

SYMPOSIUM ON RECENT ADVANCES IN GEOLOGICAL STUDIES OF THE NORTHWEST HIMALAYA AND THE FOREDEEP ABSTRACTS VOLUME, organised by the Geological Survey of India, Lucknow, 21-23 February 1995. Published by the Director General, Geological Survey of India, Calcutta, 384 pp.

The present symposium represents a major effort on the part of the Geological Survey of India to present the information collected in the NW Himalaya and Foredeep during the preceding decade and half. The abstract volume contains an impressive 177 titles, classified into four somewhat arbitrary sections, with one late abstract. The section I contains 72 titles dealing with stratigraphy, structure, palaeontology, sedimentation, metamorphism, petrochemistry, geochronology and geomorphology. Section II deals with mineralisation, environment and geotechnical studies with 38 titles. Section III includes glaciology, applied geophysics, geothermal studies, earthquakes, again geotechnical studies with a total of 43 titles. Section IV includes 23 titles covering Foredeep Geology and sprinkling of miscellaneous topics of Quaternary, environment etc. from the Himalayan region also. There is one late abstract on deformation pattern in Krol belt.

As in the past in such unscheduled general symposia organised by the GSI there is a flood of abstracts (as papers take decades to come out in print or may not appear at all if past experience is any indication). A perusal of abstracts brings out that there is considerable new information, though in several abstracts it is no different from what has already been published in the Extended Abstracts contained in the Records of the GSI, published in recent years. Notwithstanding, there are many significant and interesting contributions. The constraint of space does not permit the review of all these.

The reappraisal of stratigraphy of Palaeozoic Sequence of the Tethyan Belt of Northwestern Himalaya (Gopal Singh *et al.*) contains many valid suggestions regarding age aspect of many formations of the Tethyan Basin. However, it has to be accepted that the stratigraphic nomenclature can be attempted only by workers who have carried out regional mapping based on litho-stratigraphic classification. If existing stratigraphic names are irrational and cause academic embarrassment they should be changed.

Depositional discontinuities observed in Spiti-Kinnaur Basin have regional significance (Bhargava and Bassi).

The Meenmarg Formation along the Ganderbal-Dras transect in Kashmir-Kargil sector as the extension of the Precambrian Suru crystallines of Zanaskar is a significant contribution (Razdan *et al.*).

The discovery of additional ammonoid zones from the Nodular Limestone, also of the ammonoid *Stauria*, from the Middle Triassic opens the scope for revision of Khunamuh Formation of Nakazawa and Kapoor (Arora *et al.*).

Crystalline rocks from Lahaul (Prashra and Des Raj) and Almora (Chakrabarti and Malviya) are variously considered due to Himalayan and Precambrian orogenies respectively. The fact is that Himalaya experienced earlier orogenies but the dominant one remains to be Tertiary which greatly obliterated the earlier imprints.

The report on the occurrence of tephra bearing horizon between Dagshai-Kasauli contacts (Mathur *et al.*) is interesting in event stratigraphic study.

The revival of the ill-defined Morar-Chakrata Formation (Saxena and Srivastava) is bound to confuse the stratigraphic picture of the Lesser Himalaya.

The reclassification of Martoli Group of Kumaun-Garhwal (Srivastava *et al.*) is useful. Only the Lower Martoli can be correlated with the Batal of Spiti-Lahaul.

The occurrence of epicule rock at the base of Tethys sediments in the NW and Bhutan Himalaya (Ameta) point to a possible volcanic event during Neo-Proterozoic.

Main Central Thrust (MCT) is the topic of three papers. The position of MCT along the UP and HP border as delineated by Jangi *et al.* is more confusing than before. Their MCT looks more like a transverse fault than a regional thrust. The observation of gradual increase of tectonic (ductile) strain towards MCT from the crystalline and subthrust zones (Shukla) and the conclusion that the process of mylonitisation in the MCT Zone is broadly controlled by the grainsize reduction contribute to the delineation of MCT.

Plate tectonic related Himalayan tectonics is covered by two papers. Sahni has attempted an analysis of the Upper Subathu *mammalian* faunas from the view point of biostratigraphy, taphonomy and palaeobiogeography. The discovery of *Redlichia sp.* from Milan Formation of Martoli Group (Kackar and Srivastava) is significant as it established not only Early Cambrian age but also suggests that Precambrian - Cambrian boundary lies within the Martoli Group. The pollen analysis of two temperate lake profiles from Garhwal (Chaya Sharma *et al.*) has shown great possibilities of establishing palaeovegetation succession and the corresponding climate over a long span of period in Late Holocene.

The Kalar Formation (Verma) is a significant revision of the Upper Siwalik Unit, though his comments on lack of glacial evidences are difficult to accept.

The chronology of Himalayan thrusts (Raiverman) overlooks the time of initiation of thrust sheets. Razdan and Raina provide a detailed map based on geological version of part of Shyok-Nubra Tectonic Zone of Ladakh.

The records of mangrove ecosystem and definite marine and shallow marine forms (Manju Banerjee and Rupali Dasgupta) suggest a coastal to marine environment in the Siwalik basins of Bhutan and Darjeeling foot-hills during Miocene.

Sedimentation aspect of wider geological units in both Lesser and Tethys Himalaya is covered by six papers.

The 1527 ± 38 Ma age of the Bafliaz volcanics, Jammu and Kashmir (Bhat and Claesson) brings home the need for extensive isotope study of Lesser Himalayan Volcanics. The Bafliaz volcanics was earlier considered Pre-Shali. Bafliaz needs better definition, delineation and detailed representation on geological maps. Kaplas Granite of Jammu & Kashmir is dated 392 ± 36 Ma (Sarkar *et al.*). Significant changes in stable carbon and oxygen isotope and REE across Precambrian-Cambrian boundary have been noticed (Bhattacharya *et al.*).

Mineralisation studies have been actively pursued in the Himalaya for nearly four decades by the GSI. However, from the point of mineral economics very few of the areas offer promise. Application of genetic models have also been attempted. But the fact remains that though there are numerous mineral occurrences in the Himalaya, very few of them can be economically exploited. However, the non-metals offer better scope. There are huge reserves of cement grade limestone, and also dolomite, moderate reserves of phosphorite, gypsum and magnesite. In recent years gold has become the target mineral even in unconventional areas like Siwalik belt. More than 30 papers deal with various aspects of

mineralisation. However, there is a need for benchmark investigation into the economic potentiality of metallic mineral deposits in the Himalaya.

The GSI has great expertise in geotechnical investigations, particularly in tunnel projects, selection of dam sites, reservoir appraisal, stability of slopes, landslide hazards etc. The Tehri dam has received intensive attention (Nawani and Sanwal). Environmental studies have also kept pace with other disciplines.

During the last two decades the glaciology has received considerable attention and GSI has carried out detailed studies of Himalayan glaciers with particular reference to glacier regimen, secular movements, residency period, mass balance, glacier deformation, crystal fabric, geomorphology and till fabric.

The geothermal studies particularly in Ladakh have received great attention and GSI has built up an excellent expertise in this field as can be made out from the papers. It only needs a final push for tapping this energy for power.

Geophysics has not lagged behind and it is being continuously applied in the mineral and geotechnical studies as can be made out from this volume.

The Foredeep area, bordered by the Himalaya in the north and the Peninsular shield in the south, is a fascinating natural laboratory for sedimentological, environmental, groundwater and neotectonic studies. More than 10 papers cover various aspects of the Foredeep. A great deal of study is required to cover this vast area.

Environmental appraisal of mining and also implications of geology and geomorphology on public health have also received much attention.

The Symposium coverage is very comprehensive as to make some impact but the actual utility will become apparent when all the papers are published in time. The Symposium has brought out the wide range of studies that are being undertaken in the Himalaya under the aegis of the GSI and other sister organisations. It is a commendable effort on the part of the GSI to have conducted the symposium.

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DECCAN BASALTS, (1996). Eds. S.S. Deshmukh and K.K.K. Nair, Special Volume, Published by the Gondwana Geological Society, C/o University Department of Geology, Law College Campus, Amravati Road, Nagpur - 400 001, 543 pp., Price : Rs.800, Foreign: US \$ 150.

The massive volume under review represents a collection of 46 papers and 12 abstracts that were submitted for the National Symposium on 'Deccan Basalts' jointly organised by the Gondwana Geological Society and the Geological Survey of India, during 10-11 March, 1996 at Nagpur. This is perhaps for the first time that a volume of papers on the Deccan that were reviewed, printed and distributed to the delegates at the time of the conference. The Editors and Organisers need to be complimented on this score.

As outlined in the introduction, the volume includes a large number of contributions covering different aspects of Deccan Basalts such as, field relations, geomorphology, flow-wise stratigraphy, petrography, mineralogy, geochemistry, geochronology, geophysics, geothermal studies, palaeomagnetism, Cretaceous-Tertiary boundary and econo-