

of advanced technology requiring a host of minerals and metals. Use of minerals is shown to have increased logarithmically causing critical shortages of many of the rare metals. It is emphasized that this critical shortage is the result of less than a century of intense mining of deposits that had accumulated over several billions of years. The author points this out as an example of the catastrophic use of a uniformitarian accumulation and natural enrichment of a resource. Excessive mining on land and ocean floor, it is pointed out, will surely lead to catastrophes in human affairs in both underdeveloped and industrially advanced countries. We are already witness to the enormous inflationary effects attendant upon the political manipulation of price of oil by OPEC. This is a human induced catastrophe.

This review it is hoped will serve to give a glimpse of the type of knowledge and creative thinking gathered together in the pages of this book. It is most stimulating reading and all geologists, whatever be their specialization, must carefully read the several articles and enlarge their vision. The paperback edition is reasonably priced and it should not be difficult to secure a copy by most of the Earth Science Libraries in the country.

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CONTEMPORARY GEOSCIENTIFIC RESEARCHES IN HIMALAYA: Editor A. K. Sinha, Publisher: Bishen Singh Mahendra Pal Singh, Dehra Dun. Vol. I (1981), pp. i-viii+250+index with 12 plates and many figures, Price: Rs. 275/-, Vol. II (1983) pp. i-iv+168+index with 8 plates and many figures, Price: Rs. 195/-.

The two volumes have been brought out in honour of Shri S. P. Nautiyal, formerly of the Geological Survey of India. Volume I deals with tectonics, regional geology and biostratigraphy and Volume II contains papers on geochemistry, petrology, sedimentology, metallogeny, photogeology and engineering geology.

Volume I contains 29 papers on tectonic aspects, eleven on regional and local geology, eight on stratigraphy and palaeontology and one each on paleomagnetism, Earthquake and Rb/Sr dating.

Valdiya and Pant discuss the evidences in support of the allochthonous nature of the Berinag belt. Schwan has concluded that B3/S3/T3 minor structures have the same attitude as major tectonic structures in the Himalaya. He relates the B1/B2 fabrics to the pre-Permian and pre-Himalayan deformations. Ruzhentsev and Shvolman conclude that the structural peculiarity in Pamir and Afghanistan is controlled by superposition of genetically different phases of deformation which can have relevance to similar set-up in the NW Himalaya. The tectonic evolution of the Sikkim Himalaya by Raina and Srivastava, surprisingly has left out all recent contributions on this sector. Their paper contains contradictory statements like existence of eugeosyncline in the northern part in one place and a categorical assertion of no volcanic rocks in Sikkim Himalaya in another. Pati and Rao have cited certain parametres to delineate the MCT in the U.P. Himalaya. Virdi presents an island arc model for the evolution of Indus ophiolite belt of Ladakh. Raiverman has made an important observation pointing out how the Surajpur Thrust in the Simla Hills has controlled the pattern of Paleogene sedimentation as a growth fault.

Geology and Stratigraphy have significant contributions on the Lesser Himalaya of Pakistan (Tahirkeli), Spiti basin (Srikantia), Kumaun Himalaya (Gopendra Kumar), Krol belts (Bhargava), Zaskar Mountains (Ganesan and others). The Lesser Himalaya of Pakistan has almost similar geological set up as the Indian Lesser Himalaya and Tahirkeli's paper is useful for regional correlation. Gopendra Kumar restates his views on the geology of Kumaun. It is time the stratigraphic nomenclature in Kumaun receives some stability. Bhargava has amply clarified the basis and significance of two Krol belts. Raina in his review of the geology of the Simla area has shown his preference for the interpretation of Pilgrim and West (1928). Ganesan and others have presented the stratigraphic succession of a part of Zaskar basin with a report of Eocene outliers and ultramafic thrust sheets. Bhattacharya's paper is hardly mathematical although titled as a mathematical study. Kumar and Gupta have reviewed the stratigraphy of Nepal. Crawford in his inimitable style discusses the problem of origin of the Himalaya.

The contribution on the palaeontological aspects of the Himalaya includes microplanktons from the upper flysch of Malla Johar (Mehrotra and Sinha), biostratigraphy of Spiti - Ladakh - Kashmir (Gupta), biofacies in the Subathu Formation based on palynological investigation (Khanna and Singh); fenestellid bryozoa from Thana Mandi-Pira belt (Dutta *et al*), Ostracods from the Kalapani limestone (Agarwal and Kumar), Tertiary plant fossils from Bihang valley, Eocene foraminifers from the Siang district of Arunachal Pradesh (Tripathi *et al*) and Cambro-Ordovician conodonts from the Tal Formation of Mussoorie (Azmi *et al*). The presence of Permo-Trias outliers in the parautochthonous belt of Jammu is well-known and the present find by Dutta *et al*, further confirms the presence of such outliers though the extension of Permian age to all the unfossiliferous rocks of this belt is questionable. The discovery of Cambro-Ordovician conodonts from the Tal Formation has far reaching consequences and the recent comments by Ahluwalia and Gupta (1984) on these conodonts remind us that a solution to its age is nowhere in sight. The discovery of Eocene rocks from Arunachal Pradesh extends the limits of the Eocene sea further east.

The paleomagnetic study by Bazhenov and Burtaman reveals that the Pamir-Punjab syntaxis is of comparatively recent origin (Pliocene-Quaternary). Singh based on the focal mechanism studies of earthquakes occurring in the Himalaya and adjacent areas concludes that in the Himalaya thrust faults have shallow dipping fault planes. Bhanot *et al* based on Rb/Sr whole rock isochron have assigned 1983 ± 83 m.y. to the gneissic rocks of Askot crystallines.

Volume II is organized into five major groups of papers. Geochemistry-Petrochemistry includes five papers. Pareek attempts a geochemical appraisal of Himachal and Kashmir Volcanics which confirms the contentions that the Mandi Volcanics are different from the Panjal Volcanics. The review of geochemistry of volcanics of nw Himalaya by Gupta and others is rather overstretched without an appreciation of the geotectonic set-up of the different volcanics. Taron reviews the composition of volcanic suites of the Himalaya. Prasad *et al* present the petrochemical characteristics of the ultramafics of the Dras area. Handa discusses the geochemistry of trace elements present in thermal spring waters in the Himalaya.

The Petrology - Mineralogy group has seven papers. Hakim Rai and Pande conclude that the norites occurring in the Ladakh granitoid batholith are enclaves in the latter. Quasim Jan presents a summary of regional petrology of Kohistan

(Pakistan) showing chemical changes from granulite to amphibolite. Verma describes the petrographic and chemical characteristics of the Se La Granite of Arunachal Himalaya. Varadarajan and Rawat discuss the origin of rapakivi texture in the Naini Granite of Garhwal Himalaya. The Krol and Infra Krol Formations receive attention with regard to clay mineralogy by Bagati. From petrographic and chemical characteristics, Jiwan *et al* consider the metabasites of Rampur Formation of H.P. to be a initial volcanism associated with eugeosynclinal phase.

The Sedimentology Group has six papers. Chaudhri has extended his Tertiary investigation to Nepal foot-hills and according to him the bulk of Siwalik sediments are from low and medium grade metamorphic rock in the north. Monique Fort and Freytet suggest that the intra-montane Quaternary basin of Pokhara, Nepal, reflects a real glacial episode and uplift in the Highlands. Clay mineral study by Kumar and Verma forms the basis for the analysis of the environmental conditions during the deposition of the Lower Murree Formation, whereas Pandey and Verma have utilized textural parameters in the study of environment of Siwalik deposits. Bhatt discusses the evolutionary aspect of Karewa lake of Kashmir. Chaudhri and Chakraborti dilate on the textural parameters of river sediments with examples from the Ghaggar river.

The Metallogeny Group includes five papers. Mathur *et al* have pointed out that the microflora in combination with suitable lithologic setting play a prominent role in continuous mobilization and concentration of uranium in Siwalik sediments. The Kohistan ophiolite belt of Pakistan, like its counterpart in Ladakh, contains significant chromite associated with dunite (Ashraf and Hussain). The polymetallic mineralization in the Himalaya is variously considered as synsedimentary in the Gorubathan of Darjeeling Himalaya (Sharma and Nair), as epigenetic in the Dudatoli Syncline of the Garhwal Himalaya (Goyal *et al*) and synvolcano-sedimentary in the Dhampur, Chamoli District of Garhwal (Nair and Singh).

Photo-geology and Geotechnical Group includes four papers. Bhattacharya *et al* discuss the utility of areal photo study in the geotechnical investigation of the Parbati-Sainj valley of H.P. In the Himalaya there is a recurrent phenomenon of landslides and Surendra Singh and Prasad have analysed their causes. Negi and others have attempted a classification of the drainage morphometry in the Garhwal Himalaya.

In recent years there has been a spate of publications on Himalayan Geology bringing together individual papers of different authors dealing with a variety of subjects with uneven quality and treatment. The 'Contemporary Geoscientific Researches in Himalaya' could have been different and made a better impact. The two volumes, nevertheless contain some valuable and original papers. Volume I is not properly organized though Volume II is an improvement in this regard. There are numerous printing mistakes which could have been avoided at the stage of proof-reading. The editor has thoughtfully provided a subject index. Despite some shortcomings, the volumes add to our information on the geology of the Himalaya and would serve as useful reference works.