BOOK REVIEWS

UPPER GONDWANA STRATIGRAPHY AND PALAEOBOTANY OF RAJMAHAL HILLS, BIHAR, INDIA by Samir Sengupta. Palaeontologia Indica, new series, volume 48, 182 pages, 24 plates, published by Geological Survey of India, Calcutta. Rs. 135, $48.60, 1988.

The Gondwana sedimentary sequence holds a very important position in the geology of India. The term 'Gondwana' coined in the 1850s has since been used to designate not only the great deposit of fresh-water sediments, but also a flora, and a super-continent. Palaeofloristically, the sequence is divided into two, or sometimes into three, divisions. The upper division—Upper Gondwana—has a unique flora, the Ptilophyllum Flora which is best developed in the Rajmahal Basin. In this monograph, Samir Sengupta has given a detailed and reasonably well-illustrated treatment of the palaeobotany, and litho- and bio-stratigraphy of the upper Mesozoic strata in the Rajmahal Basin.

For this work, Sengupta has mapped the area and measured 50 stratigraphic sections, of which 36 have been described in detail. The upper Mezozoic sedimentaries are classified by the author in two formations, namely, the Dubrajpur and Rajmahal Formations. The contact between the two formations is an igneous contact, and has been observed only in the western sector of the basin. The author has proposed a new 'Type Section' for the Dubrajpur Formation as he failed to locate the originally designated Type Section, i.e., Narganj-Sudra Section. This section, the Sarwar Pahar Section, thus is a Neostratotype for the Dubrajpur Formation. In the absence of assignment of a Type Section for the Rajmahal Formation, the author has assigned 'Type' and 'Reference' sections. Thus, the Daminkol-Palampara, and the Sitalpur and Durio sections can be considered as Lectostratotype and Hypostratotypes respectively, of the Rajmahal Formation.

Sengupta opines that the Dubrajpur Formation unconformably overlies the Barakar Formation, and that the boundary between the two can be marked in the Khatangi Hill Section on the basis of plant fossils. He, however, fails to take into account 44.2 m of barren strata between the plant beds of the two formations. Our observations on the section show that there is no lithological difference between the lower and upper plant beds. No plant fossils have been reported from the Neostratotype, and all the outcrops of the Dubrajpur Formation are devoid of carbonaceous matter.

For palaeobotanical work Sengupta collected about 1,000 specimens containing fossils. He has recorded 35 species, of which 3 are new. Evidently, he has not recorded even 50 per cent of the species already known from the area. The fossils come either from the upper part of the Dubrajpur Formation (5 long ranging species) or the lower 3 or 4 intertrappean beds of the Rajmahal Formation. How he has recognized the succession of the intertrappean beds is not clear as these beds cannot be traced laterally and their floral contents vary. It is, therefore, difficult to correlate and stratigraphically sequencify the intertrappean beds.

Though the fossil taxa have been described in detail and illustrations given, yet, his treatment of the Systematic Taxonomy leaves much to be desired. An unusually long list of 'Synonyms' is given for many of the taxa. Even those

records are considered as synonyms for which no illustration or description is available, and the original material has also not been re-examined. On the other hand, some definite synonyms have not been cited, e.g., *Todites indica* has not been included as a synonym of *Cladophlebis indica*. Sometimes the measurements do not tally. Enough attention has not been paid to typication of the fossil taxa. For example, though the Lectotype of *Equisetum rajmahalense* (GSI Specimen no. 4487a) is not traceable, yet, a new Lectotype or a Neotype has not been assigned. For almost all the taxa the author says 'Type horizon – not designated', but at the same time a Type Locality is mentioned. We know that at almost all the localities in the Rajmahal Hills only one fossiliferous horizon is met with. Even otherwise, under provisions of the International Code of Botanical Nomenclature (ICBN), to establish a valid species designation of only a Type Specimen is required; mention of a Type Horizon/Stratotype, or a Type Locality/Locustypicus is not obligatory. Further, the Type Horizon obviously refers to the layer from which the nomenclatural type (Holo–, Lecto–, Neo–, etc.) was collected. Then, when the author himself designates a type (Neotype GSI No. 20150/5/Ia/81 for *Taeniopteris crenata* McClelland 1850), how can he say 'Type horizon: Not designated'?

The use of the terms 'Type' and 'Type Locality' in GSI publications seemingly does not have the same meaning as in most other publications. For GSI 'Type' means any studied/illustrated specimen whereas under the ICBN, a Type is designated to fulfil conditions for valid and legitimate nomenclature. The practice to use unpublished reports for typication is also not permissible. For example, Sengupta not only credits Feistmantel, 1877 for correct rank of *Pecopteris lobata* Oldham, 1862 but also mentions a type specimen (GSI No. Specimen 4451), a practice not in vogue in the nineteenth century, as well as a Neotype (GSI Specimen No. 4457) designated in an unpublished report of the Geological Survey of India. Correct procedure would have been to recognize GSI Specimen No. 4451 as the Lectotype of the species. At places the author has made contradictory statements. He does not accept the assignment of GSI Specimen No. 4367 as the Lectotype of *Taeniopteris spatulata* McClelland 1850 as 'In the repository unit of the Geological Survey of India, Calcutta, there is no record about the McClelland's *(sic)* original collection of plant fossils . . .', but later he says 'It may be pointed out that Specimen No. 4366, which is the type material of *Taeniopteris spatulata* McClelland (*see* GSI Type Fossil Register) . . .'

Sengupta's contention that a fossil taxon cannot be included under a taxon of extant plants simply because the type material and his own are sterile, even though fertile stages have been reported by other workers, is not tenable, e.g., *Gleichenia gleichenoides*. The correct name for this taxon, under the ICBN, rather should be *Gleichenia bindrabunnensis* Schimper 1870. Much note has not been taken of data from areas other than the Rajmahal Hills, or possibly relevent literature was not available to him. Otherwise he would not have inconclusively discussed the taxonomic position of the genus *Thinnfeldia* vis-a-vis *Pachypteris*. Many author citations are wrong, e.g., *Pterophyllum medlicottianum* (Oldham and Morris) Feistmantel, 1877 should not bear Feistmantel's authorship.

On the basis of contained plant megafossils, 3 Assemblage Zones are recognized. There does not seem much justification for the lower biozone, i.e., Ptilophyllum acutifolium—Gleichenites gleichenoids Assemblage Zone dated as Lower Jurassic in age. The zone is bassed on just 5 long ranging species. The Late Triassic palynological age assigned to supposed Dubrajpur beds in the sub-surface

of the northeastern part of the basin, and the absence of plant megafossils in the lower part of the formation seem to have influenced this decision. The next two biozones are dated as Middle-Upper Jurassic, and Lower Cretaceous, more on the basis of apparent superposition than on the basis of fossil plants. Some of the conclusions seem to be based more on conjectures and circular reasoning rather than on facts. Thus, 'The Dubrajpur Formation contains upper Gondwana *Ptilophyllum* floral assemblage of early Jurassic age . . . . ', and then ' The *Ptilophyllum* flora *first* (emphasis mine) appears in the third intertrappean bed ' of the Rajmahal Formation. There is selective acceptance of radiometric dates, those which do not fit in with the assumed plan are either ignored or nullified.

Sengupta's monograph contains a wealth of data that could have been better organized and made more useful through Peer Review and some serious editing. The work is significant both for palaeobiology and biostratigraphy, if not for age determination, of the upper Mesozoic sedimentaries of the Rajmahal Basin.

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PERSPECTIVES ON DAKSHINA KANNADA AND KODAGU. Editorial Committee, Mangalore University, Mangalagangotri-574 199, Karnataka, India. Published by the Registrar. 349 pp. Rs. 250. $ 20.

This is a neatly got up volume of articles on diverse but interesting topics collected by an Editorial Committee, all members of the teaching staff of the Mangalore University, to commemorate the completion of ten years of existence of the University. In these days it is common to *see* such volumes containing numerous advertisements and colour portraits from that of Vice-Chancellor to that of Captains of various sports in the University. But this volume is a very laudable departure in that the articles, very well written, cover many facets of this area—Dakshina Kannada and Kodagu, along the west coast of India, wherein lie all the educational institutions affliated to this University.

There are articles on Literature and Folk Arts (4), History and Society (6), Agriculture and Trade (4), and Science and Environment (8). It is interesting to note that such a relatively small area of Karnataka contains considerable population belonging to different faiths (Hindus, Muslims, Christians, Jains), all living amicably and contributing richly to the cultural life of the area. Of course due to increase in population, migration, backwardness in certain respects and exploitation, certain problems have cropped up. The natural resources of this area is adequately covered, bringing to light some of the potential hazards lurking due to misuse of the environment.

Most of the articles contain a good number of references for further study. Whereas there is a small scale map (p. 240) of this area, it would have been helpful to have included one on a larger scale giving more locations of interest from many points of view (historical, cultural and commercial). The University is to be congratulated and this book should be of interest to all those who would like to know more about the small area tucked in between the Arabian Sea and the Western Ghats in the Karnataka State.

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