genetic elements in chromosomes' (p. 371) makes one wonder what is additional and what is original. This section differentiates between 'A. Repeated DNA' and 'B. Dynamic DNA'; the dynamic DNA again includes, among many others, repetitive DNA; moreover, categories like 'selfish DNA', 'parasitic DNA', etc. are also separately discussed. The reader would be misled to think that these are distinct categories of DNA classes. Further contradiction is provided by listing

'Unique genotypic DNA' ('DNA coding principally for structural proteins', p. 376) under dynamic DNA and later on p. 379 by the statement 'Dynamic DNA itself does not code for structural proteins, but the vital genes in which it is involved, are subject to stresses of physiological conditions'. One wonders what the reader would understand from all these confused and mixed-up statements. The section 'Additional genetic elements in chromosomes' (beginning on p. 371) includes, besides the myriad 'classes' of DNA, two subsections, 'Conclusion' (p. 381) followed by 'Future of DNA structure' (p. 383) before the next section ('Some aspects and prospects') begins. I do not find any relevance of these two subsections to what has been described as the different classes of DNA. This typifies the incoherence consistently present throughout the text.

9. Most of the figures in this book are never explained, neither in the text nor in legends to figures.

One can go on listing such (or even more glaring) mistakes/distortion of facts and confused statements. It is no exaggeration to state that one can open any page of the book and find such examples. It is very unfortunate that 'this book has grown out of a course of lectures given to postgraduate students in genetics' (first sentence of the preface to the first edition).

There are very few books written exclusively on chromosomes. Whatever standard books are available to undergraduate and postgraduate students in India are too expensive for many of them (or even their college/university libraries) to afford. Given this situation, students would be tempted to refer to this book. This would have serious and unfortunate consequences since this apparently 'authentic' source (written by a person of long experience with chromosomes) would only misinform gullible students.

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