

applications—e.g., evaluation of hydrothermally altered areas and possibly associated ore deposits marked by $\text{Fe}^{2+}/\text{Fe}^{3+}$, OH^- , CO_3^{2-} , SO_4^{2-} and H_2O . Another interesting paper is on the assessment of the mineral resource potential of the Northern Fennoscandia using qualitative data integration techniques. This volume is, therefore, informative as it covers a wide spectrum of topics related to earth sciences. In a way, it presents the state-of-the-art on the subject in which very limited progress appears to have been achieved in India.

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GEOLOGY OF HIGHER CENTRAL HIMALAYA. Edited by Anshu K. Sinha, Wadia Institute of Himalayan Geology, Dehra Dun. A Wiley Interscience Publication, John Wiley and Sons, (1989) pp. 1-219. Price \$ 220.

Authored by an active Himalayan geologist, this reference work gives a detailed account of the geology of one of the most inaccessible areas (above 3000-4000 m) in Higher Central Himalaya. The monograph is an outgrowth of work done by the author in southern Lesser Himalaya, particularly in the Shimla-Solan region of Himachal Pradesh. Since the inception, Wadia Institute of Himalayan Geology has been organizing expeditions—multidisciplinary and multi-institutional in the earlier stage—to explore the unknown regions of the Higher Himalaya. These expeditions were later followed by solo excursion of the author to the inaccessible zone behind the Nanda Devi (7820 metre) massif, identified as the priority area, for the only notable information from this region was available from the works of C. L. Greisbach (1891), and Arnold Heim and Augusto Gansser (1939).

The monograph is divided into 10 chapters, besides an exhaustive list of references and an index. Sketches, panoramas and maps are kept in three slip-cases. Chapter I provides description of cultural and historical backgrounds of the region called 'Uttarakhand', where are located many centres of pilgrimage and the highest peak of India, Nanda Devi. There are also accounts of climatic condition, flora and fauna as well as of glaciers and the drainage pattern. Chapter 2 presents, in brief, the historical background of researches carried out since 1842 up to the present.

Chapter 3 brings out the geological work done in the Lesser Himalaya, Himadri and Tethys Himalayan zones—in Kumaun as well as the Shimla hills of Himachal Pradesh, where the concept of nappe and thrust tectonics was first introduced. The Vaikrita Group of the Great Himalaya has been differentiated in five different valleys, bringing out three distinct phases of magmatic emplacement in the high-to low-grade metamorphics. A new biostratigraphic column highlighting and incorporating testimonies of scolecodont, acritarch, coccolith, dinoflagellates and other—mega and microfossils is presented for the Tethyan zone. The discovery of a new stratigraphic horizon in the Palaeozoic time-span, the extension of the age of uppermost (Cretaceous) flysch to Eocene, and a new tectonic interpretation backed

up with radiometric dates of ophiolites constitute the author's main contribution to the Tethyan stratigraphy.

Chapter 4 highlights tectonic zonation, and elucidates tectonic framework and stratigraphic pattern and zonation. The focus of attention are the Main Central Thrust delimiting the base of the Great Himalaya against the Lesser Himalaya, the thrust contact of the Great Himalayan metamorphics and its sedimentary cover, and the root of the Great Himalayan thrust sheets. The phenomenon of disharmonic and box-folding in the Tethyan sediments are comprehensively described and documented.

Chapter 5 on the geotraverses embodies eleven different geological sections, each comprehensively and vividly documenting sedimentary and structural features. The profiles (placed in the slip case) would prove an extremely useful guide to explorers and students. Significantly, the samples collected along the traverses have been catalogued even as they have been studied petrographically and geochemically. The catalogue includes geochronological data as well. There are notes on possible hazards, logistics and medicare.

Chapter 6 provides a synthesis of structural-cum-stratigraphical zonation, deformational history and tectonic evolution of Central Himalaya. There is focus on the concept of Main Axial Zone embracing deep-seated structures and a picritic rock of the root zone. A comparison of sequential events with the geological developments in other mountain belts of the world is an added attraction.

Chapter 7 embraces geochronology of rocks based on isotopic data of magmatic and metamorphic episodes, and Chapter 8 provides a wealth of petrochemical data generated through analysis of more than 200 samples of rocks and minerals. The data base would prove useful for geochemical modelling.

Chapter 9 deals with barite and associated polymetallic mineralization. Systematic prospecting on the 1 : 10,000 scale of mineralized area has demonstrated structural control of mineralization. The barite deposit is shown to be of high quality (with 63% BaO) and thought to be commercially valuable.

Chapter 10 highlights the author's concept of geological evolution of the Higher Central Himalaya.

I wish the author had incorporated recent publications in his list of references. The price is rather high for a common man. However, the book would be a valuable addition to libraries. It would prove a very good source of information on the Tethys and Great Himalayan tectonic provinces. The beautiful and informative geological maps are the forte of the work, and constitute a great contribution. Both the author and the publishers deserve compliments for bringing out the monograph and the wonderful map.

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