

Seliktar. The most general configuration contains an adventia-like layer of collagen and fibroblast, a media-like layer of smooth muscle cells followed by monolayer of endothelial cells and Dacron. The requirements of long-term potency and immune response are the prime parameters for their acceptance. Tissue engineering and cellular therapies based on stem cells are important for future developments in medicine. The review by Zandstra and Nagy outlines the biological properties of stem-cell population and highlights the challenges in the development of stem-cell technologies for therapeutic cloning and gene therapies.

The technological development reviews include the image-guided procedures (IGP), high-intensity focused ultrasound (HIFU) and functional vision restoration system (FVRS). The IGP is used to increase the information available to physicians for surgery and other forms of directed therapy. Its fundamentals are well reviewed by Galloway and specific applications to intracranial resection/ablation, function neurosurgery and stimulator placement, orthopaedics, etc. with promising results are discussed. Vaezy *et al.* have reviewed the therapeutic aspects of HIFU of intensity 1000–10,000 W/cm<sup>2</sup> and changes in tissues which are primarily attributed to its thermal and mechanical effects. For determining the target location and changes induced by HIFU, imaging techniques are used. Acoustic therapy with low-intensity ultrasound is further applied in physical therapy, tumour treatment and biomedical applications. The review by Maynard on FVRS points out that the electrical stimulation of the visual pathways can be used to produce visual sensation in blind individuals. Other issues such as biocompatibility of implant, and emotional and economic reasons of recipients are discussed.

Jafri *et al.* have reviewed the regulation of energy metabolism through ATP synthesis. Details of the micromechanisms involved in this process are well explained through the development of mathematical and computational analysis of various sub-cellular processes. Another molecule, nitrogen monoxide or nitric oxide (NO), chosen in December 1992 as 'molecule of the year' by *Science*, is a rapidly diffusing, free-radical gas with one unpaired electron exhibiting a surprisingly diverse range of biological

activity, including potentially harmful effects. The review by Buerk highlights numerous biochemical reactions or sinks for NO biotransport in the lungs and brain under normal physiological conditions. On the other hand, its excessive production contributes to numerous cardiovascular and neurological diseases.

The human genome and genetic sequencing projects have contributed in the development of sequencing technology. Marziali and Akeson have reviewed various developments in sequencing DNA. The techniques are based on electrophoretic and non-electrophoretic methods. Whitesides *et al.* reviewed soft lithography techniques applied in biology and biochemistry. These are based on printing and moulding using elastomeric stamps with the patterns of microstructure for biological research. The change of surface properties such as hydrophilic or hydrophobic contribute into transferring the pattern of molecular species. These reviews further stress upon the need of molecular biology to explain the micro- and nanomechanics associated with biological processes.

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**Geology of Bihar and Jharkhand.** T. M. Mahadevan. Geological Society of India, P.B. 1922, Gavipuram P.O., Bangalore 560 019. 2002. 563 pp. Price: Rs 500/US\$ 50.

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This is the latest publication in the textbook series on Geology and Mineral Resources of different states of India, being published by the Geological Society of India. The present volume deals with the Geology of Bihar and Jharkhand. The author, T. M. Mahadevan, brings his scholarship and rich experience with the Geological Survey of India and Atomic Minerals Division into the book. The state of Jharkhand was 'carved' out of Bihar while the book was in the printing stage. The author has shown the state of Jharkhand in a map (Figure 1.3), but it was not possible to

incorporate geographical changes in the text. This will cause some difficulty to the reader unfamiliar with the local geography.

The author discusses the geology of Bihar and Jharkhand in 22 chapters running to 558 pages. Singhbhum region of Jharkhand is one of the best-studied Precambrian terrains of India. The author rightly devotes a chapter to the seminal contribution by the earlier workers. Chapter 3 deals with the geological history of Bihar and Jharkhand in 24 pages. This is really a summary of what follows in the book. Readers unfamiliar with the geology of the region will find it out of place. Chapter 4 deals with geomorphology of the states in relation to the geological set-up. It takes up 70 pages which I consider a wee bit lengthy, but is a welcome synthesis. Some of the figures in this chapter (Figures 4.4, 4.8, 4.11) suffer from lack of clarity.

Intensive structural, stratigraphic, petrologic and geochemical studies during the last century have generated comprehensive data on the region, particularly on the Singhbhum area. The author has justifiably devoted 12 chapters covering 251 pages on these aspects. There are classical treatises on the regional geology by earlier workers and critical appraisal of the observations and opinions of recent researchers. The *Crustal Evolution of Singhbhum – North Orissa, Eastern India* by A. K. Saha was published by the Geological Society of India as a Memoir (No. 27) incorporating published data up to 1992, while the volume under review includes publication up to 2000. Mahadevan's overall comprehension of the region as a greenstone–granite terrain exposing several generations of volcano-sedimentary sequences and intrusive granitoids, cutting across the temporal boundary of the Archaean and Proterozoic, is in tune with the present-day understanding. The views on multiple BIF sequences, and the crustal evolutionary models suggested by different researchers have been critically discussed. However, inclusion of recent data on the petrochemistry of the volcano-plutonic assemblages, sedimentological aspects and gravity-magnetic models published in the extended abstracts of Geological Survey of India in the areas around Pala–Lahara, Gorumahisani–Badampahar, Champua, etc., would have enriched the volume further. Mahadevan is, of course, con-

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strained by the geographical limits of the states, although he draws geological comparison from outside the states whenever necessary.

Chapter 17 provides a comprehensive account of the Gondwana Supergroup, including the results of recent subsurface exploration and surface studies. One can get a synthesized view of the Gondwana stratigraphy, structure and tectonics, palaeontology and basin morphology, without referring to the encyclopaedic volumes on the subject published by the Geological Survey of India. Inclusion of a few geological maps of some of the major basins of the states, I believe, would have been helpful. Reconstruction of Gondwana drainage and climate has been dealt with, but coal swamps have not received similar emphasis. Chapter 21 on hot springs and seismicity adds a new dimension to the book, as does chapter 22 on soils. When the role of earth sciences to societal development is underplayed, these short chapters will highlight the relevance of earth sciences in agriculture and natural-disaster mitigation.

The book is an admirable compilation of geological information, with critical observations flowing from the personal

experience of the author. The breadth of the book does not dilute the contents, as the pages are packed with information. Mahadevan has taken an approach of guiding the reader to see what work has been done in a given area, and to make his own judgement. There are, however, instances where the matter of local relevance has been highlighted out of proportion.

The text is remarkably free of errors. The spell-check evidently weeded out most of the common typos. Names of many localities and authors, however, are misspelt. I spotted a few minor errors in the references. There is little cross-reference in the book. The five-page subject index at the end of the book will be more helpful if the main entries are highlighted in suitable fonts, grouping together sub-entries under appropriate head. Sub-sections should be given on the contents page. Many acronyms have been used throughout the text. I find these distracting. A glossary of the acronyms will help the reader unfamiliar with the local names.

One of the stated objectives of the book was to impart a taste of 'modern flavour' for research to the reader. The discerning reader will realize, at consid-

erable pains, the lack of modern facilities to the earth sciences academic community in the country.

The style of the book is not quite like that of a textbook. Detailed information has been included, for example, on the Rajmahal basalt groups and the structural styles of some areas. Some of the figures (Figures 5.2, 9.03, 9.4, 13.9(a)) and some of the photographs depicting field relations could have been reproduced better. Used in conjunction with the earlier treatises on the geology of the region, the book will be useful to the postgraduate students and researchers alike. All earth sciences departments in the country must have the book in their departmental library. Earth sciences departments abroad with interest in Precambrian Geology, will also find the book useful. The price at Rs 500 is reasonable.

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