

Fourteen papers are on general and applied coal petrology, one on palynostratigraphy, and one on photogeological studies as guides for exploration in concealed North Rajmahal coalfield. The presentation of laboratory data pertains to the Indian coals in overall assessment, and the coalfields of Jhilla, Raniganj, Sohagpur, Singrauli, Makum and Mehsana, in particular. Petrographic characterisation of Australian and Indian coals (Permian) is significantly presented. A paper on the role of petrological studies in bringing out the governing temperatures of lamprophyric intrusives in Jharia coalfield highlights the effect on coal seams by intrusives. Five papers deal with current trends in coal utilisation which include underground coal gasification, coal preparation, hydrogenation and on synthetic oil from coal. Thus, the volume encompasses a wide spectrum of field and laboratory studies on coals of India.

The volume is dedicated to the memory of Late Prof. Rajnath. The printed volume contains 637 pages. The volume has been brought out within a record time of eight months from the date of conclusion of the Seminar, and the Editor deserves full credit for bringing out this useful publication. This book will be a valuable addition to Libraries in India, and abroad.

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MINERAL DEPOSIT MODELS. Dennis, P. Cox and Donald A. Singer (Eds.)
U. S. Geological Survey Bulletin 1693 (1986), 379 pages.

'Economic Geology has evolved quietly from an 'occult art' to a respectable science as the speculative models have been put to definitive tests'. The U. S. Geological Survey attempted through this volume creation of a data bank *inter alia* synthesis of the data thus created of the mineral deposit models on a conceptual basis mainly to describe the characteristics of groups of similar deposits. The classification of similar deposits has been attempted with a two-fold objective: i) It must be open so that new types of deposits can be added in the future, and (ii) the user must be able to find easily the appropriate models to apply to the rock and tectonic environments being investigated.

The deposit models are classified into a Tree diagram and described accordingly. The geologic-tectonic environment has broadly been grouped under igneous, sedimentary, regional metamorphic and surficial types. The igneous domain has been dealt with under intrusive and extrusive categories. A further subdivision has been made into mafic-ultramafic (stable and unstable areas), alkaline and basic, and felsic (phanero-crystalline and porphyroaphanitic) under the intrusive category, and the mafic and felsic-mafic types under the extrusive category. Likewise, deposit models of sedimentary environment are described under clastic rocks, carbonate rocks and chemical sediments. The regional metamorphic environment models are subdivided into metavolcanic and metasedimentary, and metapelite and metarenite types. Residual and depositional models fall under the purview of surficial type.

In all about 85 descriptive deposit models and 60 grade-tonnage models have been described. In the descriptive models, the basic data comprising the approximate synonym, description, general references and examples constitute the main titles under which the relevant data are catalogued. Under the grade-tonnage models, the references to data followed by comments on the deposits considered for their grade and tonnage, are included.

This type of data is likely to be available in almost all countries. What is required is an effort, by a group of scientists, to collate the data and compile it on the standard formats with a view to eventually making them computer compatible. Comparative studies of similar ore deposits in different continents and in different geologic milieu, should be possible. The efforts of the United States Geological Survey in bringing out such a meaningful bulletin on the Mineral Deposit Models is commendable. This particular volume must be perused by all practising earth scientists dealing with mineral deposits, and the academicians teaching economic geology and guiding research on topics related to mineral deposits.

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CRETACEOUS AND PALEOCENE FORAMINIFERA FROM NORTHERN HOKKAIDO, JAPAN. By Hisato Yasuda. Tohoku University, Science Reports, Second Series (Geology) 1986. Vol. 57, No. 1, pp. 1-101.

This particular volume of the Tohoku University publication is devoted entirely to the Cretaceous and Paleocene Foraminifera of northern Hokkaido, Japan. The author, who is well-known for his work on foraminifera, deals at length with the systematics and biostratigraphy of the 126 and odd foraminiferal taxa from a sequence of Campanian to Paleocene strata from the Nakatombetsu area in northern Hokkaido.

On the basis of five events in intra-regional stratigraphic ranges of the selected benthic foraminiferal species, the sequence is divided into the following three benthic foraminiferal assemblage zones in ascending order: *Haplophragmoides walteri-Lenticulina obirashibensis*, *Reophax clavulina-Cribrostomoides* sp. A. (Campanian-Maestrichtian age) and *Cyclammina* sp. A—*Praebulimina angulata* (Paleocene age). The lowermost zone is subdivided into four subzones. In addition, the discovery of nine planktonic foraminiferal species (eight of Cretaceous age and one of Paleocene) in the Hakobuchi Group 3 which has hitherto been considered to be of Upper Cretaceous age, has revealed, for the first time, the existence of Paleocene in the region.

The uppermost of the four subzones (representing lower part of the Heitarozawa Formation) is dominated by the abundant occurrence of agglutinated taxa—*Haplophragmoides*, *Silicosigmoilina*, *Bathysiphon*—reminiscent of the flysch-type agglutinated assemblages known from the Alpine-Carpathian flysch basins.

The section on discussion deals at length with paleobiogeographic aspects of the fauna with particular reference to the genus *Silicosigmoilina* (represented by *S. futabaensis* in Japan). The paleobiogeographical distribution of this genus is restricted to North Pacific and South Atlantic during Late Cretaceous-Paleocene in contrast to the 'Rzehakina fauna' of corresponding age in Europe. The author, consequently, proposes the name '*Silicosigmoilina* fauna' for the Upper Cretaceous-Lower Tertiary benthic foraminiferal fauna of North Pacific.

The article is well-written and illustrated with SEM micrographs of all the taxa described in the text. For those who are particularly interested in the Late Cretaceous-Early Tertiary biological events and boundary problems, the volume will be a useful compendium.

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