

**Paleontographica Indica, Number 1: Studies in Mesozoic Foraminifera and Chronostratigraphy of Western Kutch, Gujarat.** Jagdish Pandey and Alok Dave. K. D. Malaviya Institute of Petroleum Exploration, Oil & Natural Gas Commission, Dehra Dun 248 195. 1993. 221 pp.

Over the past three decades, zonation of marine sequences by means of calcareous plankton has resulted in a relatively precise biostratigraphic framework. Similar approaches employing benthic foraminifera have been greatly hampered by unsatisfactory taxonomy, low abundances, high species diversity, relatively long stratigraphic ranges and changing depth distribution patterns through time.

In recent years, there have been a large number of systematic studies of benthic foraminifera mainly on material recovered by the Deep Sea Drilling Project (DSDP) and Ocean Drilling Programme (ODP) which enabled us to gain a better understanding of their taxonomy, biostratigraphy and paleobathymetric distributions.

Detailed biostratigraphic investigations using foraminifera in different sedimentary basins of India have been carried out by the paleontologists of the Oil and Natural Gas Commission. All these years the need was felt to document detailed systematics and stratigraphic ranges of the fauna basin-wise in order to establish stable taxonomy and biostratigraphy. This volume under the title *Paleontographica Indica Number 1*, documenting Mesozoic foraminifera of Western Kutch is a welcome and most timely contribution in this direction. The book is in two parts. The first part contains evolution of stratigraphic concepts, sections documented, zonation, chronostratigraphy and systematics, while the second part dwells on the Jurassic/Cretaceous boundary.

Kutch has been a centre of attraction for paleontologists and stratigraphers since the classical work of Wynne and Fedden (1872-74). Since then the sedimentary sequences of Kutch were extensively studied by the geologists of the ONGC, Geological Survey of India and Universities. As a result, a number of litho-biostratigraphic classifications were proposed. The litho-stratigraphic classification of the Mesozoic of Kutch proposed by Biswas

(1971, 1977) following the code, has provided satisfactory answer as far as the rock stratigraphy is concerned. But unfortunately, barring a few workers (Jaikrishna and Pathak, 1991) none of the authors so far have provided a formal description of the proposed biostratigraphic zones and their mappability in terms specified by ISSC (1976) or NASCN (1983). This renders a number of biostratigraphic classifications informal and unsatisfactory. With the publication of the present volume, Pandey and Dave have gone a long way in satisfying the need.

In the introductory chapter the authors have highlighted the inadequacies in stratigraphic nomenclature and terminology currently used in Kutch and emphasized the need for establishing stratotypes/reference sections for the biozones as per the guidelines of ISSC (1976).

The study attempts to systematically establish several stratigraphic sections in different parts of western Kutch and then draw a correlation among these surface and subsurface sections. The effort is especially to visualize the validity of pre-existing Patcham, Chari, Katrol and Umia units *vis-à-vis* the newly attempted stratigraphic correlation. The finding that the Patcham 'Series' S. S. of the conventional usage is no younger than Bajocian and its earlier placing in upper Bathonian or Callovian is erroneous, is very significant.

Of equal relevance is the discovery of a Callovian/Oxfordian unconformity in the Jumara Dome, which though hinted in the study of Rajnath (1932), was never physically verified. This again warrants a major separation of Chari and Dhosa Oolites in the rank of stage homotaxial with Callovian and Oxfordian.

Two new chronostratigraphic units, Bannian Stage and Badian Stage corresponding to Aalenian and Bathonian Stage respectively are described with their boundary stratotypes and mappability. It is for the first time the stratotypes have been designated and described in detail for the Mesozoic chronostratigraphic units of Kutch.

Although foraminifera from the Kutch Mesozoic have been recorded and described by Subbotina *et al.* (1960) and later by many workers, a comprehensive foraminiferal zonation has not emerged in Kutch so far correspond-

ing to the global ammonite zones. The present study is a step towards achieving this goal and to fulfil this long-standing deficiency. The attempt of the authors to correlate benthic foraminiferal and ammonite zones with Kutch Mesozoic stages and Magnetostratigraphy to provide an integrated bio-magnetostratigraphy is interesting and useful.

An atlas for identification of Mesozoic foraminifera has been desired for some time. With this publication, the authors have fulfilled the need. The book contains 31 plates of scanning electron micrographs and taxonomic descriptions of 85 foraminiferal taxa, including 13 new species. The Epistominids, the most important group of Jurassic benthic foraminifera, have been dealt in detail which provide better understanding of phylogenetic relationship within various taxa of this group. Perhaps, this is the first reference work to furnish a detailed systematic account of the Indian Mesozoic foraminifera and chronostratigraphy.

Part II of the book deals with the upper Jurassic and lower Cretaceous stratigraphy with special reference to the delineation of the Jurassic/Cretaceous boundary in Kutch.

The work is unique in that it integrates both surface and subsurface data to provide a comprehensive scenario of the Kutch basin. The get up of the book is quite impressive but the binding is poor. A subject index would enhance this edition. The apparent lapse is the absence of caption to tables.

Stratigraphers and micropaleontologists in industry, academic and National Laboratories, as well as students, will find the book very useful. KDMIPE should be congratulated on bringing out such a useful publication.

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**Biotechnological Applications for Food Security in Developing Countries.** H. C. Srivastava. Oxford & IBH Publishing Co. Pvt. Ltd., 66 Janpath, New Delhi 110 001. 1993. Rs. 585. pp. 616.

Biotechnology has been broadly defined as 'any technique that uses living